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THE COSTS OF DRUG ABUSE AND DRUG POLICY

PREPARED FOR THE SPECIAL SENATE COMMITTEE ON ILLEGAL DRUGS

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THE COSTS OF DRUG ABUSE AND DRUG POLICY

INTRODUCTION

Estimating the cost of a complicated issue such as drug abuse involves some difficult technical economic questions. Exactly which aspects of the problem should be included in the estimate? How should each cost element be measured? This paper will discuss examples of two types of studies: pure (economic) cost studies, and cost-effectiveness studies. Each type attracts a certain amount of controversy. The controversies surrounding cost studies concern the choice of which items to include, which items are left out because of a lack of data, the way in which the items are costed, and the effect of these factors on the quality of the results. The controversies surrounding cost-effectiveness studies focus on the way the market for illicit drugs is modelled and the various equations are chosen.

Because addiction problems affect health, the cost of illness (COI) model has been advocated as a method of costing drug abuse. In making health-care decisions, it is natural to ask how much society would save if a particular illness were eradicated. The cost savings are measured by comparing the current situation, in which some people suffer from a specific illness, to a hypothetical alternative situation in which everyone is cured. Cost savings would be achieved in various ways, such as through the reduced demand for healthcare, and through avoiding illness-related loss of productivity and earnings.

Applying the COI approach to drug abuse, however, raises the difficult question of what hypothetical alternative to the current situation should be used in the costing exercise. The opposite of an illness is health, and complete eradication of a disease may be a realistic and feasible target. But in the case of drug abuse this may not be a realistic and feasible target, because drug usage – unlike illness – is self-inflicted and buoyed by the forces of addiction. Many analysts have argued that abolitionist policies, be they for heroin, alcohol or any other drug, have never worked and will never work.

Moreover, it is not clear whether COI figures can be scaled down to provide useful analyses of partial reductions in drug usage. The economic costs measured in COI studies are total costs, and can be quite easily converted into average costs by division. For the purpose of policy analysis, however, marginal costs are needed, because policy changes are made at the margin, starting at current levels of drug abuse, treatment levels and policing effort.

The cost implications of such marginal changes may be difficult to determine. If, for example, a law enforcement crackdown on drug usage resulted in more drug offenders being imprisoned, one consequence would be an increase in the number of prison cells required. The cost of providing those marginal cells could be sensibly estimated from the average cost of existing cells. One prison cell presumably costs about the same as another similar unit, no matter which type of offender it currently houses apart from issues of security levels. Estimating the marginal cost of *arresting* more drug offenders, however, by the average cost of all existing arrests would not be sensible. The average cost of an arrest combines costs of fraud, traffic infractions and murder, and it is reasonable to assume that the police resources required vary widely, depending on the nature of each case. Nor would it be safe to assume the marginal costs of making an arrest are constant. Presumably many of the drug offenders who are currently caught are less skilled than those who are undetected – which, to the economist, points to increasing marginal costs – and undetected ones require more police effort to catch them.

A second concern with the use of zero consumption as the hypothetical alternative situation in the COI methodology is based on the fact that drug use is a choice. The use of an illegal drug meets some needs in the user, and it is an open question what would happen if an illicit drug were no longer consumed. Would these needs still exist and be met in another way – such as increased consumption of alcohol or legally available solvents – or would they be transformed into less harmful channels, or into total abstinence?

The first part of this paper discusses economic cost studies, drawing on studies of Canada, the United States and France. A summary of four experts' critical analyses of the U.S. study is also included.

The second part of the paper outlines a famous U.S. cost-effectiveness study that aimed to assess whether it would be cheaper to reduce cocaine consumption by tougher law enforcement or by more drug treatment programs. A summary of the U.S. National Research Council's critical assessment of this study is also included.

ECONOMIC COST STUDIES

A. Illicit Drug Costs in Canada

A major study of drug abuse in Canada was undertaken by the Canadian Centre on Substance Abuse (CCSA), an agency that has been at the forefront internationally in studies of this problem. The Centre held a symposium in Banff in May 1994 to discuss issues in estimating the social and economic costs of substance abuse, and to develop international guidelines for such studies. The intention was to help countries to compare their drug problems and the effectiveness of their policies within a common framework. The CCSA study was published in 1996,(1) and illustrates the approach recommended in the international guidelines (which were updated in 2001).

Before dealing with the fine details of cost estimation, it is useful to see the CCSA's broad picture of costs imposed on Canadian society by illicit drug abuse in 1992.

TABLE 1

ESTIMATED COSTS OF ILLICIT DRUG ABUSE IN CANADA, 1992		
SOURCE	**$M**	**%**
Productivity losses	823.1	60.0
Law enforcement costs	400.3	29.2
Health care costs	88.0	6.4
Prevention and research	41.9	3.1
Other direct costs	10.7	0.8
Direct losses in the workplace	5.5	0.4
Administrative costs for transfer payments	1.5	0.1
TOTAL	**1371.0**	**100.0**

Source: Eric Single, Lynda Robson *et al.*

By far the largest item in this table is the cost of productivity losses. This is the estimated value of the loss of output, as usually measured by earnings and wages, resulting from illness and early death induced by drug abuse. Productivity losses are an indirect cost that would not show up in the national accounts or the spending estimates of government departments. The other costs listed in the table are direct costs borne by government, other agencies and

(1) Eric Single, Lynda Robson, Xiaodi Xie and Jürgen Rehm, in collaboration with Rachel Moore, Bernard Choi, Sylvie Desjardins and Jim Anderson, *The Costs of Substance Abuse in Canada: A Cost Estimation Study*, Canadian Centre on Substance Abuse, Ottawa, 1996.

employers. Law enforcement costs consist of the costs of police, the courts and the corrections system. Health care costs consist of hospital, ambulance and residential care charges, physicians' fees and prescription drug costs.

Table 1 underlines the argument that the largest estimated cost of drug abuse is related to the harm those drugs do to individual lives. It should be noted, however, that Canada spends nearly ten times as much on law enforcement for drug offences as on prevention and research.

The study follows the COI approach, which attempts to measure the external costs borne by people other than the drug user for treatment, prevention, research and law enforcement, plus productivity losses caused by increased ill health and death. The report estimates that illicit drug use cost Canadian society $1,371M in 1992, or 0.2% of Canada's GDP. This cost is considerably less than the amounts estimated in the study for the abuse of alcohol (1.09% of GDP) or tobacco (1.39% of GDP).

The following section explains how the CCSA arrived at the totals listed in Table 1.

1. Productivity Losses

In more detail, productivity dollar losses are estimated as follows:

Productivity losses due to mortality	$547.4M
Productivity losses due to morbidity	$275.7M
Total productivity losses	*$823.1M*

Productivity losses due to crime are not estimated.

These productivity losses are calculated based on the Centre's estimates of the number of people who died in 1992 from illicit drugs, including their gender and age:

Estimated illicit drug-related deaths	male	641
	female	91
	total	*732*
Estimated years of potential life lost	male	27,044
	female	4,103
	total	*31,147*

The 732 deaths result in an estimated 31,147 years of life being lost. This averages out to 42.6 years per person. Unfortunately, death from illicit drug use strikes younger victims who have a lot of life unlived.

Making the assumption that those who died early would have earned the average wage rates with average fringe benefits for their age and gender for the rest of their working lives, lost earnings can be calculated. The value of lost housekeeping services is added. The present value of future earnings is computed for each age and gender group by discounting, at an appropriate rate, the value of future earnings, fringe benefits and housekeeping services. These figures are totalled to give a final estimated value of $547.4M.

The productivity loss resulting from morbidity or illness from illicit drug abuse is calculated as the difference between the mean annual earned income of people who are drug users and that of the general population. The value of lost housekeeping services and fringe benefits is added, for a total estimate of $275.7M.

2. Law Enforcement Costs

In more detail, law enforcement costs were estimated as:

Police	$208.3M
Courts	$59.2M
Corrections (including probation)	$123.8M
Customs and Excise	$9.0M
Total law enforcement costs	*$400.3M*

Law enforcement costs resulting from illicit drug abuse consist of the costs for specialized law agencies such as the (then) RCMP Narcotics Division, plus that fraction of the general costs of operations that can be attributed to dealing with illicit drug crimes. Such crimes include both direct violations of the drug laws and also that proportion of general crimes that can reasonably be attributed to illicit drugs.

Data exist on the proportion of homicide and assault cases in which the perpetrator was under the influence of illicit drugs. The Centre estimates the proportion of those cases where the assault or homicide could be causally attributed to the drug intoxication of the perpetrator. Putting these two together, the Centre estimated that 8% (0.0807) of violent crimes are attributable to illicit drugs in Canada. There is no such figure for property crimes.

The measure of police output is the offence. Offences are officially recorded and centrally reported violations of criminal law. To estimate policing costs, total policing expenditures as reported by Statistics Canada are multiplied by the percentage of offences that are estimated to be drug-related. The Centre concludes that in 1992, 2.4% of all offences were attributable to illicit drug use.

Policing costs of enforcing federal drug laws	$168.4M
Policing costs of 8% of violent crimes	$39.9M
Total policing costs	*$208.3M*

For the courts, the measure of output is the case. Costs are measured to include staff wages and salaries, building costs, and legal aid. The Centre concludes that in 1992, 5.7% of criminal court cases were attributable to illicit drug use.

Court costs of federal drug laws	$46.8M
Court costs of 8% of violent crimes	$12.4M
Total court costs	*$59.2M*

Corrections costs include the costs of prisons, the probation system and the parole system. In the jail system, costs are allocated on the basis of sentences.

Corrections costs for federal drug laws	$106.2M
Corrections costs for 8% of violent crimes	$17.6M
Total corrections costs	*$123.8M*

The Customs and Excise figure excludes programs financed under the Drug Strategy.

3. Health Care Costs

The detailed health care costs are as follows:

Morbidity - general hospitals	$34.0M
Morbidity - psychiatric hospitals	$4.3M
Co-morbidity	$4.7M
Ambulance services	$1.1M
Residential care	$20.9M
Non-residential treatment	$7.9M
Ambulatory care: physicians' fees	$8.0M
Prescription drugs	$5.8M
Other health care costs	$1.3M
Total health care costs	*$88.0M*

Data on hospitalizations from the Laboratory Centre for Disease Control are used to find the number of cases in which illicit drug abuse was the primary diagnosis. These data are given below.

Number of drug-related hospitalizations	male	4,345
	female	2,750
	total	*7,095*
Hospitalization days	male	36,536
	female	22,035
	total	*58,571*

The total is multiplied by the average per diem cost for a general hospital, for a total of $34M. A similar procedure is followed for psychiatric hospitals using the Mental Health Statistics, for a total of $4.3M.

Co-morbidity costs occur when drug abuse is not the primary diagnosis but extra days of treatment are required because drug abuse has complicated the primary condition. Using data for Ontario hospitals, the average stay for patients with a particular disease who were drug abusers is compared to the average for those who were not. The average length of stay for co-morbid patients with a secondary diagnosis of illicit drug use is 11.3 days, compared to 9.0 days for patients who did not use drugs – an additional 2.3 days on average. The total additional days for Canada are estimated and multiplied by the average per diem to give $4.7M.

The cost of ambulance services is estimated by multiplying the total cost of ambulance services by the fraction of total hospital days attributed to illicit drugs, to give $1.1M.

Statistics Canada reports residential care costs for alcohol and drug treatment combined. The Centre applies the ratio of alcohol to drug treatment days in psychiatric hospitals to split total residential care costs, giving $20.9M.

Non-residential treatment costs were not measured nationwide officially. The Centre took the available provincial figures from Alberta, Ontario and Manitoba, and scaled these up for a national estimate of $90M. A portion of this total is then attributed to alcohol and drug residential treatment, on the basis of hospital days with primary diagnoses of alcohol and drug abuse; the resulting estimate is $7.9M.

Ambulatory care costs consist of physicians' fees and other professional fees. Because a breakdown of fees by diagnosis was not available nationally, the CCSA had a tabulation run by Manitoba Health. The proportion of total Manitoba physicians' fees attributable to illicit drug use is 0.1%. Applying this to the national total for physicians' fees yields an estimate of $8M, of which $5M is for males and $3M for females. Other professional services, such as those of dentists, chiropractors, optometrists, podiatrists, osteopaths,

naturopaths, private-duty nurses and physiotherapists, psychologists and psychotherapists, are excluded from this figure because of a lack of information.

The Laboratory Centre for Disease Control ran special tabulations to connect prescribed drugs and diseases. The CCSA then used its estimates of what percentage of a particular disease could be attributed to illicit drugs to find the amount of drug costs that could be attributed to illicit drugs. This percentage is about 1% of overall prescription drug charges, or $5.8M.

Other health care costs are divided on the basis of the proportion of hospital days attributable to illicit drugs. Household help and special rehabilitation equipment costs are not included in the estimate for other health care costs because of lack of data. Other health care costs are estimated to be $1.3M.

4. Prevention and Research

The breakdown of costs for prevention and research is as follows:

Research	$5.0M
Prevention programs	$36.7M
Training costs for physicians	$0.2M
Total	*$41.9M*

These prevention and research estimates include an attributable portion of the costs of research on disorders that are partially attributable to illicit drugs. Prevention costs are mainly for programs. Medical training costs are based on the proportion of undergraduate medical training devoted to drug issues. Training costs for nurses are not measured. There was no available estimate of the costs of averting behaviour attributable to illicit drugs, such as through programs aimed at fire prevention and crime prevention.

5. Other Direct Costs

Other direct costs consist of traffic and fire damage:

Traffic accident damage	$10.7M

Working from the proportion of motor vehicle fatalities attributed to illicit drugs, 0.35% of motor vehicle accident damage is attributed to illicit drug use. No estimate of drug-related fire damage was available.

6. Direct Losses in the Workplace

Direct losses in the workplace are estimated as follows:

Employee Assistance Programs and health promotion programs	$3.5M
Drug testing in the workplace	$2.0M
Total	*$5.5M*

Estimates of spending on Employee Assistance and health promotion programs were available only for Ontario, and were scaled up to cover all Canada. The only drug testing cost included is Health Canada spending in 1992. There are no estimates of the private cost of workplace drug testing in Canada, but 4% of Ontario workplaces had some form of drug screening in 1994.

7. Administrative Costs for Transfer Payments

The administrative costs for transfer payments cover social welfare and other programs, workers' compensation, and other administrative costs:

Social welfare and other programs	N/A
Workers' compensation	$1.5M
Other administrative costs	N/A
Total	*$1.5M*

Administrative costs for workers' compensation payments attributable to drug abuse are based on the fraction for non-fatal occupational and machine accidents attributed to illicit drugs. This fraction was 0.155%. No figure was given for the proportion of the administrative costs for unemployment and dependence on social assistance attributable to drug abuse. The study uses a figure of 0.5% for alcohol, and the authors presumably thought the fraction for drug abuse was too low to measure. Other administrative costs include group life insurance, private insurance, widow's bonus under the Canada Pension Plan, extra disability pension due to retirement for health reasons, and payroll taxes that finance pension, sick leave and disability attributable to substance abuse. Insufficient information was available to permit the attribution of part of these costs to drug abuse.

B. The CCSA Partial Update to 1995

In 2000, Eric Single, Jürgen Rehm, Lynda Robson and Minh Van Truong published an update of the original CCSA study to a year 1995 basis.(2) The update was limited to the health data used in the study, rather than the economic costs. The same relative risk numbers were used in the update; the prevalence numbers were updated for alcohol and tobacco, but not for opiates and cocaine. Because the prevalence numbers for illicit drug use did not change, the etiologic fractions in the 1995 update remained very close to those of 1992, which are listed in Table 2 below.

TABLE 2

ETIOLOGIC FRACTIONS FOR SOME CONDITIONS PARTIALLY ATTRIBUTABLE TO USE OF ILLICIT DRUGS IN CANADA, 1992

Condition	Associated Drug	Outcome; Sex; Etiologic Fraction				Age Range
		Mortality		Morbidity		
		M	F	M	F	
Suicide and self-inflicted injury	Various	0.14	0.03	N/A	N/A	15–49
AIDS						
< 15 years	IV	0.13	0.13	0.13	0.13	< 15
≥ 15 years	IV	0.04	0.13	0.04	0.13	≥ 15
Victim of assault	Various	0.14	0.03	0.08	0.03	15–49
Motor vehicle accidents	Various	0.02	0.00	0.02	0.00	15–49

Source: Eric Single, Lynda Robson *et al.*

It should be noted that only hard drugs are considered. The etiologic fractions are then used for a breakdown of the 1995 incidence figures. The number of hospitalizations and the number of deaths attributable to illicit drugs are given in Tables 3 and 4 below. The data in these tables underline the greater incidence of drug-related problems among males.

(2) Eric Single, Jürgen Rehm, Lynda Robson and Minh Van Truong, "The Relative Risks and Etiologic Fractions of Different Causes of Death and Disease Attributable to Alcohol, Tobacco and Illicit Drug Use in Canada," *Canadian Medical Association Journal*, vol. 162, no. 12 (13 June 2000), 1669-1675.

TABLE 3

NUMBER OF HOSPITALIZATIONS DUE TO ILLICIT DRUGS IN CANADA, 1995			
Causes	**No. of Hospitalizations**		
	M	**F**	**Total**
Opiate poisoning	266	245	511
AIDS	140	54	194
Cocaine poisoning	124	62	186
Poisoning, intent unknown	0	0	0
Victim of assault	922	53	975
Motor vehicle accidents	257	0	257
Other conditions	2,827	1,980	4,817
Total attributed to illicit drugs	**4,536**	**2,394**	**6,940**

Source: Eric Single, Jürgen Rehm *et al.*

TABLE 4

NUMBER OF DEATHS AND POTENTIAL YEARS OF LIFE LOST DUE TO ILLICIT DRUGS IN CANADA, 1995						
Causes	**No. of Deaths**			**Potential Years of Life Lost**		
	M	**F**	**Total**	**M**	**F**	**Total**
Suicide, self-inflicted injury	313	15	329	13,591	768	14,359
Opiate poisoning	129	31	160	4,908	1,378	6,286
AIDS	66	17	83	2,485	733	3,213
Cocaine poisoning	65	13	78	2,718	654	3,372
Poisoning, intent unknown	34	23	57	1,109	801	1,910
Victim of assault	34	3	37	1,469	152	1,621
Motor vehicle accidents	29	0	29	1,349	0	1,349
Other conditions	21	7	32	1,081	471	1,552
Total attributed to illicit drugs	**691**	**109**	**805**	**28,710**	**4,957**	**33,662**

Source: Eric Single, Jürgen Rehm *et al.*

C. Illicit Drug Costs in the United States

In 1998, the U.S. National Institutes of Health published a study by Henrick J. Harwood, Douglas Fountain and Gina Livermore, HFL.[3] This study has been subject to considerable expert debate which is summarized later in this report, so only an overview will be given here.

The HFL study follows the COI approach. It assumes that drug abuse causes resources to be diverted from other uses, and that the appropriate cost of drug abuse is the cost of these resources. It should be pointed out that the study follows the common methodology adopted for official U.S. government health studies. The advantage, in theory at least, for health studies is that policy makers can take studies of two diseases or illnesses and compare them to see if the right amount of health resources is being allocated to the treatment of each disease.

Economic losses from premature deaths caused by overdosing are measured according to the human capital approach. Unrealized future earnings are forecast and discounted back to a present value. The results are summarized in Table 5 below.

TABLE 5

ECONOMIC COSTS OF DRUG ABUSE IN THE UNITED STATES, 1992		
ECONOMIC COSTS	**US$ M**	**%**
Health Care Expenditures		
Drug abuse services	4,400	4.5%
Medical consequences	5,531	5.7%
Total Health Care Expenditures	***9,931***	***10.2%***
Productivity Effects (Lost Earnings)		
Premature death	14,575	14.9%
Impaired productivity	14,205	14.5%
Institutionalized populations	1,477	1.5%
Incarceration	17,907	18.3%
Crime careers	19,198	19.7%
Victims of crime	2,059	2.1%
Total Productivity Effects	***69,421***	***71.1%***
Other Effects on Society		
Crime	17,970	18.4%
Social welfare administration	337	0.3%
Motor vehicle crashes	-	
Fire destruction	-	
Total Other Effects on Society	***18,307***	***18.7%***
Total	**97,659**	**100%**

Source: Henrick J. Harwood, Douglas Fountain et *al*.

(3) Henrick J. Harwood, Douglas Fountain and Gina Livermore, *The Economic Costs of Alcohol and Drug Abuse in the United States, 1992*, National Institute on Drug Abuse, NIH Publication no. 984327, Rockville, MD, 1998.

The range of the study is impressive in that very few items of cost remain unestimated. On the other hand, there has been strong criticism of how some of the estimates have been developed, which will be discussed later.

The largest cost item is loss of productivity, which makes up 71.1% of all costs. Health costs are mainly related to hard drug use by injection and HIV/AIDS problems. A small item for HIV babies is included in the detailed tabulations.

The study attempts to allocate the costs of drug abuse, finding that 46% is borne by the government (through the criminal justice, health and social services systems), while private insurance bears 3% of costs. The remaining half falls on the shoulders of abusers themselves and their families in the form of lowered earnings and reduced household production.

D. Illicit Drug Costs in France

In 2000, the Observatoire français des drogues et des toxicomanies published a study by Pierre Kopp and Philippe Fenoglio, KF.[4] The authors of the study are primarily interested in the social costs of drugs – in their terms, the costs borne by the community. As in all countries, the illegality of drugs reduced the amount of data available for analysis; the study seems to have been slightly hampered also by a lower quantity and quality of data available through public reporting and the administrative documents of public agencies, such as annual estimates. The results are presented in Table 6 below.

According to this study, in 1995, 15.8% of people between the ages of 18 and 75 had used an illicit drug during their lifetime, with 4.4% using one in the past year. Males are more likely to declare drug use than females in surveys. The average age for first trying cannabis is 16. Between 23 and 30% of young people have used drugs. Cannabis is by far the most common drug among the young, and young males are more likely to have used it by about 10 percentage points than young females. The prevalence of solvent inhalation is between 1 and 6%, and ecstasy perhaps 3%. The cannabis spending data comes from assuming consumption rates for the qualitative consumption ranges used in surveys. For example, daily smokers are assumed to be using 0.5 grams per day, people who consume at least once a week are assumed to consume 1.5 grams per week. At an average price of Fr 35 per gram, total spending on cannabis is estimated at Fr 4,405.5M. Heroin spending is estimated at Fr 4,600M, and cocaine spending is in the range of Fr 3,000-10,000M.

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(4) Pierre Kopp and Philippe Fenoglio, *Le Coût social des drogues licites (alcool et tabac) et illicites en France*, Observatoire français des drogues et des toxicomanies, Étude nº 22, Paris, 2000.

TABLE 6

BREAKDOWN OF THE SOCIAL COST OF ILLICIT SUBSTANCE ABUSE	
	%
Health costs (1)	11.42
Public administration costs	36.37
Income and production losses (2) including :	45.69
- losses by individuals	13.29
- loss of production in the workplace	32.39
Government revenue losses (2)	6.49
Spending by private agencies	N/A
Other drug-related costs	0.04
Total	**100.00**

Notes: (1) Health costs include only costs attributable to HIV/AIDS treatment and for treatment using Subutex.

(2) Income and production losses and government revenue losses include only premature deaths from HIV/AIDS that are attributable to drug abuse, premature deaths from overdosing, and incarceration under drug legislation.

Source: Pierre Kopp and Philippe Fenoglio.

1. Health Costs

Estimating the health costs attributable to drug abuse is always difficult. KF face an array of data problems. Hepatitis C, for example, was not treated as a separate disease category for recording purposes.

AIDS is strongly linked to injection drug use, with about 25% of new cases in France in 1995 arising from injection drug use. The costs of HIV and AIDS treatments are derived from health ministry data. From these figures and from estimates of the number of HIV and AIDS patients who were drug users, the total costs of HIV/AIDS attributable to drug use can be calculated as Fr 575.24M and Fr 349.27M, respectively.

Subutex, based on buprenorphine, is a morphine replacement, apparently a treatment of choice in France. From the hypothesis that 40,000 individuals are under this treatment, the estimated cost of Fr 600M is derived.

2. Public Administration Costs

For the judicial system, KF have data on the proportion of court cases that involve drug laws. The total costs of the various types of court (including salaries for judges,

magistrates, clerks and officials, as well as administrative and building costs) are prorated by the amount of drug activity handled. The resulting amount totals Fr 99.943M in 1995.

Penal service costs are estimated from the proportion of those incarcerated for drug offences. In 1995, there were 11,816 inmates serving sentences for drug crimes out of a prison population of 51,325. KF would have preferred to work with data showing the individual duration of sentence, but these were not available. After some consideration of different scenarios on sentencing length, KF's preferred estimate is Fr 1,315.14M.

In France, the youth protection services cover both minors in danger and delinquents. Public- and private-sector aid agencies are funded by the state. Unfortunately, the Protection judiciaire de la jeunesse does not publish the number of minors taken into care for drug-related reasons, but the number of minors charged under the drug laws, about 4%, is available.

Customs employs about 20,000 officers, of whom less than a half are involved in surveillance and anti-smuggling. The Customs agency estimates that about 500 agents work full-time on drug smuggling. KF prorate the reported total personnel costs of the Customs agency by the percentage on anti-drug duty. Similarly, overhead is allocated to anti-drug activities. The resulting estimate totals Fr 532.29M.

One police service, the national Gendarmerie, exercises control functions by enforcing the drug laws, and is involved in preventative measures. Unlike many national police forces, the Gendarmerie does not have a separate drug unit; KF therefore have to estimate the costs of police anti-drug activities based on some relevant measure of output. In the case of law enforcement, data were available on the proportion of complaints and of people taken into custody. KF estimate this police function to cost Fr 311.62M. Based on an earlier study which found that 3% of patrol functions involve drug activities, KF arrive at an estimate of Fr 109.5M. An amount of Fr 38.2M is estimated for other costs, including such items as anti-drug training programs and dog handlers.

The National Police, a separate entity from the Gendarmerie, has 2,000 full-time officials working on drug problems, plus 195 full-time equivalents, for a cost of Fr 503.53M. For the street patrol functions, KF assume that 3% of total time was on drug matters, borrowing that estimate from their Gendarmerie calculations. This amounted to Fr 732.43M.

The main estimates of the ministry of social affairs, health and urban affairs provide some data on drug-related expenses. Anti-drug programs within the health arm of the

ministry amount to Fr 544.3M. This includes funding for treatment centres, prison programs and community living operations. There are some technical difficulties in using these reported estimates because of multi-year contracts. Part of the official programs to control HIV/AIDS is directed to drug users, for example needle exchanges. In addition, voluntary agencies working in this area devote part of their funds to drug users. After adding in estimates of these amounts, total spending by the health sector of the ministry on drug-related activities is estimated at Fr 696.32M.

The social affairs arm of the ministry spends Fr 14M on such activities as anti-drug training programs. The interdepartmental affairs program in the ministry's urban affairs sector makes grants, often matching, to other levels of government targeted at drug abuse and HIV/AIDS programs. These amount to Fr 22M.

In total, the ministry of social affairs, health and urban affairs is estimated to spend Fr 748.62M on the drug problem.

The education ministry spends Fr 2M on supporting school anti-drug committees, and Fr 41.68M on research funding at the various higher educational institutions.

The youth and sport ministry does not break down its spending in detail. KF estimate that one person worked half-time on drug issues in each department and region. This amounts to 52 full-time equivalents at a cost of Fr 8.8M.

The ministry of foreign affairs contributes about Fr 14M, as estimated by KF, for anti-drug and anti-trafficking programs. It seems that the ministry did try to produce its own estimates of spending on this activity, but abandoned the exercise because of technical difficulties.

The ministry of international co-operation is in charge of aid to developing countries. Part of this assistance takes the form of aid to police forces and gendarmeries. KF make a subjective evaluation that 20% of the policing assistance and none of the gendarmerie assistance is directed to drug problems and trafficking, for a total estimate of Fr 42.6M.

Finally, France contributes 17% of the European Union budget in total, and 17% of the EU drug program spending is Fr 30.87M.

3. Income and Production Losses

KF prefer to account only for the more measurable costs of drug abuse. In particular, it does not attempt to measure any subjective pain and suffering costs. The losses to be measured include the losses from premature death (including drug deaths and overdoses),

accident victims of drivers who were under the influence of drugs, and fatalities from drug crimes. Unfortunately, there are no data for the last two categories. Also included in the costing are the productivity losses of people incarcerated and of those hospitalized or off work due to illness.

In 1995, 228 persons died of drug overdoses in France. The ages of death are not available, and KF use a figure of 35 years of age. Working from the number of HIV/AIDS deaths and attributing 25.47% of these deaths to drug use yields 259 males and 60 females. Data are not available for hepatitis deaths. Assuming an annual income of Fr 97,012 with a discount rate of 6%, overdoses result in a cost of Fr 73.62M and HIV/AIDS in a cost of Fr 131.77M, for a total productivity loss of Fr 205.39M.

Those imprisoned under the drug laws also lose income. The losses are calculated by assuming the same annual income of Fr 97,012 and multiplying this by the total time of incarceration. The resulting total is Fr 1,569.34M. No figures are available for those crimes in which drug use could be implicated as a causal factor.

Income loss from hospitalizations and sickness caused by drug use is another category that KF would have liked to have costs for a wide range of illnesses, but data are not available in France, even for HIV/AIDS.

The value of production lost in the workplace is derived from looking at the amount of value added from the national income accounts. Incarcerations under the drug laws result in a productivity loss of Fr 3,677.58M, while early deaths cost the economy Fr 646.88M.

4. Government Revenue Losses

As well as the essentially private losses that can be attributed to drug users' incomes and the incomes of the enterprises that would have employed drug users had they not been incarcerated, in hospital or on sick leave, the government loses the various obligatory payments that income earners, both personal and corporate, are required to pay. In Canada, these payments are mainly income taxes; but many European countries separate out social security taxes. With a sizable government sector taking in 46% of national income, these amounts are worth measuring, although care must be exercised to ensure that costs have not already been included elsewhere and double counted. KF estimate a government revenue loss of Fr 100.25M from premature drug-related deaths, and Fr 765.99M from incarcerations for drug offences.

5. Spending by Private Agencies

KF were unable to obtain data on private agencies working in the drug area. Drug fines are imposed in France, and should be accounted for as a state receipt. Individuals may also be sentenced to community service, have their driving permit suspended, or be required to undertake counselling or education. Unfortunately, there are no financial data on these measures. KF feel it would be perilous to estimate lawyers' costs.

6. Discussion

The KF study presents some very interesting methodological suggestions about how to develop cost estimates. It would seem to the reader who compares this study to the North American work, that the North American researchers have at their disposal substantially better raw data as well as more resources to undertake the research and to sponsor additional research to fill in knowledge gaps. It is quite surprising to see which data are not available in France. For example, premature deaths from drug overdoses were not available broken down by gender. In terms of the way in which KF compute estimates, this was not an issue: KF assume that everybody is capable of earning the same income – the national average income – be they male or female, inexperienced or established in the labour force.

KF are interested in a systematic decomposition of costs that North American researchers did not use. But it is less clear whether this decomposition gives new insights or answers relevant questions in a substantially different way. Emphasizing the loss to society of forgone taxes and social security levies resulting from early death or imprisonment or sickness is valid, but numbers based on a national average wage will be rejected by those who point out that many inmates have a history of minimum-wage employment. Some questions and complications introduced by KF seem to be of no great practical importance. For example, the costs of imprisonment can be calculated either on the basis of what costs were incurred in the base year or on the basis of those who were sentenced in the base year.

In the area of public administration costs or indirect cost of drug control, the methodology used by KF is very much the same as that used in the North American studies, namely, cost allocation. The total costs of policing, courts and prison are divided by some indicator of the fraction of system use that can be attributed to drug offences.

E. Critiques and Rejoinders

In 1999, the Society for the Study of Addiction to Alcohol and Other Drugs devoted 17 pages of its journal *Addiction* to a discussion of the 1998 HFL study.(5) After an exposition of the report, four experts commented on the study.

1. Peter Reuter - Are Calculations of the Economic Costs of Drug Abuse Either Possible or Useful?

In summary, Reuter sees a number of flaws in cost estimation studies:

> I believe that even for the data-rich United States, the results are subject to enormous uncertainty; plausible changes in a few key assumptions can lead to major changes in both total costs and its composition in two sets of relevant dimensions (source and incidence of burden). This is a consequence of both conceptual ambiguities and empirical limitations that are unlikely to be resolved in the foreseeable future. Moreover, the value of the exercise is in question; the policy objectives ostensibly served by these estimates would be better met by research estimating impacts of policy changes.
>
> Reuter in Harwood, Reuter *et al.*, p. 636

These types of studies attempt to cover the whole of society, but scientific understanding and knowledge may not have progressed far enough to be useable in some areas. Reuter finds that there is not a strong empirical base for many of the figures that make up the estimates. As an example of an area of inconsistent findings by previous researchers, Reuter looks at the cost of impaired productivity. This is a major cost of substance abuse. Some previous analyses with other datasets found no statistically reliable, significant impact of drug use on wage rates, earnings or employment. The statistical results on marijuana use are quite diverse, with some studies finding that marijuana users are more likely to be employed than non-users.

HFL decided to undertake their own investigation of the effects of drug use on current income. Reuter finds the new research results reported by HFL ambiguous; the estimates changed considerably with alterations in the model specification. He sees no statistical reason to ignore the previous research on this topic and just use one of the new results.

In other parts of the HFL study, estimates are based on no more than a good guess. Reuter cites homicides as an example of this. The study attributes 15.8% of murders to

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(5) Henrick J. Harwood, Peter Reuter, Mark A.R. Kleiman, Pierre Kopp and Mark A. Cohen, "Cost Estimates for Alcohol and Drug Abuse," *Addiction*, vol. 94, issue 5 (May 1999), 631-647.

drug abuse based on U.S. Federal Bureau of Investigation records, and presumably people in the police system have made guesses about the role substance abuse played in specific cases. Reuter cites earlier research that reviewed FBI records and interviewed homicide detectives and found much uncertainty in the attribution of causal factors. Reuter argues that the substantial literature on drugs and crime shows little sign of making major progress in this area. The HFL study uses point estimates which may be subject to large sources of non-statistical error.

In those areas with a weak research base, HFL set the cost at zero. For example, the study attributes no vehicle accidents or fatalities to drug abuse, because of a lack of reliable data. Reuter points out, however, that a number of other studies mention cases where authorities have tested reckless drivers who were not drunk and found drug abuse. The measured fraction of drug abusers differs among the various studies of illicit drug abuse and driving accidents, but it is never zero.

HFL attempt to estimate the value of resources that would be freed up if no illicit drugs were consumed. However, the elimination of drug consumption raises different conceptual problems from the elimination of, for instance, diabetes. If someone is cured of diabetes, that person will not be predisposed to contract another disease; but if, for example, smoking marijuana were eliminated, would drinking increase in response?

Reuter is somewhat sceptical of the usefulness of economic cost studies. Would they contribute to a better understanding of the nature and magnitude of the impact of alcohol and drug abuse? Would they help decision makers to identify appropriate strategies? Reuter tests these questions by looking at the use made of earlier cost studies. Reviewing a sample of publications that cite the cost studies, he finds that data on the high cost of substance abuse are used only as a prop for a policy argument. That use would not have been altered were the cost have been much higher or lower. Costing policy changes needs estimates of marginal rather than average costs.

Reuter credits the official U.S. interest in these calculations to interagency competition for funding and resources in an era that takes numbers seriously. Reuter sees the process of generating such estimates as the statistical equivalent of an armaments race: each agency needs a number to show the seriousness of the problem for which it is responsible.

2. Mark A.R. Kleiman – "Economic Cost" Measurements, Damage Minimization and Drug Abuse Control Policy

Kleiman argues that, although exercises to calculate the economic costs of alcohol and drug abuse ought to be an important first step in designing policies to minimize harm, the use of a concept of cost that is too narrow in scope and not a marginal cost limits the usefulness of these estimates.

Kleiman is strongly convinced that the willingness-to-pay approach to economic cost is a far superior measure. In the willingness-to-pay method, economists find out the dollar amount that consumers would be willing to give up from their own resources to avoid the disadvantages created by the condition to be costed. This is a much wider meaning of economic cost than the opportunity cost notion, which concentrates on the cost of lost resources that are readily convertible into dollars and cents. For example, the narrow opportunity cost of an injury would be medical expenses plus lost wages, excluding any measure of pain and suffering. The opportunity cost underestimates the willingness-to-pay measure.

To Kleiman, the willingness-to-pay measure alone allows a coherent and consistent analysis. Would society be better off if a treatment for a painful injury or disease was developed? If the disease did not account for much absenteeism, development costs could outweigh the gain in productivity and this treatment would show up as a net loss to society. But if the reduction of pain and suffering was estimated, the benefits of this treatment could outweigh the costs.

HFL use the narrow definition of economic cost because of data limitations. Measuring willingness-to-pay to avoid small risks of death results in much higher estimates of the costs of an early death than the discounted present value of future earnings, typically in the order of millions as compared to hundreds of thousands of dollars.

According to Kleiman, HFL's bad choice of cost measure makes the published results counter-intuitive in a number of places. The study finds that car crashes caused by substance abuse produce more damage to automobiles than to humans. Alcohol kills four times as many people as illicit drugs, but is estimated to cause only 50% more total damage.

Kleiman suggests the following back-of-the-envelope calculation to see the order of magnitude change that would result from using a more appropriate measure of loss. If the one tenth of the adult population of the United States that suffers from substance abuse would be willing to pay $10,000 for a year's remission, then the total willingness-to-pay to avoid addiction itself would total $200 billion per year in the United States. This is nearly as much as the HFL estimate of $246 billion for out-of-pocket expenses, direct costs and lost income from addiction.

Kleiman puts forward the figure of $10,000 from introspection and quizzing acquaintances. He argues that it would seem a plausible number for the average American. The HFL estimate of the financial impacts of substance abuse covers only a part – very likely, in the light of this back-of-the-envelope exercise, less than half – of the properly measured cost. This could lead to an underestimate of the benefits of policy intervention and perhaps the choice of wrong policies.

Rather than the total cost of substance abuse, the real policy interest is the marginal impact on costs of changing policy variables. Policy questions do not ask "What is the total cost of cocaine abuse?" but, more likely, "What would happen to the total economic costs of cocaine abuse if another 100,000 dealers were imprisoned, or another 100,000 addicts treated?" A different approach to model building is needed. The results from HFL cannot be easily fixed up to give marginal impacts.

Knowing the economic cost of illicit drugs, whether on a willingness-to-pay basis or not, does not illuminate important questions such as whether it is better to imprison an additional dealer or treat an extra addict, or whether either would be a good social investment. This requires a detailed modelling of the demand and supply sides of the illicit drug markets.

3. Pierre Kopp - Economic Costs Calculations and Drug Policy Evaluation

Kopp finds the methodology of calculating public spending on illicit drugs questionable and the breakdown of the social cost unpersuasive. He finally questions whether social cost estimates help guide public policy.

The cost figures for the public sector include total spending by drug agencies plus a fraction of the budgets of the multi-function agencies, such as police, which deal with a wider range of social problems than substance abuse. Kopp argues there is an incentive for U.S. agencies to label too much as drug-related to take advantage of the relatively more plentiful federal anti-drug funding.

Kopp also finds the rule-of-thumb approaches that the multi-function agencies use to allocate costs are inconsistent. As an example, Kopp considers AIDS and injection drug use. One-third of AIDS cases are drug-related but Kopp is against allocating one-third of the U.S. AIDS bill to the drug bill. It is part of the government war on AIDS and not part of the war on drugs, because it treats AIDS, not drugs. This does not affect the total amount of public spending, but its distribution. Kopp finds the methods used in costing the drug prevention area inconsistent with the AIDS costs. Drug prevention spending seems too low to Kopp, who is of the opinion that many non-federal healthy lifestyle or anti-delinquency programs were not included.

The law enforcement and criminal justice costs are so much out of line with previous estimates that Kopp thinks there must be some accounting or reporting problem requiring more discussion. The calculation methods used by the law enforcement agencies are often unclear. In addition, the methodology is inconsistent with that used in the case of AIDS, because a portion of non-drug crimes in which drugs was a factor is not costed.

The division of the social costs of drug use between the various parties produces results that Kopp finds surprising. HFL reported that nearly one half of social losses accrue to the government. Kopp argues that premature death should result only in a loss of future tax revenue, and that the abuser should be allocated the cost of future lost income. Also, early death lessens future government expenses and transfer payments. Kopp is uncomfortable with a lack of distinction between the government and the taxpayer, who is the ultimate source of funds for the government. He would have preferred an attempt to allocate costs to abusers, crime victims, non-abusers, private insurance and the government. Kopp thinks that employers pay part of the costs of lower productivity caused by drug abuse, as well as increased health insurance and social insurance premiums. Similarly, the family members of the drug abuser face a reduced family standard of living because of the abuser's lower income, coupled with higher health care and insurance costs, plus a reduced quality of life for the family.

For Kopp, current methods of calculating the social cost of drug use do not lead to ways of modelling large changes in drug policy. Lowering consumption by putting abusers at higher risk of criminal prosecution might eventually cause total social costs to rise because of the effect of criminalizing drug users, but the methods in the study do not illuminate these sorts of questions.

4. Mark A. Cohen – Alcohol, Drugs and Crime: Is "Crime" Really One-Third of the Problem?

Cohen finds four issues of concern in the HFL study, centring on the inappropriate attribution of some crimes to alcohol or drug abuse and the use of inaccurate data on the cost of crime.

Unlike the case of medical problems, where epidemiological studies isolate the relative risk and control for other health risks, the data linking crime with drug abuse are mainly based on interviews with detainees and prisoners. Such data are subject to over-reporting, because prisoners use alcohol and drugs as an excuse and intoxicated criminals are easier to find and arrest.

Cohen does not find the figures in the study credible. Thirty percent of homicides are attributed to alcohol abuse, and another 15.8% to drug abuse. To Cohen it is implausible to argue that doing away with drink and drugs would halve the U.S. murder rate.

The theoretical and empirical research does not support this degree of causal effect. Developmental histories show that criminal activity comes before substance abuse. The statistical research can neither rule out nor rule in causality. Some drugs inhibit violence, but others induce violent behaviour.

The HFL report understates the number of crimes, because it uses the number of crimes reported to police. Not all crimes are reported to the police. There are social surveys that ask a random sample of the population if they have been a victim of a crime recently; the degree of under-reporting can be quite staggering, with 5 million assaults reported to the police out of 7 million, and only 140,900 of 1.1 million rapes reported.

According to Cohen, HFL use outdated estimates of the cost of crime, which seem to underestimate the true costs. The research in this area has moved towards more substantial cost figures. For example, the estimated average medical cost for a rape victim rises from $28 to $2,200 when long-term care and counselling are added in. Similar problems are found in the lost productivity estimates for crime victims, where the short-term figures used by HFL are only about a quarter of the newer long-term estimates.

In the same spirit as Mark Kleiman, Cohen thinks that opportunity costs such as medical costs plus lost wages are too narrow a basis on which to measure the true costs of being a crime victim. The intangible losses from crime, pain and suffering, which manifest themselves in such things as not being able to enjoy a walk in the park from fear, or worrying about being victimized again, are very real to the victims. They change observable behaviour, and are now starting to be measured.

Cohen disputes the assumption in the HFL report that if offenders were not in prison they would be earning average wages. This assumption is used to generate an estimate of lost earnings from incarceration. In earlier research, Cohen had found much lower earning potential for inmates – in fact, far below a full-time minimum wage job. Of course, part of the low earning potential can be attributed to substance abuse, but substance abuse is symptomatic of other psychological problems. Some other researchers have also found that street drug dealers had below-average earning records before taking to crime.

5. Eric Single and Brian Easton – Estimating the Economic Costs of Alcohol Misuse: Why We Should Do It Even Though We Shouldn't Pay Too Much Attention to the Bottom-line Results

At a meeting in Toronto in May 2001, Eric Single and Brian Easton presented a vigorous defence of economic cost studies.(6) It should be noted they were not part of the symposium summarized above and are not explicitly replying to the above critiques. As might be expected from the title of their paper, many shortcomings in the CCSA study are admitted; but it is argued that the real value of such studies lies in the detailed results on mortality and morbidity, and on the relative contribution of acute and chronic conditions to overall problem levels and adverse social consequences such as crime and economic productivity, rather than in using the bottom-line results to promote abuse issues to a higher place on the public policy agenda. Stakeholders, policy makers and the media are very interested in the costs of substance abuse. Single and Easton believe that these economic cost studies inform decisions about funding and interventions to prevent or reduce adverse consequences.

Single and Easton see themselves as producing an index like the mortality rate or GDP. They ask themselves: "For all their failings, what serious demographer would abandon mortality rates, what serious economist would throw out GDP?" The cost estimates provide a framework for comparing the aggregate societal impact of addictive substances. There are practical limitations at the present state of development of cost estimates, stemming from data inadequacies and from difficulties in applying new theories. However, these limitations should be identified and remedied.

Single and Easton enumerate the main sources of error in economic cost estimates. The costs of premature mortality have usually been estimated by the human capital approach based on estimates of forgone future, but the willingness-to-pay technique has now been used in some studies of tobacco costs. Single and Easton support the philosophical position that we value life above the value of lost of production, but point out this is a new area of measurement without full consensus among the experts.

There is a lack of basic data on many items of interest. The proportion of crime attributable to substance abuse is highly contentious. Consumption data are a problem for both illicit and legal substances. Productivity problems such as absenteeism, job turnover, lower on-

(6) Eric Single and Brian Easton, "Estimating the Economic Costs of Alcohol Misuse: Why We Should Do It Even Though We Shouldn't Pay Too Much Attention to the Bottom-line Results," paper presented at the annual meeting of the Kettil Bruun Society for Social and Epidemiological Research on Alcohol, Toronto, May 2001.

the-job productivity and disability, and their relationship to substance abuse, are not well measured. Government budgets do not break out drug policy costs for prevention, research and law enforcement.

The prevailing methods for estimating economic costs involve a layering of multiple assumptions. The estimates of death and illness attributable to substance abuse are based on the relative risk that abusers will contract an illness, and prevalence or consumption data. These two figures are combined to give the etiologic fractions, which are then applied to the reported number of deaths and illnesses to give the attributable numbers. The relative risk figures come from epidemiological analysis and may involve the meta-analysis of data from different countries. This can introduce inaccuracies. For example, epidemiological studies from Canada and Australia are often combined because they are medically similar countries; but freezing to death, which accounts for 20% of overall mortality in certain parts of Canada and is often the result of alcohol misuse, is almost unknown in Australia.

Although they agree there are still significant sources of error in the bottom-line estimates of total economic costs, Single and Easton remain committed to these studies. Undertaking a study identifies information gaps, research needs and desirable refinements to national statistical reporting systems. The CCSA found a gap in the information available on the proportion of crime that could be attributed to alcohol and drug misuse in Canada. As a result of that finding, a study was being undertaken by Kai Pernanen and Serge Brochu on this topic in 2001. Moreover, the economic cost studies set standards of quality control for those policy makers who need and use cost estimates. Unlike Reuter, Single and Easton feel that economic cost estimates are frequently used to argue about policy and funding priorities. Cost estimates help to direct attention to those areas of substance abuse that involve the greatest economic costs. Single and Easton forecast that the development of improved estimates of the costs of substance abuse offers baselines measures for more sophisticated economic analyses to determine which policies and programs are the most effective in reducing the harm associated with substance abuse.

F. Discussion

Of the four authors who reviewed the U.S. cost study, two are opposed to further such studies being undertaken, while one wishes more such work were done in Europe. In addition to the large questions of whether economic cost studies are worthwhile in themselves or

whether they are the best research strategy for investigating addiction and providing policy advice, a number of questions of a more technical nature were raised.

The CCSA study found that lowered productivity is the major cost element, accounting for 60% of all costs related to drug abuse in Canada in 1992. However, the effect of substance abuse on workplace performance is the subject of considerable debate between experts. Comparisons between the wages of impaired workers and those of the unimpaired would tend to show that impairment has a cost; but if the analysis is done rather differently to model the joint choice of job and of drug use, these results can be reversed. The professional debate is rather subtle, concerning issues of selection bias. A less esoteric question about how the drug problem works may illustrate the issue. If the drug user in a job below his qualifications and training stops – or is stopped from – using drugs, will he move on to a higher-paying job? The answer will depend on whether drug use is like a disease or more like a choice of lifestyle. It is difficult to analyze data in a way that sheds light on this sort of question. A related concern can be raised about the CCSA study's use of average earnings to value future loss of life, and the basis for thinking that if addiction is removed the individual lifetime income will improve.

A willingness-to-pay approach, or the inclusion of some pain and suffering costs, seems to be gathering more support among analysts and will in all probability become the new standard in cost studies in the not-too-distant future.

The treatment of crime in the CCSA study is far from satisfactory. Canada has a low rate of crime against the person, unlike the United States; but it has a high rate of property crime. Moreover, a substantial percentage of crime is not reported to the police. Some of the American concerns may not be relevant to Canada. Altogether, it is a very open question how far the experts are from reaching any consensus on the role of drugs in crime.

The CCSA study includes only the administrative costs of transfer payments such as welfare, not the amount of the payment itself. The study treats health insurance benefits (treatments, hospitalization, prescription drugs and so on) as items to be costed, but not social or employment insurance benefits. The amount attributable to activities concerning illicit drugs was too small to include. It should be pointed out that some provincial governments have had campaigns against drug users on welfare. This may be an area where expert opinion and public views differ significantly.

Another criticism concerns the study's treatment of medical costs related to deaths from drug abuse. The study considers the entire amount of such costs to be drug-related.

However, everybody will die of something eventually. It could be argued that the appropriate cost element, in the case of deaths from drug abuse, is the excess of those costs over average medical costs at the end of life.

Of course, the CCSA study has cut corners and made approximations, but the ultimate standard by which it will be judged is how much use it is to the client population. That usefulness is still an open question: how well the study answers questions depends on what questions are asked. Reuter finds no citation evidence that U.S. cost studies have been used for anything more than a prop for an argument. Single and Easton argue the contrary but present no evidence.

Single and Easton feel that economic cost studies will provide the basis for more sophisticated policy analysis, while Reuter argues that one might as well go directly to policy modelling. The technical points here are that in policy analysis marginal impacts are needed, which require a detailed systems modelling of various connections. Neither of these is a part of a standard economic cost study. How different policy modelling can be is illustrated in the next section, where a famous RAND policy modelling is discussed.

COST-EFFECTIVENESS STUDIES

Cost-effectiveness studies focus on a well-defined empirical target, and the question for the policy analyst is how that target can be achieved at the lowest cost. The target itself may not be a true policy objective, such as diminishing the harm caused by drug abuse; instead, it may be something less encompassing or a more intermediate target, such as achieving a specific reduction in aggregate drug consumption. The most cost-effective policy need not be worthwhile in the sense that the benefits of this policy should exceed the costs; it may simply be the way to achieve a pre-determined goal at minimum cost.

A. Controlling Cocaine: Supply versus Demand Programs

Controlling Cocaine: Supply vs. Demand Programs (the RAND study) by C. Peter Rydell and Susan Everingham, caused quite a stir in U.S. policy circles when it was first published in 1994.(7) It compared domestic drug treatment programs with supply control methods such as eradication of drugs in the source countries, interdiction, and domestic law

(7) C. Peter Rydell and Susan S. Everingham, *Controlling Cocaine: Supply vs. Demand Program*s, RAND, Santa Monica, CA, 1994.

enforcement. U.S. military resources had been mobilized in the U.S. drug war, perhaps looking for a new role at the end of the Cold War, and there was considerable debate in the country about whether this was a suitable use of the military. Domestic law enforcement efforts were being toughened. Prison sentences were being lengthened, along with mandatory minimum and "three strikes" policies. The RAND study concluded that there was compelling evidence that drug treatment is the most cost-effective method to reduce cocaine consumption. The study was used to suggest that funds ought to be redirected away from the military towards drug treatment programs. The expected reaction ensued. The Institute for Defence Analysis was asked to produce a study of the U.S. interdiction effort abroad; it found that interdiction really worked. Faced with these conflicting results, the Office of National Drug Control Policy asked the National Research Council to evaluate the two studies.

In 1994, the authors found that the U.S. cocaine epidemic was not over but that the peak aggregate consumption had passed. Looked at more closely, consumption patterns were still a cause for concern. The overall decline in the number of cocaine users was the result of a substantial decline in the number of light users, defined as people who consume cocaine at least once a year but less than weekly, coupled with a substantial increase in the number of heavy users. The heavy or weekly user consumes about eight times as much cocaine as the light user. The preceding 15 years had seen the price of cocaine decrease while consumption increased in spite of increasingly stronger public policy responses.

According to RAND figures, in 1992 the U.S. spent about $13 billion on cocaine control. Domestic enforcement – such as seizing cocaine, making arrests, and imprisoning drug dealers – was estimated to cost $9.5 billion. Interdiction by the Coast Guard, Army and Customs Service cost $1.7 billion, while outpatient and residential user treatment programs cost $0.9 billion.

Supply strategies to control cocaine included operations in the source countries, interdiction before and at the U.S. border, and the domestic enforcement of drug laws. The main demand strategies included drug treatment programs, sanctions to reduce demand such as the fear of arrest and prison, and prevention programs in schools and communities.

For cocaine, the demand and supply strategies work through the marketplace, which equilibrates demand and supply. The authors are interested in a long-run equilibrium.

- *Demand controls* can reduce the number of users or the amount that they are willing to purchase at a given price. Prevention programs attempt to reduce future demand by persuading people not to becoming users. Treatment programs work in two ways to reduce consumption: first, people in treatment are off drugs; and second, after treatment, a number of them will be able to control their usage. Sanctions make users fearful of the consequences of consumption.

- *Supply control* strategies remove cocaine from the production and distribution system. They do not make it impossible to obtain cocaine in the United States, but they increase its price. The producers and dealers have to raise the price on the cocaine that gets through to cover the costs of both the supply actually sold and the supply forfeited to the authorities. Increased drug seizures mean increased arrests and imprisonment, and the forfeiture of assets. Drug dealers will seek additional compensation for the increased chances of being arrested and imprisoned as well as for the loss of assets. These costs, along with additional recruitment costs, will be passed on to the user. Supply control policies work in the same way as spoilage, wastage, theft and shoplifting do for normal goods, with additional costs being embedded in the retail price.

The RAND study set a target of a 1% decrease in cocaine consumption over a 15-year period, and asked whether it would be cheaper to meet this goal by means of demand control or supply control. To find the answer, the authors have to specify the demand function for cocaine in the United States and determine how this function is changed by spending more on drug treatment programs. They also have to specify the supply function for cocaine in the United States and determine how this function is changed by spending more on interdiction and law enforcement. These are not easy tasks. The RAND Corporation has been undertaking a substantial research program in this area for many years, and the authors benefit by being able to draw on parameters and insights from preceding RAND studies.

1. Supply

The RAND Corporation has modelled the supply process for cocaine as a series of production steps:

- coca is grown and the leaf harvested;
- the leaf becomes a paste;

- the paste becomes cocaine base;
- this cocaine base is then shipped to the United States; and
- the cocaine is then parcelled out and sold on the street.

Cocaine is a refined agricultural product, easy to grow and requiring a fairly simple refining process. Changing supply should not alter costs. In 1992, cocaine cost only $4,000 per kg in South America, but one kg had a U.S. retail value well over $100,000. This mark-up reflects the U.S. domestic interdiction and law enforcement efforts in place in 1992. These numbers suggest that replacing seized product is not the largest cost faced by the illicit drug industry. The three supply control programs considered by the authors are source countries control, interdiction, and domestic enforcement. They ran their model for each of these three alternatives.

The RAND Corporation modelled each of the six stages in the cocaine production process mentioned above. The output at the previous stage becomes the input at the current stage. Input and output at each stage of production are related by a yield factor. Net output at each stage equals gross output, minus seizures, minus consumption, where consumption denotes that product which is diverted away from the stream headed for the United States. The total cost of production at each stage is equal to the costs of the drug from the previous stage of production, plus processing costs at that stage, plus the cost of the financial sanctions imposed by seizures and arrests. From the assumption that the cocaine market is competitive, price equals average cost of product sold. This gives a downward-sloping long-run industry supply curve, which is the long-run average cost curve.

The effect of supply control programs is to move the supply curve around; in simple terms, it makes less product available at higher prices. Costs are imposed upon the drug producers from losing production and distribution workers; producers seeking financial compensation for these additional costs move the supply curve around. To increase these financial sanctions against drug dealers, the public has to spend more on its various enforcement authorities.

The cost of cocaine is assumed to increase with the level of supply control activity. The public cost of supply control programs consists of the seizure costs, the costs of processing arrests, and the costs of imprisoning those found guilty. Subtracted from this is the value to the public of the assets seized by the police from the drug dealers. The authors model

the relationship between the total public expenditure on supply control programs mathematically as a power function of the quantity of cocaine seized. The power chosen is greater than one in value. This means that the public cost increases disproportionately as more and more cocaine is seized. The authors have a parameter that they call the diminishing productivity parameter – the ratio of marginal productivity of supply control expenditure to average productivity. The seizure costs themselves depend upon the proportion of cocaine seized when searches are random; however, when searches are based on intelligence information, the costs depend on the amount seized.

2. Demand

In 1992, there were approximately 5.6 million light users of cocaine and 1.7 million heavy users in the United States. Within the technical literature on addiction, researchers specify a multi-stage process of abstinence, initial use, abuse, dependence, and finally recovery. RAND has undertaken longitudinal studies of cocaine use progression. The researchers estimate that every year 15% of light users stop using cocaine, and 2.4% move up to heavy use. The annual outflow from heavy use is 6%, made up of 4% returning to light use and 2% abstaining. Against this pattern, the authors considered increasing the availability of outpatient and residential drug treatment programs. The outpatient treatments are shorter, less costly, and have been used more. Residential treatments are relatively expensive, take longer and are less used.

About 80% of users do in fact keep off cocaine during the treatment program; and some users will drop out before completion. The success rate of these treatment programs is quite low. In the year after treatment, 12.2% of those who received outpatient treatment were no longer heavy users, compared to 16.7% in residential treatment. The authors estimate that these programs account for a 4% outflow from heavy users. Thus two-thirds of the annual outflow from heavy users of cocaine can be attributed to drug treatment programs, with one-third of those heavy users who escaped from heavy use doing it on their own. The average treatment cost was $1,740 in 1992. This rather low figure reflects the high use of outpatient treatment as opposed to the more costly residential treatment programs.

The authors point out that a surprisingly large part of the reduction in cocaine use by heavy users is during the treatment program. One-fifth occurs during treatment. Treatment programs in the United States attract only heavy users; thus, demand control programs will

affect only one part of the user population. On the other hand, supply control programs work through the price mechanism, and all users will reduce their consumption to a certain extent, as determined by their price elasticity.

The modelling of demand is complicated by the need to introduce some supply control considerations, because enforcement efforts will change the number of dealers, who are also drug users. The authors model the number of users according to a Markov model, in which an individual changes from one state to another, such as from being a light to a heavy user, with a known probability. The number of light users in the current year is equal to the number of light users in the previous year, plus the number of new light users, minus the number of light users who quit, minus the number of light users who become heavy users, plus the number of heavy users who become light users. Similarly, the number of heavy users depends upon the previous year's number of heavy users, plus the number of light users who have increased their consumption to heavy, minus the number of heavy users who have quit totally or become light users. Price changes affect the probability that an individual will change usage category. This is modelled as a power function.

Total cocaine consumption is given by the number of light users times their average consumption rate plus the number of heavy users times their average consumption rate. The consumption rate of light users depends upon the current price of cocaine, and the incapacitation rate of drug dealers who were light users relative to the base period. For heavy users, the consumption rate depends upon three factors: price; the incapacitation rate of the dealers who were heavy users; and the desistance rate, which is related to the average amount of time that the average heavy user in a treatment program remains drug-free.

The authors assume that outpatient treatments for drug offenders will be offered to those users who are easy to treat, while the more difficult cases will be treated as inpatients. This implies that increasing the budget for drug treatment will mean catering more and more to those clients who need residential treatment. There will be increasing costs for individual treatment as the treatment budget increases.

The RAND model is solved over a 15-year period from 1993 to 2007, with demand being equated to supply in each period. Because cuts in consumption occur at different times during the model runs under demand versus supply policies, the study compares the current value of cuts in cocaine consumption and increases in program costs in 1992 present values.

The authors have gathered data and estimates from a number of earlier RAND studies, including data on:

- coca production in Bolivia, Colombia and Peru;
- the amount of leaf produced;
- the base refined from the leaf;
- final cocaine;
- the corresponding price data at each stage of production;
- the amount that has been seized by the authorities;
- the cost of seizures to the public purse (source: various law enforcement authorities). In the United States, the assets of drug dealers may be forfeited to the police. The value of these assets is calculated both on the basis of the cost of replacement for the drug dealers, as well as on the value realized upon public auction. The replacement cost of the assets is part of the financial sanctions faced by the dealers. The auction value becomes part of the budget of the police force.

At various times, the RAND Corporation has analyzed budgets of the police authorities, the court system and the prisons. From these budgets they have derived estimates of the amount of public resources devoted to law enforcement activities against cocaine drug dealers. In most cases, direct data have not been available, so that the amount of public resources devoted to dealing with cocaine offences has been assumed to be proportional to the percentage of cocaine arrests.

In addition to the public costs of law enforcement, early RAND studies had formulated estimates of the cost to drug dealers of being arrested, tried, and spending time in jail. To give an idea of the magnitude of these numbers, the cost to a drug dealer of being arrested was put at $6,395, based on a 1986 study adjusted to 1992 values. A cell-year in prison was estimated in 1992 to impose a cost of $38,588 on producers and drug dealers. It was assumed that these costs were one-third of the U.S. level in foreign source countries.

B. The National Research Council Analysis of the RAND Study

The U.S. National Research Council sees the downward-sloping supply curve in the RAND study as worthy of debate. According to the Council's understanding of the RAND study, marginal costs do not change with output in the growing and refining stages of cocaine

production, but spreading the burden of drug seizures over an increasing output results in lower average costs at the retail level. The Council is interested in seeing if the authors' results are invariant under different parameters of demand and supply. The Council notes that the authors do not consider the possibility that some policies may affect both demand and supply. For example, increasing domestic enforcement may deter purchasers.

Although the National Research Council finds the RAND study to be serious, innovative and sophisticated compared to previous studies of drug policy, it believes that the study makes many unsubstantiated assumptions. Plausible changes to these assumptions may change the qualitative conclusions of the study. Thus, the Council does not find the conclusion that demand control policies are superior to supply control policies to be persuasive.

The measures of treatment effectiveness in the RAND study are derived from the TOPS, or Treatment Outcome Prospective Study, that looked at more than 11,000 patients in 41 treatment programs in ten cities between 1979 and 1981. Some follow-up continued for three to five years. However, according to the Council, TOPS looked mainly at methadone replacement for heroin. (There is no replacement drug for cocaine that is as useful as methadone is for heroin.) Could the results be biased because of more highly motivated subjects in the 41 treatment programs? Would their motivation have yielded similar results without the program? Moving more resources into drug treatment programs, as the RAND study recommends, may involve treating groups of drug users who are less susceptible to treatment programs. The National Research Council believes that: the RAND study has ignored the difficulties of inferring treatment effects in heterogeneous populations; and the sensitivity analysis performed by the authors is not wide enough to cover these difficulties.

The National Research Council also questions:

- the assumption of the downward-sloping supply curve;
- the way control activities affect production costs;
- the use of seizures as a measure for control activities; and
- the assumption that the cocaine market equilibrates by price alone.

The Council presents an approximation to the authors' model in which supply curves slowly upwards. With these new parameters, consumption becomes more responsive to supply control measures.

The RAND study assumes that one dollar added to average costs at any stage in the production results in the same addition to retail price. The National Research Council questions this, wondering why a cost increase at the coca growing stage is not marked up by the same amount as the base product. The implication of this is that foreign zone operations could be much more effective than the RAND study calculates.

The Council argues that, in illegal markets, consumers as well as dealers face legal sanctions and social stigma. Police crackdowns may substantially increase the search costs to find cocaine, making the shopping process more expensive. The Rand study does not consider these matters.

On the demand side, the Council has questions about the value chosen for the price elasticity parameter, or how responsive demand is to price (an elasticity of -1 means a 1% increase in price causes a 1% decrease in the quantity demanded) and the way RAND models the impact of control policies through the demand side.

As in all demand and supply analysis, the elasticities are crucial, and making the demand for cocaine more elastic dramatically improves the effectiveness of supply control programs. Given the measurement difficulties, there were few studies of the demand for illegal substances available to the authors. However, much more analysis had been done of the demand for legal addictive substances such as alcohol and tobacco. The RAND study used a price elasticity of -0.5, which was borrowed from the alcohol studies, and performed sensitivity analyses on the values of -0.38 and -0.75. Econometric studies published since 1994 suggest that the price elasticity for cocaine is much higher than had previously been thought, perhaps even over -1.0.

In the RAND study, everyone shares the same price elasticity, be they light or heavy users. In practice, however, the price may affect initiation very differently than it affects intensification of drug use. The RAND study deals only with cocaine and does not consider other psychoactive substances, either illegal or legal. It is often argued, however, that there is a high degree of relatedness in demand between the various drugs that satisfy the same underlying psychological needs.

The RAND model faced considerable criticism from the Council on methodological grounds. Words such as “unsubstantiated” and “unpersuasive” are strong criticisms of any research that is meant to advance policy. The RAND model in total or in its elements has not been subject to a systematic validation by its authors. There has been no “goodness of fit” testing of the model, nor any attempt to evaluate the accuracy of the model’s predictive capabilities based on the sample actually used.

C. The RAND Response

In 2000, RAND issued a response to the National Research Council's assessment.(8)

The RAND study based its estimates of the effect of drug treatment programs on the TOPS data, but the RAND researchers feel that it successfully separated the cocaine users out of the dataset and excluded heroin users and those on methadone replacement. Large-scale studies such as TOPS face problems of selection bias, but the authors discussed these matters with treatment experts at the time and estimated effects conservatively. They put two-thirds of those who self- reported as abstainers into the light use category. The RAND researchers remark that since the study was initially published, they have been told as often as not that the estimates of treatment effects were too small. At the time of the original study, some sensitivity analysis was performed on the treatment effects parameters but, perhaps mistakenly, the results were not published because the conclusions were not sensitive to the numerical experiments then performed. RAND argues that its study shows that even with post-treatment success rates as low as 13%, drug treatment programs are more cost-effective than the law enforcement controls. RAND thinks that it is important to obtain better estimates of the effectiveness of drug treatment programs for policy analysis, but it is most likely that new estimates will only support the existing conclusion.

The National Research Council also wondered what would happen if the supply curves were of a different shape. The RAND supply curve was derived from the argument that long-run prices equal average cost and that average cost includes the cost of cocaine seized, and that the risk of drug dealers being caught, fined, imprisoned and having assets seized was priced into the supply curve. The Council asked what would happen if drug dealers required more compensation than that. In the RAND response, economic rents were added, but the effect was to reduce the ratio of domestic enforcement to treatment costs from 7.3 to 7.2 times. Changing the convexity of the cost curve, or how fast cost changes with scale of output, had some effects, but not enough to reverse the conclusions. The authors had argued that, in the long run, coca would be grown and refined at constant marginal cost because there were no constraints on new resources being brought into use. Coca is easy to grow and the refining processes are

(8) Jonathan P. Caulkins with James R. Chiesa and Susan Everingham, *Response to NRC Assessment of RAND's "Controlling Cocaine" Study*, RAND, Santa Monica, CA, 2000.

straightforward. RAND ran the model with a convex cost curve, but domestic enforcement was still 3.8 times as costly as drug treatment programs.

The authors believed that one of the factors leading to a downward-sloping, longer supply curve was the effects of enforcement. A bigger market spreads the enforcement resources more widely and reduces their effect on unit price, while a small market makes the effect of enforcement on cost higher. RAND looked at the model again, making the cost of seizing a fixed proportion of the cocaine market independent of market size, and found that domestic enforcement was 6.5 times as costly as drug treatment programs compared to the original 7.3 times.

The Council wondered what would happen if all the assumptions in the authors' study were varied together. RAND did such experiments and could not lower the cost effectiveness of drug treatment beyond the level of 5 times more cost-effective than domestic enforcement.

Foreign source country interdiction and enforcement efforts were quite cost-ineffective in the authors' study. The Council had wondered whether this was caused by cost increases entering into the price structure in an additive rather than a multiplicative fashion. RAND provides a graph of cocaine base prices and retail cocaine prices. There does not seem to be a strong correlation between the two, and therefore RAND feels comfortable with the additive price formulation.

In response to the Council's criticism that the authors focus on cocaine seizures as the sole measure of enforcement activity, RAND argues that it also takes account of the seizure of assets, arrest sanctions, and imprisonment as well as the effect of taking dealers off the street. RAND does point out that the model is not sophisticated enough to evaluate tactical choices. It is directed at the larger strategic questions of enforcement versus treatment.

The Council feels that the authors' study neglects non-monetary aspects of the drug market and, in particular, search costs and the stigma of arrest and imprisonment. RAND points out the approach was to embody the price of arrest and punishment risks into the price of cocaine. Modelling stigma costs explicitly resulted in no real alteration of the results. For search costs, RAND quotes research results that cocaine is relatively easy to find. One study found that experienced heroin users spent 35 minutes shopping for a $26 purchase. Cocaine and heroin users reported that they knew of between 10 and 20 suppliers of their drug of choice. Thus it

seems unlikely to RAND that search costs will increase by much because of stronger enforcement efforts.

The RAND study dates from a period when it was commonly believed that the demand for illegal substances was quite price-inelastic, and the numerical value of -0.5 was chosen. Since then, research results have shown a much higher price elasticity for illicit drugs. Doubling the price elasticity to -1.0 still leaves treatment four times more cost-effective than enforcement. In response to the criticism that there are a number of important different demand elasticities for initiation and intensification of use, RAND admits that these are key parameters but notes that even today there is little empirical evidence about their relative magnitudes. A number of alternative assumptions were run, but treatment remains more cost-effective than enforcement. The effect of the availability of other alternative drugs on the demand for cocaine is still not known at an empirical level.

RAND agrees with the Council that the authors' model has not been validated, but believes that good data are not available to enable a validation exercise to be run. RAND argues that most of the areas of concern raised by the Council do not affect the relative cost-effectiveness of demand and supply control policies, apart from the treatment parameters and the additive price effect specifications for source country policies in which foreign price increases are not grossed-up as they work through the distribution chain. RAND argues that it is unreasonable to expect any policy model to be totally validated. This is not the case with the management of the economy or with climate change. RAND believes that its model meets a reasonable standard of persuasiveness. Cocaine treatment programs cost about $2,000 per admission in 1992 and had relapse rates of 60% or 80%. Although these numbers seem to say that treatment programs are not effective, interdiction and source country control methods and domestic law enforcement have a very limited ability to change the price of cocaine.

D. Discussion

The RAND program of research on drug policy is impressive. The disciplines of economics, sociology, criminology and economic anthropology have been brought together constructively to address a major problem facing U.S. society. The long-term focus has been maintained, and an interesting program that builds upon earlier research in a coherent way has been sustained for more than a decade. However, the U.S. government has not been convinced that its policies are more costly and less effective than they need to be. Nor has the National

Research Council been convinced. Indeed, it is now beginning its own research program on drug policy.

The way that the authors' study uses previous research makes it hard to evaluate this study on its own. In addition, data and calculations of varying historic vintages are combined together, and the reader has to wonder by how much things have since changed. For example, the risk of arrest and imprisonment is priced in the model. When enforcement activities increase the chances of dealers being caught, they also increase the chances of being found guilty, imprisoned and having assets forfeited. All this is folded into the pay structure for drug dealers. But would it be unreasonable to expect the risk premiums to stay constant as labour market conditions change? During a period of high unemployment in the 1980s, there might be a ready supply of potential labour, but during a period of lower inner-city unemployment such as the 1990s, perhaps higher-risk premiums would have to be paid to attract potential dealers into the trade. An additional problem is that it is very difficult for anyone else to validate the numbers chosen by RAND, and thus to have faith in the results presented by the RAND model.

The information needs of the RAND model are high. On the demand side, the aim is to model separately the dynamics of the number of drug users, both heavy and light users, and the average consumption of each type of user. Total consumption is derived by adding up light and heavy user consumption. For this model to work, the transition probabilities, the effect of price on these transition probabilities, and the consumption price elasticity need to be known. The authors work with just one elasticity, which is divided by two for some uses and divided by four for others. It should be pointed out that, in response to the National Research Council critique, RAND had in fact performed some sensitivity analysis of these elasticities. There still remain the hard questions of modelling philosophy. The model is quite disaggregated with lots of detail added, but without the detailed individual response parameters being available. It is not clear from statistical theory that this approach produces better results than a more modest, less detailed model based on estimated parameters.

As previously remarked, cost-effectiveness studies may select a target that, in some policy senses, is inadequate. Reducing consumption by the same amount through demand or supply control is not the same. The new equilibrium price will be higher under supply control programs than under demand control. In the authors' study, total spending on cocaine increases under supply control but decreases under demand control. The number of users still in the

cocaine market also differs. The authors estimate that there would be a 0.37% decrease in the number of users under supply control, compared with a 0.22% decline under demand control, for the target 1% decrease in total cocaine consumption. Under both policies, the highest relative decline is for heavy users whose number decrease by twice as much under treatment programs as under supply control. It must be remembered that the authors' model treatment programs take only heavy users. Under the demand control scenario, light users decline in number by 0.05%, compared to 0.33% under supply control.

The authors do attempt to extend the objective function towards a more useful measure of the impact on society rather than just the reduction in drug consumption They consider societal costs, including the costs of crime and the costs of productivity losses. The authors believe that the "state of harm" measurement is rudimentary, and that evidence is needed to support the assumptions they make. They assume that the cost to society of crime caused by cocaine users is proportional to spending on cocaine, and they also assume that productivity losses are proportional to the consumption of cocaine, where productivity measurements do not include time in prison. When measured in terms of the societal costs, domestic enforcement is 14.6 times more costly than treatment programs.

CONCLUSION

Knowing how much the state spends on its various activities is a democratic right; but, given we live in countries in which government goods and services are delivered by multipurpose agencies, attempts to estimate precise spending on a particular narrow area of public interest – be it drug abuse or terrorism – may be an exercise in cost allocation, with crude approximation replacing precise measurement. A societal concern about illness and social problems may drive us to look at the magnitudes involved more closely.

The magnitude of a problem can be measured in many ways. For example, injection drug use with unhygienic needles can lead to the transmission of diseases such as HIV/AIDS and hepatitis. Illness and death can follow. Obviously, one measure of the magnitude of the problem of dirty needles is the number of HIV/AIDS and hepatitis cases caused; a related measure would be the amount of medical drugs needed to maintain the health of the infected individuals; and a final measure might be the number of deaths caused.

Using cash as a measure is the next step in complexity in measuring the size of a problem. An economist might be asked to put dollar values on these magnitudes. Medical drugs are bought in a marketplace and their cost is therefore easily measured. Estimating the value of a premature death is a harder exercise, involving not only a range of economic considerations but also significant ethical questions, and different economists might give different answers.

Before embarking on the adventure of finding which economist is right, it is useful to stop and ask whether, why and which information is needed. Suppose you are a decision maker tasked to choose whether to supply new needles periodically or chlorine bleach to clean the existing needles. How to find the answer is fairly obvious, and does not require an economist to value the lives lost; all that is required is a controlled experiment to see which method produces the lower infection rate. Obtaining an accurate estimate of the value of a human life lost is no substitute for knowing the infection rates.

The two types of studies discussed above demonstrate these two different approaches. If it is necessary to estimate the magnitude of the drug problem, then, as has been summarized earlier, there are a number of technical issues of methodology, of raw data and, as in any real world measurement exercise, a question of which corners can be cut without too much scientific discomfort. These questions are illustrated in the discussion of the cost studies in the first part of this paper. If, on the other hand, it is necessary to compare policies, a different exercise is needed. The RAND study discussed in the second part of this paper is an example of such an exercise. It is characterized by impact coefficients which model how altering the policy variables, such as interdiction effort or the availability of drug treatment places, affects the target variable, cocaine consumption.

There seems to be no debate between analysts about the differences between these two sorts of exercises, economic cost analysis and policy analysis. However, some analysts appear to believe that cost analysis is a necessary preliminary exercise to policy analysis modelling, and some do not.

The nature of the policy modelling exercise will depend on the problem itself. Some analysts have concerns about applying the Cost Of Illness methodology to drug problems. A primary cause of this concern is based on the major difference between an illness, such as polio, that is randomly visited upon an individual, and a drug addiction, which involves an element of choice. Remove the scourge of polio, and the consequences are unambiguous: children do not walk with leg-braces or need iron lungs. If by some magic, however, one could remove cocaine from the hands of addicts, the question is what other substance or behaviour would be substituted.

Studies of illness, quite reasonably, present a cost estimate of achieving a feasible goal that could be realized by society upon eradication of the disease. Nobody wants the disease. Illicit drugs do give pleasure, and it seems discordant to our notions of how people behave or to any reading of the social history of drugs to think that there is any way in which the estimates of the total costs of illicit drugs in economic cost studies represent a cost that could be returned to society. This is not to say that the choice of drug policies is unimportant, but that the magnitudes shown in cost studies cannot be realized by society.

In the aftermath of the policy storm raised by the RAND study discussed above, one may well come to the conclusion that policy modelling exercises are extremely difficult even in the country with the richest set of data resources and a very well funded, high-quality research community. But evidence-based decision-making is now gaining ground in our health care system, and it is perhaps not a forlorn hope that it will spread further into the area of drug policy.

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