A SYSTEMS ANALYSIS OF HEROIN USE AND THE HEALTH CARE SYSTEM

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I. Heroin Use Presents Problems for the Health Care System

A phenomenon may be considered part of a system if it has important effects on either inputs or outputs of that system. Consequently, when analyzing the health care system in the U.S., one must consider heroin use, because heroin use affects both the outputs of the system (heroin use itself induces debilitating physical states; heroin use in the context of U.S. drug politics results in increased mortality and morbidity), and the inputs of the system (public anxiety about heroin use engages the time, attention and resources of people who administer the health care system; the treatment of heroin addiction absorbs resources which could be directly applied in other health care activities).

A. Heroin Use Affects the Health of Users

1. Physical States Induced by Heroin Are Debilitating

If one defines health broadly as the absence of debilitating physical symptoms, then heroin use adversely affects the health of users because the drug induces sensations which debilitate the user.

The intravenous injection of heroin results in a regular succession of physical sensations; the "rush," "nodding," getting "straight," and getting "sick." The rush is a fleeting, but

intense sensation of euphoria. It is approximately as debilitating as a brief fainting spell. The "nod" is a longer period during which the user is drowsy, unresponsive, and unable to make quick decisions. In this state, the user is similar in physical capabilities to somebody suffering from exceptional fatigue. Following the "nod," the user "gets straight." During this period, the user is alert, competent and behaves normally. Soon after he "gets straight," the user begins to experience (psychosomatically or phsyiologically) the symptoms of withdrawal. These symptoms include itching, running nose, nausea, cramps, chills, diarrhea. If he continues without an injection of an opiate, these symptoms will increase in severity and may last from 2-10 days, depending on the tolerance that a user has developed prior to the last administration of heroin. This state has been described as roughly comparable to a moderate case of the flu. From this description it should be clear that three of the four states are "unhealthy." To the extent that the user spends time experiencing the "rush," "nodding," and "getting sick" he will be unhealthy and pose a challenge to the health care system.

2. The User Tends to Spend Long Periods of Time in Debilitating States

The user tends to spend large amounts of his time in these debilitating states for two reasons.

a) Heroin Use Tends to Become a Chronic Condition

The tendency for heroin use to become chronic is a well documented fact. Many people who experiment with heroin become chronic users. Few people who become chronic users give it up before 7-10 years of use. Consequently, the probability of experiencing the debilitating effects of heroin use continually given that one has used heroin casually and experimentally is very high. This implies that heroin use is less like a common cold and more like tuberculosis. Like people with tuberculosis, heroin users surrender a substantial fraction of their lives to long periods of moderately debilitating, and shorter periods of acutely debilitating symptoms.

b) Heroin Users Spend a Large Proportion of Each Cycle Debilitated

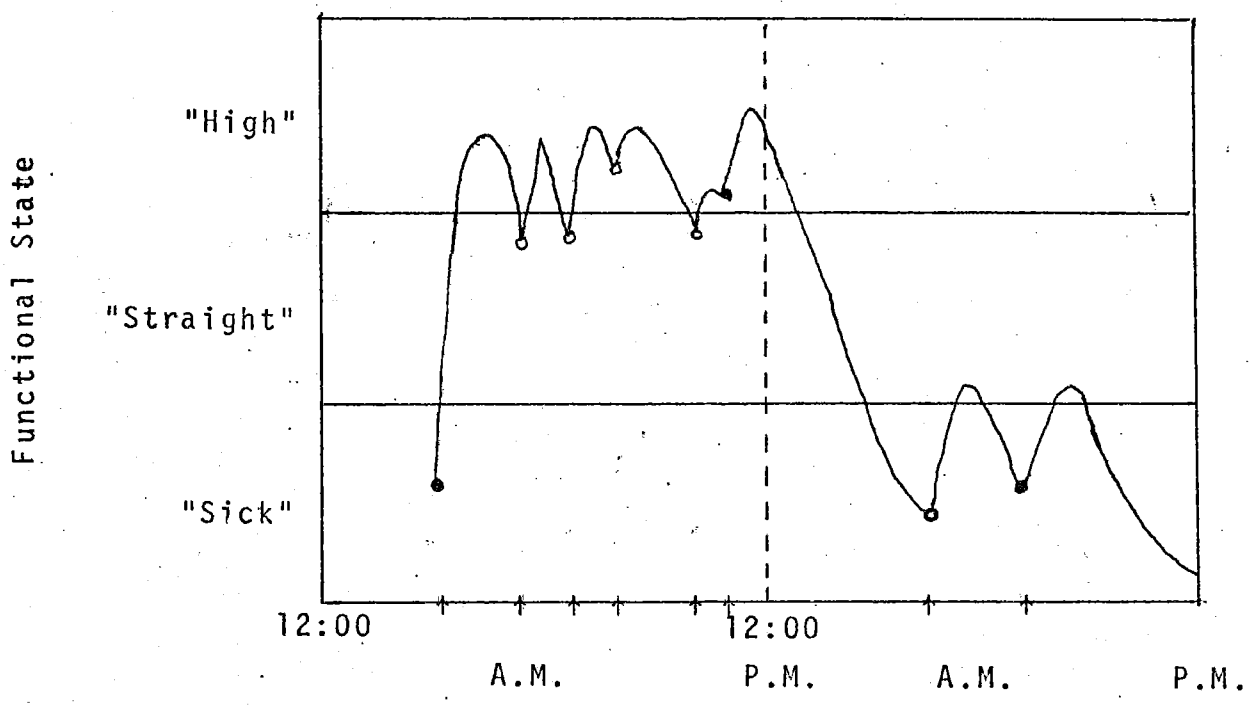
The proportion of each cycle that a user spends in the "unhealthy" state rather than being straight is determined by the user's "tolerance," the dose he administers to himself, and to the length of time between doses. Table 1 indicates that an addict in the U.S. spends a large proportion of his time being sick or nodding.

3. The Proportion of Time Spent in Debilitating States Relates to the Illegality of Heroin Use

Some analysts argue that the large proportion of time spent in debilitated states is a consequence of the illegality of heroin use in the U.S., and not necessarily an unavoidable

TABLE 1

Proportion of Time that an Addict
Spends in Debilitated States



↑ indicates injection of heroin

effect of the drug. They argue that illegality makes it difficult for American users to predict doses and to maintain a regular schedule of injections. British users who do receive reliable doses and are able to administer the heroin on a regular basis are alleged to spend a larger portion of their time being "straight." We have little evidence on the states experienced by British users. Experiments conducted by Dr. Vincent Dole in this country seeking to "stabilize" users on heroin, i.e. regulate their dose so that they experienced neither euphoria, nor "nodding," nor getting "sick," found stabilization doses impossible to achieve. Apparently the body metabolizes heroin unpredictably.

Even if stabilization doses of heroin could be achieved, one could still argue that heroin use is debilitating. The body metabolizes the drug so quickly that frequent administrations of heroin would be required (approximately every 4-10 hours). Occasionally, these doses would be inappropriate or mistakenly administered and the user would suffer some debilitating effects. Consequently, like a diabetic, a heroin user would be constrained by a need for regular administration of a drug, and would occasionally suffer adverse symptoms from mistakes in dosage or metabolic changes.

4. Heroin Use in Itself has No Demonstrable Long Run Effect on the Physical Functioning of Users

In the previous sections, we have used a rather broad

definition of health. If we limit our definition of "health" to the absence of objectively observable organic deterioration, then it is harder to show that heroin use in itself affects the health of users. With this narrower definition, the context in which the drug is administered becomes a very important factor affecting the health of heroin users.

A somewhat surprising fact is that it cannot be demonstrated that chronic opiate use causes any major medical complications. Researchers examined 31 male addicts all of whom had used opiates for at least 35 years and discovered that:

> Twenty-eight out of 31 patients were still in average or fair medical condition for their age after a lifetime of opiate addiction. Although these patients were ill at their last admission, this was not attributable to drug use, with the possible exception of the malnutrition case. Two of the 31 died at a later time in the hospital (from subarachnoid hemmorhage and cardiac failure), but there was no reason to relate this to prior opiate use.

On the basis of this evidence the authors concluded that:

> While there is ample evidence that the aberrant way of life followed by most heroin abusers has both acute and chronic medical consequences (i.e. tetanus, overdose, hepatitis, endocarditis) there is insufficient basis for maintaining that long term use of opiates -- in and of itself -- is related to any major medical condition.

There is no major study that contradicts this conclusion.

5. Heroin Use in the Context of U.S. Drug Policies Has Large, Adverse Effects on the Mortality and Morbidity of Users

Although major medical consequences of opiate use in itself cannot be discovered, it is painfully obvious that opiate use

in the context of the current American drug problem has very large effects on the mortality and morbidity of users. Table 2 summarizes the available evidence on the mortality of heroin users.

The evidence concerning the mortality of youthful opiate users is particularly shocking. Given that the mortality rate is about 2.7% for opiate users and 0.1% for non-opiate users in the 15-24 age cohort, it is not surprising that heroin use is the most important cause of death for this group, nor that a 20 year old heroin user has roughly the same life expectancy as a 55 year old man.

The high mortality rates are produced by a combination of four factors which distinguish heroin users from most others in the population: a risk of death by "overdose" estimated at 0.5% for the opiate using population; a slightly increased susceptibility to diseases which may be fatal like hepatitis, endocarditis, tetanus and pulmonory complications; a slightly greater tendency to die from these fatal diseases, particularly tetanus and endocarditis; and a greater rate of dying in accidents and crimes since fully 12% of the death of opiate users in N.Y. in 1969 were caused by trauma.

In addition to these major illnesses, addicts suffer from the debilitating symptoms of malnutrition, fatigue, abcesses, ccllapsed veins, and poor teeth. All of these effects are associated with the demanding life of heroin addiction rather than the effects of the drug.

TABLE 2

Data Concerning the Mortality of Heroin Users

Researcher	Date	Sample Size	% of Sample that Died Over Unspecified Study Period	Annual Rate of Mortality
Medical Examiner New York City	1953	100 deaths Estimated 20,000 Addicts		0.5%
Pescor	1943	4,766 Addicts	9.7%	
Trussell	1960	247 Adolescent Addicts	4.9%	
Duvall	1963	453 Addicts	11.5%	
O'Donnell	1964	266 White Ky. Addicts	13.9%	5.6%
Mason	1968	2,743 Young Addicts		2.7%
Thalinger	1969	1,031 Deaths Estimated 100,000 Addicts		1.0%

B. Policy Measures Adopted to Control the Heroin Problem Absorb Medical Resources

In addition to affecting the health of users, heroin use affects the health care system by absorbing resources which could be used in more traditional health care activities. Although treatment of the heroin problem has always absorbed medical-specific resources, this tendency has recently become more pronounced.

1. Public Hysteria About the Heroin Problem Distracts People Who are Important in Achieving Traditional Health Objectives

The exaggerated attention given to the heroin problem by the media and the general public has distracted private doctors, medical administrators, and legislators from other health objectives. Suburban doctors now spend long hours describing the dangers of drug use to PTA committees and soothing anxious parents who discover strange capsules in their children's rooms. Medical administrators spend long hours in meetings with their staffs and interested community groups who want them to devote hospital resources to the heroin problem. They respond with expenditures of scarce discretionary money, and a willingness to spend doctor and administrative time in the large "start-up costs" of running an addiction treatment clinic. Members of

the Health committees in federal, state and local governments begin cutting into money allocated for traditional health objectives to beef up the allocation to the drug problem and demonstrate their responsiveness to the public's concerns. Thus, health centers are forced to respond to the frantic demand for information about and facilities for the treatment of heroin addicts.

2. The Treatment of Chronic Heroin Use Absorbs Resources Which Would be Directly Applicable in Other Health Care Functions

Effective methods of treating heroin use are becoming increasingly "medical resource intensive." In the past, the procedures used to treat heroin users required extensive use of vocational counsellors, ex-addicts, and parole officers and minimal use of doctors and nurses. The current procedures which show the greatest promise for the large scale treatment of addicts require significantly more intensive use of medical personnel. Methadone maintenance makes much larger claims on doctors, nurses, space for outpatient facilities, and laboratory equipment than did either the individual psychotherapy and counselling approach of the '50's or the theraputic community approach of the '60's. Similarly, the promise of long-acting narcotic antagonists used in "immunization" or treatment programs will attract significant amounts of medical research time and talent. If the research is successful, the administration of the antagonist programs will

make claims on medical resources similar to those made by methadone maintenance. Table 3 outlines the demands the new addictive treatment programs make on medical specific resources.

In calculating the effect of these programs on the total stock of medical resources in the U.S., it is important to note that because these programs are expanding very quickly, they may produce some short-run dislocation effects which are out of proportion to the actual size of the demands made on medical resources. In addition, since heroin users tend to be concentrated in areas where medical resources are already stretched thin, i.e. ghetto areas of major metropolitan areas, the additional demand by heroin users for medical resources will have a disproportionately large impact.

TABLE 3

Medical Input Requirements of Medical Treatments of Heroin Addiction

	Resources Required for Treatment of 1,000 Addicts[1]				
	Doctors (FTE)	Nurses (FTE)	Space	Current No. of Addicts in Treatment	Current Research Expenditures
Methadone Maintenance (Govt. Clinics)	15 - 20	20 - 30	N. Available	~ 15,000	N. Applicable
Methadone Maintenance (Private Doctors)	5 - 10	25 - 40	N. Available	250-300 Doctors Have IND Numbers	N. Applicable
Antagonists	25 - 30	25 - 35	N. Available	< 100	0.2 Million
Ambulatory Detoxification	0.2	0.6	N. Available		N. Applicable
In-Patient Detoxification	1 - 3	2 - 6	N. Available	~ 1,000	N. Applicable

[1] Estimated from New York City Program designs where applicable (Methadone Maintenance, Ambulatory Detoxification, Antagonists), and guessed for In-Patient Detoxification.

II. "Epidemiology" of Heroin Addiction

We wish to analyze chronic heroin use as a disease whose treatment makes demands on the health care system. To do so will require the investigation of four specific questions:

A. How many people are afflicted now?

B. How is the disease distributed among the population?

C. How does the disease spread and how many people are susceptible?

D. How does the treatment and control of heroin use affect the incidence of other drug abuse?

A. How Many People are Afflicted Now?

According to the most serious estimates, there were 170,000 heroin users in the United States at the end of 1968 and close to 200,000 by the end of 1970. This implies an average annual growth rate of approximately 9%. Table 4 shows the demand that the heroin problem could make on medical resources if the number of users continues to grow and if we continue to treat users by medical intensive procedures.

The summary statistics are handy reminders of the scale of the problem, but it is important to remember that these statistics are derived by manipulating uncertain estimates. The procedure is to divide the number of reported users by a factor of under-reporting. The number of reported users is uncertain because there is an uncertain amount of duplication in the register due to the use of aliases and no reliable procedures for removing

TABLE 4

Aggregate Demand for Medical Inputs[1]

	Doctors (FTE)	Nurses (FTE)
Methadone Maintenance	3,000 - 4,000	4,000 - 6,000
Methadone Maintenance	1,000 - 2,000	5,000 - 8,000
Antagonists	5,000 - 6,000	5,000 - 7,000
Ambulatory Detoxification[2]	~40	~1,000
In-Patient Detoxification[2]	200 - 600	400 - 1,200

[1]Assuming all addicts treated in medical programs.

[2]This assumes only one detoxification/addict. Since addicts are rarely "cured" following one detoxification, a large multiple of these inputs may be required to allow these programs to reach the same output levels as the other programs.

users' names when they cease to be users. The "factor of unreporting" is estimated by observing the proportion of "accidentally" discovered heroin users who were not previously identified in the register. Since there must be large variances associated with the "accidental" way that users are identified, and since there is some variance around the number of reported users, the estimated summary statistics must also be very uncertain. The range of uncertainty about this estimate can be narrowed by checking it for consistency with other miscellaneous information currently available about the incidence of heroin use. (See Table 5)

B. How is Heroin Use Distributed Among the Population?

Our primary interest in reporting on the distribution of heroin use among geographic areas, and age, racial, and occupational groups is to make inferences about the adequacy and accessibility of medical services to those populations afflicted by chronic heroin use. However, the demographic characteristics of users also give crude indications of how much the society loses by not having the heroin users be healthy.

1. Heroin Use is Concentrated in Urban Ghettos

An indicator of the rate of opiate use in specific states in the U.S. is the proportion of their population that comes to federally supported addiction treatment hospitals. Table 5, displaying this information, indicates that opiate use is a major problem in New York, Puerto Rico, and in a surprising number of

TABLE 5

Information on the Incidence of Heroin Use

	Researcher	Method	Findings
1.	Robins & Murphy [1967]	Sample survey of 221 Negro men in St. Louis	13% of sample have used heroin 10% became addicted 5% still addicted 3% used less than 6 times
2.	N. Y. State Narcotics Addiction Control Commission and N. Y. City Narcotics Register [1969]	Estimate no. of addicts by multiplying number of reported addicts by "factor of underreporting"	2.29% of residents of N. Y. City have used heroin in 1967
3.	Narcotics Register [1970]	N. Y. City users reported by police, treatment programs and private physicians	94.7 thousand users in N. Y. City in 1969
4.	N. Y. State Narcotics Addiction Control Commission	Sample survey of population of New York State (drawn from those with permanent addresses)	1.0% of state residents have used heroin: as of 1970 0.6% are former users 0.2% are irregular users 0.2% are regular users
5.	DuPont [1971]	Estimate number of addicts by deaths times estimated death rate in Washington, D. C.	2.1% in Washington, D. C. are users as of 1971
6.	Koval [1971]	Same as no. 2	2.79% of residents of N. Y. City have used heroin as of 1968

TABLE 6

Male Patients in Federal Addiction Treatment Hospitals/
100,000 Population in States

New York, Puerto Rico, District of Columbia	> 12.4
Illinois, Alabama, Texas, Arizona, Louisiana, Georgia New Mexico, New Jersey, Kentucky, Nevada	4.0 → 12.4
West Virginia, North Carolina, Tennessee, South Carolina, Mississippi, Michigan, Colorado, Ohio, California, Oklahoma, Indiana, Arkansas, Delaware, Connecticut, Virginia, Massachusetts, Maryland, Pennsylvania, Rhode Island, Florida, New Hampshire, Oregon	1.0 → 4.0
Washington, Vermont, North Dakota, Hawaii, Kansas, Utah, Wisconsin, Nebraska, Minnesota, Iowa, etc.	< 1.0

southern states. With the possible exception of the extraordinary contribution that New York makes to the national heroin problem, the chart indicates a wider diffusion of opiate use then might be expected. However, the chart is somewhat misleading in that it masks significant differences in the kind of opiate use characteristic of the different areas, and fails to show clearly the degree of concentration that has marked chronic heroin use in recent years.

In a careful analysis of the sample which produced the indications of table 6, Ball concluded:

> Two quite different patterns of narcotic addiction exist in the U.S. at the present time. One addiction pattern is followed by young heroin users who come from metropolitan areas and are engaged in illegal endeavors. The other pattern is typified by the middle aged southern addict who uses morphine or paregoric and obtains his drugs through legal or quasi-legal means.

Since illegal heroin use is the kind of opiate use which poses the greatest threats to users and non-users alike, it is fair to include that the heroin problem is concentrated in metropolitan areas. Indeed, recent impressionistic reports from a number of cities indicate that 60-80% of the national heroin problem is concentrated in a few major cities.

The degree of concentration within metropolitan areas can be illustrated by different rates of drug use in different sectors of a city. Table 7 shows estimated rates of heroin use in boroughs and selected health center districts of New York in relation to the incidence of other selected health and social problems. The positive correlation between heroin use and the other indicators of social deprivation suggests that heroin use is concentrated

TABLE 7

Rates of Opiate Use and Other Selected Health and Social Problems in Selected Health Center Districts in New York City

Area	Opiate Use/1,000	Infant Mortality/1,000	Venereal Disease/1,000	Hepatitis/100,000	Juvenile Delinquency/1,000
N. Y. City	22.9	23.7	10.3	32.5	59.0
Central Harlem	145.7	39.2	20.6	49.0	70.7
East Harlem	72.5	35.7	7.7	46.6	112.6
Riverside	62.3	18.5	10.6	39.0	60.5
Morrisania	39.3	28.1	8.4	19.4	94.9
Flushing	2.7	14.2	0.6	22.8	14.5
Maspelts - Forest Hills	3.0	10.9	0.6	28.0	22.6
Richmond	3.1	23.9	0.7	58.8	31.4

in the "ghettos" of metropolitan areas. The rates estimated for New York City ghetto areas are roughly comparable to the rate of heroin use discovered in a survey of ghetto residents in St. Louis, where 9% of the sample studied were heroin users. Impressionistic evidence indicates that heroin use appears even more concentrated if one looks at areas smaller than health center districts. It is reported that as many as 90% of the males aged 15-25 are heroin users in some blocks in Harlem.

The concentration of heroin use in metropolitan ghetto areas implies that medical services will be both inaccessible and inadequate. We know that ghetto residents lack the money, information, and confidence required to obtain medical services on the free market. We also know that such public medical services as exist in ghetto areas are already strained. Consequently, these services are unlikely to be able to respond to the specialized demands which heroin use makes without significant outside subsidies.

The concentration of heroin use in ghetto areas also implies that heroin use is concentrated among people who are likely to be unemployed and unhealthy even if they were not chronic heroin users. This makes the problem worse in that those who suffer already are forced to suffer still more, and better in that the opportunity cost of this lost productivity is small.

2. <u>Heroin Use is Concentrated Among People Aged 20-34 and Is Increasing Fastest Among People Less Than 20</u>

The incidence of heroin use within age cohorts across the U.S. has not been estimated. However, table 8 gives the incidence of heroin use among age cohorts in New York City, and shows clearly that heroin use in New York is concentrated among people aged 20-34.

The fact that the lowest rate of heroin use occurs in the group under 20 is surprising because the general public expectation is that heroin use is primarily a problem for youths. We can resolve the contradiction between public expectations and these findings in two different ways.

First, the chart probably underestimates the number of young heroin users. Several factors which increase the probability of being reported (length of time one has been using, and the amount of heroin an individual consumes) are positively correlated with age. Consequently, one would expect that a smaller proportion of young users would be known to the registers.

Second, our expectations may have been created by changes in the incidence of drug use rather than absolute levels, and it is true that heroin use has been increasing at the fastest rate among people less than 20. In 1959, 4% of the addicts reported to the national registry were under 21. By 1969, 7% were under 21. In 1964, only 7.3% of the newly reported users in New York City were under 20. By 1968, the proportion of newly reported users who were aged less than 20 had increased to 23.7%.

The rapid increase in the use of heroin among people aged less than 20 suggests that many new users will find medical services inaccessible because correct medical procedures are in-

TABLE 8

Rates of Heroin Use Within Age Groups in New York City

Rates/1,000 Population

Total Population	Population Under 20	Population 20 - 24	Population 25 - 29	Population 30 - 34	Population 35 - 39	Population 40 & Other
22.9	11.5	34.0	34.0	25.9	16.3	12.8

appropriate for young users, and because young people in general are less conscientious about obtaining medical support. This implication emphasizes the importance of devising medical procedures which will attract and successfully treat young users.

The rapid increase in the use of heroin by young people makes the problem seem worse than it would otherwise be for two reasons. First, young users typically forego the chance of continued education and good jobs. This means a significant loss of human capital. Second, we are morally indignant about young people using heroin because we suspect that they make a decision which has very important long run consequences on the basis of poor information and with the usual short-sightedness of adolescents. The fact that innocents can be "trapped" into a life of heroin use starkly illuminates the government's responsibility.

3. Heroin Use is Concentrated Among Blacks and Spanish Speaking Minorities

A simple rule of thumb based on New York City's experience is that 50% of the heroin users are black, 25% are white, and 25% are Spanish speaking. Studies of miscellaneous samples of addicts throughout the U.S. indicate roughly comparable proportions with some significant local variations (see table 9). Since blacks and Spanish speaking people appear in samples of users disproportionately frequently, we may infer that rates of heroin use are greater in those groups than other racial groups.

TABLE 9

Miscellaneous Samples on Ethnicity of Users

			Negro	White	Spanish Speaking	Other
Freedman & Brotman	1965	Users in Metropolitan Hospital, N. Y.	36%	24%	39%	1%
McLean	1970	Users in Populations of N. Y. City	65	4	30%	1%
New York City Register	1970	Reported Users in New York City	44	32	22	2
NACC	1971	Survey of New York State Residents	38	34	28	0
Gearing	1969	Methadone Patients in New York City	44	39	27	1%
NACC	1968	All Commitments to NACC through March, 1968	39	27	34	0

These high rates of heroin use among black and Spanish speaking populations implies that medical resources available to many users will be scanty, because we know that those ethnic groups do not receive adequate medical care. Only when more resources are available and delivered efficiently to these minority groups will the heroin users in the gorup have some hope of being cured.

The concentration of heroin use in these racial minorities makes the heroin problem particularly urgent. No minority should suffer serious debilitating diseases disproportionately, particularly not if the disease is in some way related to unequal economic and social opportunities.

4. Many Users are Unemployed. Those Who are Employed Tend to be Concentrated in Low Income Occupations

There is no relaible information about the occupation of users at a national level. Table 10 offers some survey data about the employment of heroin users in New York State. There are three surprising findings in this survey; the high absolute level of incidence in the population, the large ratio of employed to unemployed users, and the concentration of heroin users in sales, clerical and other low status, white collar occupations.

The method used in selecting the sample biases these results in several ways. The most important effect is that the ratio of employed to unemployed users is over-estimated. The sample was

TABLE 10

Prevalence and Incidence of Heroin Use Among the Labor Force of New York State

	Prevalence Rate (Ever Used)	Incidence Rate (Regular Use)
Professionals, Technical Workers, Managers, and Owners	70	20
Clerical and Other White Collar Workers	70	60
Skilled, Semi-skilled Workers	140	30
Unskilled Workers	180	30
Service and Protective Workers	150	-
Sales Workers	210	210
Farmers	-	-
Total Employed	130	50
Not Employed Housewives	50	-
Other Not Employed	150	20
Total Not Employed	90	10
Total	110	30

chosen from all those people who had permanent addresses. One would expect that users who had permanent addresses were more likely to hold jobs than users who did not have permanent addresses. Consequently, the survey included users who were likely to have jobs and excluded users who were unlikely to have jobs. This resulted in an upwardly biased estimated of the ratio of employed to unemployed users. Other informal surveys of users indicate that only 1/3-2/3 of the users are employed.

The implications of these findings about the occupation and employment of users are as follows. Users who are employed will still experience difficulty in gaining access to medical aid because they are concentrated in jobs which have low pay and inadequate fringe benefits. Medical care delivered via industries and occupational groups will only reach heroin users if the plans cover low status, marginal employees. Even expanded medical services to employed persons will not reach many heroin users because many are unemployed.

C. How does Heroin Use Spread and How Many are Susceptible?

A theory which explains or predicts the incidence of heroin use should identify factors or mechanisms which affect the probability that an individual who has never consumed heroin will consume heroin at least once in a while, and the probability that an individual who consumes heroin occassionally will advance to regular heroin consumption. If we had such a theory, we could

devise empirical tests for the model, use it to make predictions about the spread of heroin use, and derive policy implications. Unfortunately, what we have is a variety of poorly specified theories which can show some supporting empirical evidence, allow only weak predictions of the incidence of heroin use, and make conflicting policy implications. Table 11 outlines the existing theories, the available supporting evidence, predictions of the number of susceptibles, and policy implications.

Since theories predicting the incidence of heroin use allow only weak predictions of the number of "susceptibles" in the population, it is possible to improve our judgment of how bad the heroin problem can get by looking at past experience across the nation and current experience in specific areas.

In 1912, approximately 0.25% of the population were users of opiates. This is the largest incidence of opiate use ever reported for this country. If such an incidence were reached today, roughly 500,000 people, or two and one half time the number currently estimated, would be heroin users. To put the 1912 experience in context, many people were addicted to patent medicines containing paregoric, a relatively inexpensive and convenient form of opiate use and probably accessible and tolerable to a larger proportion of the population in 1912 than heroin use is today.

This relatively optimistic picture is darkened by recent evidence of the number of people who become addicted in areas where heroin is easily accessible. Early returns on the Viet

TABLE 11 CONTINUED

Remaining Questions	Prediction of who is Susceptible	Policy Implications for Prevention Strategies
I. 1. Why do people experiment? 2. Why do people typically resume old patterns of consumption following detoxification? 3. Why do people get trapped when heroin is so diluted that euphoria and withdrawal effects are weak.	All who are likely to try heroin once, an uncertain fraction of the population.	Limit the probability of first use by 1. Prohibiting heroin. 2. Warning people of bad consequences.
II. 1. Why do people experiment? 2. How can some people give up heroin use after long periods of chronic use?	All those who are "neurologically susceptible", an uncertain fraction of the population.	1. Keep heroin from those who are susceptible. 2. Reduce the susceptibility by finding drugs which "block" euphoric effects of heroin.

TABLE 11 CONTINUED

Theory of Incidence	Factors Which Determine Probability of First Use	Factors Which Determine Probability of Continued Use Given First Use	Evidence Which Tends to Support the Theory
III. People use heroin to overcome depression and anxiety.	Depression and anxiety lead to persistent searches for activities and substances which reduce there effects.	Success of heroin use in reducing anxiety and depression.	1. Post hoc studies of heroin users reveal that heroin users are anxious, depressed, and passive people.
IV. Heroin use is a reinforcing experience. Consequently, users are conditioned to seek and use drugs.	Unspecified	1. Reinforcement provided by heroin lead to continued efforts to obtain it. 2. Generalization of the reinforcing stimulus implies more and more frequent cues to use heroin.	1. Drug seeking behavior is resumed after detoxification when users find themselves in the same environment. 2. Ancedotal evidence of users suddenly being seized with desire to "shoot up" when they see an old friend, or a place where they used to inject themselves. 3. Existence of "needle habits" when addicts get high simply from putting needle in their arm.

TABLE 11 CONTINUED

Remaining Questions	Prediction of who is Susceptible	Policy Implications for Prevention Strategies
III. 1. How do those who are anxious and depressed choose among various styles of "acting out"? 2. Why can't we predict who is likely to become an addict on the basis of abnormal psychological characteristics?	All who are anxious and depressed in ways that heroin use will improve, an uncertain fraction of the population.	1. Keep heroin from those who are susceptible. 2. Reduce the anxiety and depression experienced in the population.
IV. 1. Why do people experiment? 2. How can some people give it up while remaining in environment?	All who are likely to try heroin once.	1. Prohibit heroin use. 2. Remove users from environment which was reinforcing. 3. Administer drugs which reduce effect of heroin.

TABLE 11 CONTINUED

Theory of Incidence	Factors Which Determine Probability of First Use	Factors Which Determine Probability of Continued Use Given First Use	Evidence Which Tends to Support the Theory
V. People who live in areas without opportunities or power tend to use heroin.	Sense of anomie.	Sense of anomie.	Heroin use is currently concentrated in areas where people are poor, disorganized, and discouraged.
VI. People are encouraged to use drugs by economically motivated "pushers" and then trapped into regular use.	Aggressive marketing by economically motivated pushers.	Tolerance and Withdrawal mechanisms.	Many heroin users sell drugs.
VII. People use drugs because their peers persuade them that it is a good thing and help them find drugs.	1. Successful advertising by peers. 2. Help by peers in finding and using drugs.	Unspecified	1. Heroin use is increasing fastest among the young. 2. Heroin use clusters tightly by neighborhoods.

TABLE 11 CONTINUED

Remaining Questions	Prediction of who is Susceptible	Policy Implications for Prevention Strategies
V. 1. Why don't all those in slum areas become users? 2. Why do we observe heroin use increasing in affluent communities?	Those who feel powerless and discouraged, an uncertain factor of the population.	1. Reduce Anomie in the Society. 2. Prohibit heroin.
VI. How much risk does a pusher face in selling to people he does not know and can't trust?	Those who are likely to be tempted by a drug pusher.	1. Arrest and isolate all those who sell drugs. 2. Inform people of the bad effects of drugs.
VII. Why do people use heroin after they find it debilitating, undignified and burdensome.	Those whose friends use drugs.	1. Make heroin difficult to find. 2. Inform people of bad consequences of drug use. 3. Identify and isolate those who are about to spread heroin use among their friends.

Nam experience suggest that 5% of men between the ages of 18-25 may become addicted if they are put in a boring or dangerous environment where drugs are freely accessible. This proportion is strikingly close to the proportion of addicts observed in urban ghettoes in the cities where heroin use has had a long history and heroin supplies are available. If this pattern was maintained and heroin use was to spread to more urban ghettoes and into suburban areas where youths are bored, 5% of that population, or roughly 1.3 million youths, may become addicted.

Although we remain uncertain about how bad the heroin problem could become nationwide, it is conceivable on the basis of past experience and current local experience that the problem may increase by a factor of 2 to 7 times.

D. How Does the Treatment and Control of Heroin Use Affect Others?

It used to be assumed that heroin addicts were different than other drug abusers, and that if one could cure them of their heroin use, there was no great danger that they would become abusers of other drugs. Recent experience indicates that most heroin users use many other drugs as well as heroin. Table 12 shows that barbiturates and amphetamines are particularly common substitutes for heroin. Another study with a small sample found that 87% of addicts who used barbiturates began using them because heroin was unavailable or was too weak.

These findings are significant not only because they suggest

TABLE 12

OTHER DRUG USE BY HEROIN USERS

(N = 422)

Drugs Used	Per Cent Using Drug More than 6 Times	Per Cent Using Drug 6 Times or Less	Total Per Cent Ever Using Drug
Marijuana	86%	6%	92%
Cocaine	47	19	66
Hashish	44	14	58
Barbiturates	34	11	45
Amphetamines ("bombitas")	33	10	43
Methadone ("dollies")	26	11	37
Morphine	16	11	27
Methedrine ("speed")	16	10	26
Airplane glue	14	8	22
LSD	11	8	19
Opium	8	10	18
Demerol	9	8	17

that heroin users are vulnerable to other drug abuse, but also because the drugs they use when they don't use heroin are at least as dangerous as heroin. Addiction to barbiturates seems to cause obvious, gross organic deterioration in a way that chronic use of heroin does not. Indeed, there are reports of deaths occurring in the withdrawal from barbiturates. Medical evidence of damage cause by amphetamines is less compelling, but the consequences of chronic amphetamine abuse seem at least as serious as chronic heroin use. Consequently, in curing addicts of heroin use, we may not necessarily save them from other drug abuse. Indeed, the Methadone maintenance programs in New York City report that 10% of their patients abuse alcohol and another 10% abuse other drugs despite their daily administration of methadone.

E. Summary:

1. Roughly 200,000 people in the U.S. use heroin.
2. Heroin use tends to be concentrated among people who live in metropolitan ghetto areas, who are aged 20-35, are black and Spanish speaking, and are unemployed or employed in low status, low paying jobs.
3. We do not understand how heroin use spreads and consequently cannot make powerful preditions of how many people will become heroin users. However, an upper estimate based on past experience is that the population using heroin could get twice as large, and an upper

estimate based on current local experiences is that it could get 7 times as large.

4. Most heroin users today are multiple drug abusers. Since the other drugs they abuse have consequences on their health at least as serious as heroin use, we will not necessarily improve their health by stopping their heroin consumption.

III. The Social Consequences of Heroin Use

A simple method for determining the important social conseauences of heroin use is to research why anyone worries about heroin use. Confronted by this question, a person considers a miscellaneous set of effects he believes follow as a necessary consequence of heroin use by individuals in the society: the demoralization of individuals who see drug abuse as a symptom of a civilization in decline; the enrichment and encouragement of organized criminal activites; the "consumer surplus" gained by ghetto residents who purchase stolen T.V.'s from addicts; the increased mortality and morbidity the users themselves experience; etc. Working from intuitive judgments of what are important effects of the heroin problem, the analyst begins to formalize his understanding of the social consequences by 1) outlining the effects he can imagine in such a way that he can look comprehensively at the effects and summarize them efficiently, and 2) estimating the magnitude and value of the effects.

A. An Attribute Hierarchy for the Heroin Problem

The first task is accomplished by designing "an attribute hierarchy" for the heroin problem. Ideally, such a hierarchy would be comprehensive. This means that we would name not only those effects that occur as a consequence of heroin use under existing structural conditions (i.e. heroin use is illegal; it is concentrated among the urban poor; it is considered depraved and criminal by large numbers of the population, etc.), but also

under other possible or likely structural conditions. Such a hierarchy should also be integrating. The effects would be aggregated in a few, independent mutually exclusive categories. In practice, we end up with a scheme which falls short of these objectives; one gives the appearance of organized, hierarchal categories only by narrowing the range of effects he wishes to consider. Table 13 gives a current version of an attribute hierarchy for the heroin problem.

B. Dollar Benefits of Avoiding a Man-Year of Addiction

This hierarchy becomes useful as a "scorecard" for alternative government policies only when we can measure the magnitude of the effects of government policies. It is still more useful if we could measure the effects in the same value units as we measure the costs of government programs -- dollars.

Dr. Allen Leslie at the H.S.A. in New York has attempted to estimate the benefits of avoiding a year of heroin use in dollar terms. Table 14 gives the categories of benefits for which he was willing to estimate dollar values. In his report, he also identified a number of important "intangibles" including fear of crime, corruption of police agencies, etc. He then estimated the effects of various policy instruments in avoiding years of addiction and the average costs of these instruments. Table 15 gives his estimate of the benefit-cost ratios for the different policy instruments currently considered by the New York City government. On the basis of these estimates, he recommends

TABLE 13

Attributes of the Heroin Problem

I. Effects on the User and Close Relations

A. The Health of the User

1. Mortality (medical, trauma, "acute reaction")
2. Morbidity (major illnesses, states of heroin use, minor illness)

B. The Dignity of the User

1. The economic independence of the user
2. The user's sense of autonomy and power over his own life
3. The user's ability to enjoy friends, family, etc.

II. Effects on Others in the Society

A. Contagion of Heroin Use

B. Crimes Committed to Procure or While Under the Influence of Heroin

1. Economic gains and losses (losses to victims, gains to purchasers and brokers, losses to rest of society in higher insurance costs)
2. Costs of fear and constrained behavior (expenditures on private protection, unwillingness to travel or to use public facilities, etc.)

C. Demoralization of the Rest of Society

1. Attack on ethnics and aesthetics of many in the society
2. Wealth and power of organized crime
3. Corruption of law enforcement agencies

D. The Expenditure of Public Resources

1. Money spent to cure or control users
2. Money spent on public services used or made necessary by users (police, fire, welfare)
3. Reduced value of public services due to presence of addicts

TABLE 14

The Benefits Derived From Averting One Man-Year of Addiction

Increase in employment earnings	$ 3,260	
Reduction in premature deaths	1,510	
Reduction in morbidity	410	
Reduction in crime	3,984	
Reduction in enforcement costs	1,640	
Reduction in housing stock	164	
	$10,938	
Contagion factor (1.25)	2,734	
Total	$13,672	per addiction year

TABLE 15

Cost/Benefit Evaluation of Alternative Treatment/Prevention Programs

1.	Detoxification	20.7	6.	Phoenix	3.0
2.	Antagonists (future form)	19.1	7.	Heroin Maintenance	2.9
			8.	State NACC	2.8
3.	Methadone	7.9	9.	Involuntary Incarceration	1.7
4.	Odyssey House	6.5			
5.	Increased Enforcement	3.4	10.	Heroin Legalization	1.3

the expansion of methadone programs, the maintenance of theraputic communities, and the development of an ambulatory detoxification program.

This study stands as the most impressive and ambitious cost-benefit analysis of the heroin problem. However, given the current state of the art in cost-benefit analysis, it is generally risky to base policy strictly on these estimates, and particularly risky in this case. There are several errors or debatable points in the estimation of the benefits (eg. the use of an average cost estimate of the savings to the city by not having to process addicts through the court system rather than a marginal cost estimate which would be be much lower; double counting of increased earnings associated with ending addiction and not dying; the arbitrary assumption that all addicts are equally likely to attract new users, etc.). In addition, the estimates are frequently and necessarily arbitrary.

Although these problems might make one nervous about relying too heavily on these estimates in formulating policy, the major reason for not relying on these estimates is that the value of the "intangible" effects of heroin use probably swamp the effects enumerated in the analysis. In my opinion, the large adjustments that many people make in their daily routines out of fear of crime are probably much more important than the economic losses to victims of crime; the fact that heroin use absorbs many of the most talented and energetic of the ghetto population is much more important than the fact that a blue collar worker's wages are lost; the corruption of the police force is much more import-

ant than the savings to the city of not having to arrest and process addicts, etc. Since these intangible effects are probably of much greater value than the effects we measure, and there is no reason to believe that the intangibles are affected by government policies in the same way as the tangible effects, there is every reason not to trust the cost-benefit estimates in the formulation of policy.

C. Indications of the Effects of Heroin Use

An alternative form of analysis is the cost-effectiveness analysis. With such an analysis, we are only required to describe the magnitude of the effects of heroin use in whatever units are appropriate. Since the objective estimate of the value of avoiding heroin use is abandoned, the valuation of the various costs and effects is left to the policy making group. Table 16 gives some indicators of the current magnitude of the effects of heroin use with no additional government intervention and no structural changes in government policy. This chart summarizes what I consider to be the important social consequences of heroin use.

The advantages of this analysis over cost-benefit analysis is that we do not obscure our knowledge of the effects of the heroin problem by summarizing the value of the effects with an arbitrarily chosen value. We concentrate on being precise

about describing and predicting the proximate effects of heroin use. Such an analysis is suitable in a situation where we can make reasonable statements describing the effects of heroin use, but cannot have these effects valued by a market or a unanimously supported "social welfare function."

IV. A Simple Integrative Model of the Heroin Problem

In this section, we seek to provide a simple conceptual tool which will allow analysts to organize the material covered thus far, and to compare systematically the effects of different policy instruments, the subject of the next section.

A. A Dynamic Flow Model of the Pool of Heroin Users

As a first approximation, the magnitude of the heroin problem is a function of the number of people who use heroin. Consequently, we are interested in current size of the pool of heroin users, and the rate at which people flow in and out of that pool.

The flow into the pool from non-using, "straight" society depends upon the "recruitment" and "contagion" functions. The flows out of the pool are deaths and spontaneous remissions from heroin, called "maturing out." If the government did nothing to affect the heroin problem these flows would determine the number of heroin users at any given time; they would define the magnitude of the heroin problem.

However, we know that the government does many things to affect the heroin problem. We can define the effects of some programs in terms of the states and flows already defined (eg. nearly all the important effects of drug education programs should be captured by changes in the flow into the pool out of straight society.) Other government programs have effects by creating

new flows or new states. Programs devoted to treatment create a flow out of the pool by curing or rehabilitating addicts. Treatment programs also create a new state -- addicts in treatment. This state differs significantly from uncontrolled use because the behavior of addicts in treatment has different social consequences than the uncontrolled activity of users. Programs devoted to control have their greatest impact in creating this state -- addicts under control. Control programs occasionally provide an exit from the pool but their major contribution is probably the changed behavior of these users who find themselves "under control." Thus, government has intervened to affect the heroin problem by creating new conditions in which addicts live (under control and in treatment) and by creating new opportunities for users to exit from the heroin using pool. Table 17 outlines the basic states and flows that determine the magnitude of the heroin problem at any given time.

B. A Typology of Users

To extend the model above to the point of practical application, we must note that users differ in several important respects.

1. Some addicts are "worse than others from society's point of view (i.e. they have a larger negative effect on "social attributes"). For example, some addicts commit many crimes; others attract new users by example; still other addicts maintain

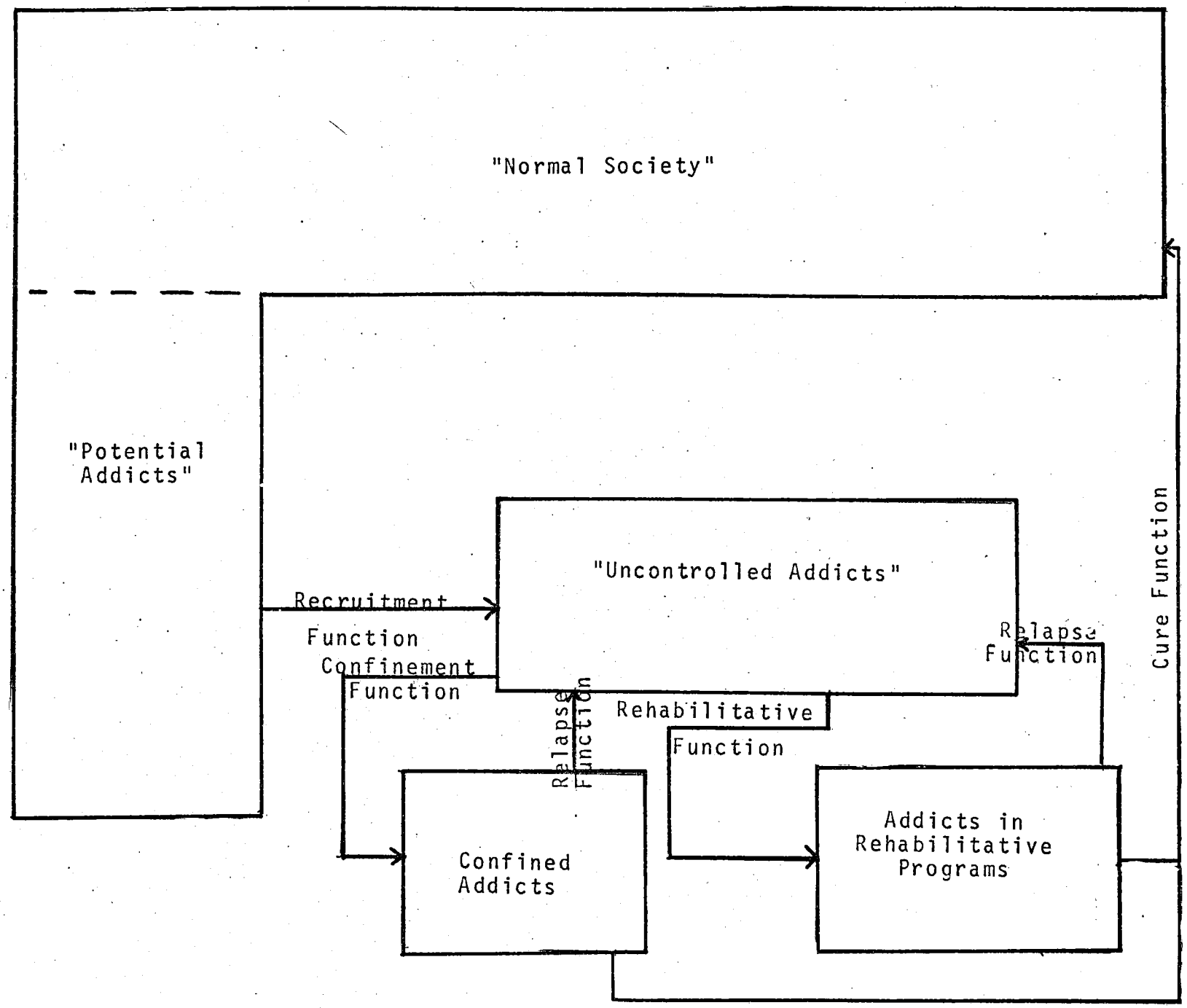

"Normal Society"
"Potential Addicts"
"Uncontrolled Addicts"
Recruitment Function
Confinement Function
Relapse Function
Rehabilitative Function
Relapse Function
Cure Function
Confined Addicts
Addicts in Rehabilitative Programs

TABLE 17

a decent appearance and good health, etc.

2. Some addicts are more "susceptible" to treatment or control programs than others. For example, some addicts will volunteer for methadone programs and shun all others. Others, because of their residence and style, will find themselves the target of vigorous recruiting by an outreach unit of a therapeutic community. Still others will be exceptionally vulnerable to arrest and confinement.

3. Addicts change over the period during which they use heroin. Typically, researchers describe "stages" in a user's career and discover important differences in attitudes, behavior, and appearance among the different stages. Thus, the addict population observed in an instant of time will show different "types" simply because users will be in different stages of use.

4. Addicts differ with respect to their expected responses to a situation where there is no longer heroin. Some who like being stoned will find other substitute intoxicants for heroin. Others will take the opportunity to give up all drugs. Still others will scarcely notice the loss of heroin from an already complex multi-drug consumption pattern.

Since these differences can affect the value of government programs undertaken to affect the heroin probelm, it is important to accomodate the differences in our analysis.

A typology of users is a useful way of capturing the significant differences among users. Table 18 presents an effort to produce such a typology. It has not been empirically verified and is included as much for illustrative purposes as for

TABLE 18

Addict Type	Demographic Characteristics: Age	Race	Employment Status	Sex	Drug Use: Level	Multiple?	Length	Crime: No. of Offenses	Proportion Correlated w/Heroin	Infectiousness w/respect to 12-20-year olds
1. Drug Dabblers who use heroin	16-25	W, B P.R.	Unemployed Irregular School	M	Low	Yes	0-3 Yrs	Small	None-Small	M-H
2. Heroin "Joy Poppers" or "Weekenders"	12-25	W, B P.R.	Unemployed Irregular School	M F	Low	No	0-1 Yrs	Small-Mod.	Small	H
3. Hustlers who use heroin	16-25	B, P.R.	Unemployed	M	L-M	L-M	1-7 Yrs	High	Small-Mod.	H
4. Addicts in their "run"	14-25	W, B P.R.	Unemployed Irregular	M	M-H	Mod.	1-5 Yrs	Mod.-High	Mod.-High	M-H
5. Drug Dependents	18-30	W, B P.R.	Unemployed Irregular	M F	H	H	3-7 Yrs	Small-Mod.	Mod.	L
6. "Burned-out Addicts"	25-70	W, B P.R.	Unemployed Irregular	M	L-M	H	8-? Yrs	Small	High	L
7. "Maturing" Addicts	18-40	W, B P.R.	Irregular	M	L-M	M-L	8-15 Yrs	Small-0	High	L
8. "Physiologic" Addicts	18-40		Regular, Irregular	M F	L-M	No	0-5 Yrs	0-Small	High	L

TABLE 18 CONTINUED

Susceptibility to Treatment and Vulnerability to Confinement							
T.C.	Chemotherapy	Detoxification	NACC	Prison	Probability of "Maturing Out"	Probability of O.D. (relative to the users)	Degree of Morbidity
L-M	0	0	0	0	H	L	L
L-M	L	L	L	L-M	1 in 5 1 in 2	L-M	L
L	L	M	L	M	1 in 5 1 in 2	M	L
M	L	H	M	M-H	1 in 10 1 in 4	M	L-M
L	M	H	L	M	1 in 20 1 in 5	H	M-H
L-M	M-H	H	M-H	M-H	Very low	H	H
M	M-H	H	M-H	L-M	H	L-M	L-M
M-H	M	H	L-M	L	H	L	L

substantive contribution.

The dynamic element in the heroin user's life may be captured analytically by generating a transition matrix whose states are the different types of heroin use. Table 19 presents such a matrix with subjective estimates of the transition probabilities.

We may fit this typology of addicts and transitive matrix into the dynamic flow model simply by adding the different user types as new states, and the transitions from user type to user type as new flows in the model.

TABLE 19

Transition Matrix of Addict Types

	Drug Dabblers	Weekenders	Hustlers	Addicts	Drug Dependents	Burned Out Addicts	Maturing Addicts	Physiologic Addicts	Ex-Users
Drug Dabblers	.6	0	.05	.05	.15	0	0	0	.15
Weekenders	.05	.5	.2	.1	0	0	0	0	.15
Hustlers	0	0	.60	.25	.05	0	0	0	.10
Addicts	0	0	0	.70	.10	.10	.10	0	0
Drug Dependents	0	0	0	0	.6	.3	.05	0	.05
Burned-out Addicts	0	0	0	0	0	.9	.05	0	.05
Maturing Addicts	0	0	0	0	0	0	.4	0	.6
Physiologic Addicts	0	0	0	.10	0	0	0	.5	.4
Ex-addicts	.05	.05	0	0	0	0	.1	0	.8

V. The Costs and Effects of Policy Instruments

A. The Policy Instruments Available to the Government

For the purposes of this study, it is useful to divide the policy instruments available to the government into medical and non-medical programs. The distinction is based on whether or not the program or policy requires the intensive use of resources which could be used in traditional medical activities.

1. Medical Programs Operated in Government Sponsored and Regulated Clinics

a) Methadone Maintenance (Beth Israel Protocol)

The methadone maintenance program as currently practiced in New York City's programs involves three different functions: detoxification, building up a stable tolerance to methadone and daily administration of methadone at a stable level (about 80-150 mg of methadone per day); and psychological and vocational counselling.

The theory behind the program is that people continue as chronic users of heroin because they have a physiologically based "craving" for opiates, because heroin use is a reliably reinforcing experience, and because the short time that elapses before a user experiences withdrawal and the difficulty associated with obtaining drugs preclude normal life styles. Consequently, the program is designed to satisfy the craving for opiates through the daily administration of methadone, to eliminate the reinforcement of

heroin use by "blocking" the euphoric effects of heroin use, and to encourage normal life styles by providing psychological and vocational counselling.

The following facts are important to know about methadone. Methadone is an addictive opiate. Its use as a substitute for heroin is desirable because stabilization doses can be achieved, and because users can go for relatively long periods before requiring another administration of the drug. It appears to "block" the euphoric effects of heroin by monopolizing potential "receptor sites" in the body's nervous system. Withdrawal from methadone is less painful than withdrawal from heroin given the same dose. However, because methadone programs typically provide very large doses of methadone to reach stabilized, blocking levels, patients would experience greater pain from the abrupt cessation of methadone than if they ceased their normal heroin use on the street.

There is disagreement about the feasibility of weaning methadone patients from methadone, and little evidence available to resolve the controversy. There is a consensus that methadone maintenance is an inappropriate treatment for young or beginning users because the program may commit someone to a lifelong dependence on methadone, and because methadone may have some tranquilizing effects which would retard the emotional development of young people.

There are several significant variations of the program. "Barebones Methadone Maintenance" excludes the psychological and vocational counselling from the Beth Israel protocol. Those who advocate this variant argue that the psychological and vocational

counselling actually do little to improve the social adjustment of former heroin users and contribute 2/3 of the cost of the program. Another variant is the "Low Dose Methadone Program" which differs from the Beth Israel Protocol in that it administers small, non-blocking doses of methadone. Early experimentation with this program indicates only slightly less success for the low methadone group than the high methadone group. Many people who believe it is possible to wean methadone patients from methadone advocate the development of these low dose programs as an intermediate step.

b) Drug Antagonists (Cyclazocine)

Programs administering drug antagonists to users are similar to methadone programs in that detoxification is performed, psychological and vocational counselling are provided, and a drug which "blocks" the euphoric effects of heroin is administered. The differences in the programs arise from the differences between methadone and drug antagonists.

There are four important differences between the antagonists and methadone: the antagonists are non-addictive; they have a low "abuse potential" (i.e. taking them in larger than prescribed doses does not result in any pleasant physical sensations); they apparently "block" the euphoric action of heroin by neutralizing neurological reactions rather than by monopolizing "receptor sites"; and it is more difficult to build patients up to stable, blocking tolerance levels without discomfort for the patients. It would appear that the non-addictive property gives antagonists

a decided advantage over methadone, particularly in the treatment of young addicts. However, without the threat of withdrawal, it is hard to keep volunteers showing up for their daily medication.

If longer acting antagonists can be developed, or if a timed-release vehicle is developed which can release antagonists over 3 months to 1 year time periods, then it may be possible to "immunize" people against the euphoric effects of heroin use. This "immunization" may constitute an important prevention program that does not exist now.

c) Detoxification

Detoxification programs have two purposes: to reduce users' tolerances for heroin and to refer them to more intensive treatment programs.

In the 1950's, detoxificiation (occasionally in conjunction with perfunctory psychological counselling) was practically the only treatment program available to addicts. During that period it was criticized for being no more than a "revolving door." Addicts came in as addicts and left as addicts, with no real changes in their attitudes or behavior. Detoxification has recently been revitalized as a government program for two reasons: 1) Since many addicts will be motivated to come to these clinics at some time to relieve withdrawal symptoms, a larger proportion of users will come to the attention, and to some degree under the supervision of government authorities. In effect, it is a program to lure addicts from the underworld into the scrutiny and concern

of the government. 2) To the extent that the program reduces the habit size of users, it is assumed that the program will reduce crime. There is some additional pious noise about reducing the probability of addicts dying from "overdoses" and increasing the probability of a cure.

In an in-patient detoxification program the addict is confined to a hospital ward for the period of his detoxification. In an ambulatory program, the addict is not confined in any way, but is expected to show up for the regular administration of methadone to reduce his tolerance without pain.

2. The Use of Ordinary, Private Physicians in These Programs

Currently, these medical treatments of addicts are generally provided in large government sponsored and regulated clinics. However, there is increasing interest among doctors and policy makers in the possibility of allowing private physicians to sell these services to welfare- or self-supported users. The British have had a system in which ordinary private doctors dispersed heroin to certified addicts since 1920. Following a quadrupling in the number of users over the period 1962-1968, the regulation of doctors was tightened, and the system became one where only a few specially licensed physicians are allowed to prescribe heroin and methadone. Most opiates in England seem to be dispensed currently in large clinics. Thus, England continues to experiment with the use of ordinary physicians in drug maintenance pro-

grams and to pose an alternative to the American system of tight regulation in government sponsored clinics.

The anxieties in this country about using private physicians are that they will be irresponsible and uninformed in their prescriptions, and consequently that many drugs will "leak" into the hands of people who would abuse them. The scanty evidence available is not reassuring in this regard. A doctor on the West Side on New York last year sold a prescription for 500 mg of methadone to a New York Times reporter who could not demonstrate a history of addiction. It was later discovered that this doctor had over 120 patients and that he was making over $2000/week by prescribing methadone to people who said they were addicts.

A report from Miami indicates that before methadone distribution was consolidated in a single clinic in that city, the undisciplined prescription of methadone by private physicians had resulted in observable increases in the incidence of opiate addiction. Since these reports have fueled strong, pre-existing anxieties about the use of private physicians in the dispersing of opiates to chronic users, one would predict that most treatment will continue to be concentrated in government sponsored and regulated clinics and that this will continue until it can be shown that private physicians can be successfully regulated.

3. Non-Medical Programs and Policies

a) Preventive Education Programs

Preventive education programs have the objective of giving parents and children objective information about the harmful

effects of drug use.

The theory behind these programs is apparently that people begin drug use (in the case of children) or allow drug use to continue (in the case of parents) because they are ignorant of the effects and symptoms of drug use. Consequently, if parents could be educated about the symptoms and effects of drug use, they could become more effective supervisors and advisers of their children; and if children could be impressed by the harmful effects of drugs, they would be deterred from drug use. Objective information about drug use seems to be the least important part of making parents effective supervisors and deterring children from risky and precocious behavior, but it may have some significance.

An alternative hypothesis, however, is that the capacity of secondary communications systems to communicate messages in areas where there are important consequences and great uncertainties is sharply limited. Indeed, the effect of such messages may be simply to create an occasion for people to seek mis-information in primary communications networks (eg. from face to face conversations with peers, siblings, neighbors, etc.). To the extent that favorable attitudes foward drug use exist in primary communications systems, and to the extent that these attitudes become explicit and persuasive in conversations triggered by messages from secondary sources, these education programs may increase the probability of heroin use.

Significant variants of these education programs directed

at potential users include: 1) lectures by police officials who are negatively valued by their audiences, tend to distort information in obvious ways, and threaten sanctions which are unbelievable; 2) lectures by ex-addicts who have some rapport with students but tend to convey a sense of nostalgia and romance to the old days when they were users, and contradict their own warning that heroin use is dangerous by appearing as people who became successful precisely because they triumphed over heroin use; and 3) advertisements by youth heroes such as entertainment and sports stars which lack intimacy.

b) Theraputic Communities (Phoenix House, Daytop, etc.)

The objective of theraputic communities is to alter the personality of heroin users from dependence to individual responsibility. They accomplish this objective by placing users in structured and disciplined communities and forcing them to recognize their own weaknesses and inadequacies in encounter sessions.

The theory behind these programs is that chronic heroin use is a symptom of an inadequate, undisciplined personality. Consequently, only when a user recognizes the extent of his own debasement and responds to community responsibilities in a reliiable way can he be cured of his heroin use.

The rhetoric of the programs makes much of the new independence of the heroin user, but there are alternative explanations of what occurs in these communities. One theory is that the communities are a relatively mild form of "brain washing." The techniques of requiring people to confess guilt and disciplining

daily behavior and attitudes through concentrated, concerted peer group pressure are remarkably similar to the techniques reportedly used on Americans who remained in China following the Communist takeover. Another theory is that the communities succeed only in substituting one disciplined compelling life style for another, i.e. that the extensive rules and discipline of the theraputic communities are able to structure the time of users as comprehensively and compellingly as the regime of daily heroin use. Whether or not these theories are good descriptions of what occurs in theraputic communities, it does seem clear that users "cured" in such centers remain unusually dependent on the communities even after they are cured. Indeed, few ever live or work anywhere other than in similar communities.

The programs vary in the amount of professional staff they use. The earliest communities were made up exclusively of ex-addicts. Recent communities, particularly ones that concentrated on young users, make more extensive use of professional psychologists and guidance counsellors.

c) Improved Enforcement of Drug Laws

The Harrison Act of 19 has been a cornerstone of American drug policy. It makes the possession, use, sale, importation and manufacturing of heroin illegal. An important policy option for areas threatened by epidemics of heroin use is stepped up enforcement of this law.

Some people have argued that making heroin use against the law is about as effective and humane as ruling heart disease or

cancer illegal. They observe that "sick" people (chronic heroin users) are forced to suffer degradation and disability over and above that normally created by their "disease." They also observe that the society places its police under enormous corrupting pressures by outlawing commodities desired by some people in the society. They can explain this policy of outlawing heroin use only as a smug, morally self-righteous response of a puritan nation to the sinful use of drugs.

One argument against this position is that it may be worth something to many people in the society to maintain a strong moral position against drug use. However, a more important argument is that the reason we make drug use illegal is to prevent drug use by making it difficult for people who are not yet addicted to find and use drugs. We suffer all the bad effects of the policy simply to have the lowered probability of drug use.

Many scoff at this position because they believe that 1)most people who become chronic heroin users would have done so even if the law was not enforced because it is a sign of a disease that people have, or 2)that the law is not enforced effectively enough to make a difference because "everyone knows you can buy anything you want in the schoolyard," or 3) that the adverse effects of the policy are so great as to swamp the meager prevention effects we admittedly do obtain. In my opinion, these counterarguments do not carry the day.

Many people also argue that it is impossible to get improved enforcement of drug laws. It is clear that there are important constraints on the possibility of improved enforcement; the inefficiency of existing police procedures, the extent of corruption in police agencies, and the rules of evidence which make arrests difficult. However, it is not clear which of these constraints is currently most binding, and also not clear how expensive it is to remove the constraints. Until these issues are resolved, it is probably not wise to eliminate improved law enforcement as a policy which may be effective in improving the heroin problem.

Significant variants of this program include 1) enforcement against "top level" dealers (assumed to have the greatest inpact on the available supply of heroin. but the most expensive in terms of police time and expertise), 2) enforcement against low level dealers (assumed to be ineffective because the dealers are easily replaced, but inexpensive to obtain), and 3) enforcement against users (assumed to be unimportant in preventing drug use, and all too effective in making chronic users' lives miserable).

B. The Effects of Policy Instruments

Ideally, we would use all the attributes identified in section III for evaluating the effects of the policies described in the preceeding subsection. In practice we will use a reduced

attribute space which highlights particularly important effects of different kinds of policies. In addition, we will give explicit attention to the costs of various programs and the political and bureaucratic factors which will affect the implementation and performance of the various policies. Where there are important uncertainties in the range of costs or effects, they will be identified. Where there are important arguments supporting different predictions of effects, they will be outlined. Table 20 outlines these effects and uncertainties for the policy measures we identified.

TABLE 20

Proximate Effects of Government Policies

...m ...tion	Types of Addicts Attracted to Program	Types of "Cures" Which Occur & Their Frequency	Impact on the Criminality of Users	Impact on the Spread of Heroin Use
...e ...ance	Proportions of types attracted to program a) "Burned-out Addicts" (80-100%) b) "Matured-out Addicts" (70-90%) c) "Physiologic" Addicts (60-90%) d) "Drug Dependents" (50-90%) e) "Committed Addicts" (50-75%) f) "Hustlers who use drugs" (10-30%) Young, early users currently excluded	a) Use of Methadone, but no other drugs; Reg. employment; reduced criminality. (40-70% of those who stay in program) b) Continued drug abuse, employment & lowered criminality (~ 10% of those in program) c) Continued drug abuse, welfare, lowered criminality (~ 10% of those in program) d) Continued drug abuse, similar criminality (< 5% of those in program) e) Methadone only, similar criminality (?) (Retention rate equals 90% of those admitted in first year; 65% at end of 4 years)	a) Diminished no. of offenses for those in program (?) b) Shift to less visible, less violent for those in program (?) c) Since many of those in program were not particularly "crime prone" addicts, the aggregate effect on crime may not be large	a) Little effect on contagion mechanisms since the program does not absorb addicts important in that mechanism b) Some reduction in deterrent effects because methadone is an acceptable way out for those who do "get hooked". c) Perhaps some deglamorization of hustling life associated with drug use which makes drug use less appealing

TABLE 20 CONTINUED

stituencies Which or & Oppose The Program	Factors Which Affect the Bureaucratic Implementation of the Program	Miscellaneous Observations
o the program: nti-crime constituency edical personnel ike it because it s simple and uses heir skills n the program: Lacks & Radicals ho see genocide t-Addicts who are ti-drugs zealots. er arguments about cular location of c)	The program is for bureaucracies to expand and control a) Easy to replicate: 1. Simple procedures 2. Simple facilities 3. Ample supply of personnel b) Easy to control because personnel are all accustomed to bureaucratic disciplines	a) The program may be showing high success rates because they are absorbing those who would "mature out". b) There are some methadone related deaths. c) There is a small expansion in the Black Market distribution of methadone. d) Success in getting methadone patients employed may be at its peak now. Cannot expand to keep pace of programs. e) Promising variant is "Barebones Methadone"

TABLE 20 CONTINUED

of Addicts ed to Program	Types of "Cures" Which Occur & Their Frequency	Impact on the Criminality of Users	Impact on the Spread of Heroin Use
attracted to g Dependents" 80%) g Experimen- " (60-80%) mitted Addicts" 70%) kenders" 60%) siologic cts" (40-50%) sers are fairly	a) Complete abstinence; employment in drug programs; (10-40% of those in program) (only as long as programs are expanding?) b) Complete abstinence, diminished criminality (5-10% of those in program) c) Others enjoy short run gains (inprovement in health, reduced criminality, conventional relations, etc.) while they stay in program (Retention rate is unknown since unclear who is "admitted")	a) Reduced substantially for those who find alternative employment b) Reduced for those under the supervision of the program.	a) Potentially large impact on "contagion mechanisms" because of early detection of users. Currently unexploited because program concentrate on treating those in program, not findin and deterring friends of early users. b) Some reduction in deterrent effects because ex-addicts do well in running programs. ("I'm going to grow up to be an "ex-addict.")

TABLE 20 CONTINUED

Constituencies Which Favor & Oppose the Program	Factors Which Affect the Bureaucratic Implementation of the Program	Miscellaneous Observations
a) Pro the program: 1) People who believe in psychological model of addiction and believe abstinence is only appropriate objective 2) Ex-addict and Black "Patronage Groups" who believe that programs should be run by non-professional, community people b) Con the Program: 1) People who think it is cost ineffective 2) People who are suspicious of zealots	Program is difficult to expand and control a) Expansion is difficult because of few trained personnel and complicated procedures and facilities b) Control is difficult because personnel object successfully to bureaucratic disciplines.	a) Most statements made here are guesses due to very poor evaluation efforts on the part of these programs. The poor evaluation is both sign and part of the control problem.

TABLE 20 CONTINUED

gram iption	Types of Addicts Attracted to Program	Types of "Cures" Which Occur & Their Frequency	Impact on the Criminality of Users	Impact on the Spread of Heroin Use
atory ification	All except "Week-enders" and "Drug Experimenters"	a) Reduced drug seeking lower criminality and improved social relations (< 1% of cases) b) Slightly increased probability of entering other treatment programs (?) c) Short run impact on physical health and morbidity of users	a) Slight decrease in the number of crimes committed by users b) Perhaps some shift in the type of crime	a) Little effect on contagion mechanism b) Reduced deterrants to drug use

TABLE 20 CONTINUED

Cost of the Program	Constituencies Which Favor & Oppose the Program	Factors Which Affect the Bureaucratic Implementation of the Program	Miscellaneous Observations
a) ~ $100 per detoxification b) Significant economies of scale	a) Pro the program: 1. Anti-crime constituencies 2. Those who like large government intervention in a problem b) Con the program: 1. People who will have the program in their block 2. People who object to "revolving door" treatment of addicts as inhuman and ineffective	Program is cheap and easy to implement on a large scale. Few problems that cannot be quickly solved.	a) How many of the detoxifications provided substitute for informal detoxifications?

TABLE 20 CONTINUED

ɔposed Policy Change	Predicted Effects on Crime Rates (Short Run)	Predicted Effects on the Number of People Who Become Heroin Users	Predicted Effects on the Rate at Which Heroin Users are "Cured"
Improved Law enforcement against medium-high level dealers	a) <u>The crime rate will go up</u>: 1. Improved law enforcement raises the price of heroin 2. Addicts are so eager to maintain regularity in consumption that they are willing to trade-off their little remaining leisure to get money to buy drugs. 3. The most productive use of addict time is in criminal activities, and the supply of criminal opportunities is very elastic with respect to addicts' efforts. 4. Therefore, addicts will commit more crimes. b) <u>The crime rate will not go up</u> 1. Improved law enforcement raises the price of heroin.	a) <u>The expected number of users will decrease</u>: 1. When the supply is restricted, dealers cut out their "marginal" customers (i.e., customers whom they don't know well and who buy small quantities of drugs) 2. All neophyte users of heroin are marginal consumers 3. ∴ They find it difficult to "score". b) <u>The expected number of users will increase</u>: 1. The higher prices mean higher profits for pushers. Therefore, there will be even stronger incentives for them to addict new people 2. Addicts seeking to maintain their old habit at new prices will have to "hustle" more. This makes the	a) <u>The expected number of "cures" will increase"</u> 1. Since life is more difficult for addicts when the price goes up, there are strong incentives for addicts to "clean-up" in these periods. b) <u>The expected number of "cures" will stay the same</u>: 1. Addicts enjoy their life even when it is difficult. Few addicts seek treatment when they enjoy their life. Their capacity to enjoy their life seems to be independent of our analysis of the objective circumstances of their life. c) <u>The expected number of "cures" will decline:</u> 1. Since addicts will be committing more crimes, they are more vulnerable to jail. Once they are in jail, treatment options are limited.

TABLE 20 CONTINUED

Expected Effect on the General Morale of the Society	Expected Effect on the Wealth & Power of Organized Crime	Expected Effects on the Consumption of Other Drugs
a) <u>The general morale will be strengthened</u> 1. A strong societal stand against drugs will reenforce existing standards of morality currently under attack or being eroded by leisure, affluence, etc. 2. Improved law enforcement will signal a decrease in the corruption of the police force	a) <u>Their wealth & power will increase</u> 1. An inelastic demand for heroin guarantees larger money profits for dealers in heroin. 2. Aggressive policing implies that many free lance distributors will be arrested. This means that the monopolistic position of organized crime will be maintained more easily.	a) <u>Addicts will use other drugs extensively</u> 1. Addicts like to be stored and are willing to substitute among drugs 2. The supply of other drugs is elastic 3. Therefore, addicts seek and find other drugs
b) <u>The general morale will be weakened</u> 1. The society will find itself in the position of subjecting sick human beings to a degrading and harsh existence.	b) <u>Wealth & power will decrease</u>: 1. An elastic demand forces dealers to absorb more risk for lower profits. 2. Ranks of organized crime are decimated by police arrests.	b) <u>Addicts will give up drug use</u>: 1. It's uncomfortable to continue using heroin 2. No other drug is satisfying 3. Therefore, they give up all drugs

TABLE 20 CONTINUED

ed Policy ange	Predicted Effects on Crime Rates (Short Run)	Predicted Effects on the Number of People Who Become Heroin Users	Predicted Effects on the Rate at Which Heroin Users are "Cured"
	2. Addicts will not give up their leisure to get more drugs, but rather absorb the price increase in one of the following ways: a) They "shave" their habit by detoxifying informally b) They substitute other drugs c) They commit themselves to a hospital to "clean up" 3. Addicts give up their leisure, but the supply of criminal opportunities is sharply limited. They do not earn enough to pay for increase. Therefore they absorb price increase in one of ways suggested above.	life seem more glamorous and attractive to others. c) <u>The expected number of users will not change</u> 1. Those people who want heroin will find it and buy it at any price	Therefore, fewer get to "cure" programs