

GENERAL FRAMEWORK FOR CONDUCTING BENEFIT-COST ANALYSES OF DRUG ABUSE TREATMENT PROGRAMS

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I. EXECUTIVE SUMMARY

Many government entities are responsible for dedicating public monies or passing financial support to public and private organizations that treat individuals with drug abuse problems. These government entities usually have constraints on the amounts of funding they can designate for treatment of different types (e.g., inpatient, residential, outpatient drug free, and outpatient pharmacotherapy), treatment for different populations (e.g., women, adolescents, or IV drug abusers), and treatment in general (i.e., a maximum treatment budget). Because of these constraints, decision makers can benefit from a methodology that helps them evaluate the allocation of resources to competing ends according to explicit rules. Cost-benefit analysis is the only method that values all costs and all benefits in monetary terms; it alone helps decision makers decide whether or not they "should" spend tax dollars on treatment.

This report presents a general framework for conducting cost-benefit analyses of drug abuse treatment programs, developed through a review of recent articles and books in which the estimation of the costs of drug abuse treatment, the benefits of drug abuse treatment, or both is detailed.

Based on our literature review, this report outlines an operational framework for conducting a high-quality, comprehensive cost-benefit analysis that must include the following six steps:

- Describe the decision-making context;
- Describe the treatment program being analyzed;
- Estimate the benefits of the program in monetary terms;
- Estimate the monetary value of the resources consumed by the program (costs) to deliver the intended results;
- Conduct a comparison of benefits and costs; and
- Discuss the implications and limitations of the analysis.

This framework is intended to be used with qualitative and quantitative evaluation of drug abuse treatment effectiveness. A framework for comprehensive treatment effectiveness research, developed by the ONDCP Treatment Outcome Research Working Group, will be presented along with the enclosed cost-benefit framework, in our final report on treatment outcome effectiveness measurement that will be submitted under separate cover.

II. INTRODUCTION

Many government entities are responsible for dedicating public monies or passing financial support to public and private organizations that treat individuals with drug abuse problems. These government entities universally have constraints on the amounts of funding they can designate for treatment of different types (e.g., inpatient, residential, outpatient drug free, and outpatient pharmacotherapy), treatment for different populations (e.g., women, adolescents, or IV drug abusers), and treatment in general (i.e., a maximum treatment budget). Because of these constraints, decision makers can benefit from a methodology that helps them allocate resources to competing ends according to explicit rules.

Economic analysis concerns itself with choices. Resource scarcity, and society's inability to produce all desired amounts of all goods and services, is the domain of economics. Consequently, the tools of economic analysis are the logical methods for guiding decision makers faced with the types of budget allocation questions mentioned above. Cost-minimization analysis, cost-effectiveness analysis, cost-utility analysis, and cost-benefit analysis are all economic tools that may, depending on the context in which they are applied, aid decision makers. Cost-benefit analysis, the only method that explicitly values all costs and all benefits in monetary terms, is the preferred method because it alone helps decision makers decide whether or not they "should" spend tax dollars on treatment. The other methods tell decision makers *what* they are buying, and how much they are *paying* for it, but not the *value* of what they are buying.

The general framework we present for conducting benefit-cost analyses of drug abuse treatment programs was developed through a review of recent articles and books in which the estimation of the costs of drug abuse treatment, the benefits of drug abuse treatment, or both is detailed. The literature review is not the end in itself; rather, it is the vehicle by which the necessary steps in benefit-cost analysis are revealed. The six-step framework presented is neither identical to, nor logically inconsistent with, any of several paradigms we found in the literature.

The report is presented in three sections. This introductory section identifies the need for a benefit-cost framework that decision makers and researchers can use to conduct

economic analyses of drug abuse treatment. In Section III, Methodology, a description of how the framework was developed via a review of recent articles and books in which the estimation of the costs of drug abuse treatment, the benefits of drug abuse treatment, or both is detailed. We present our findings in Section IV as a narrative description of the activities that need to be conducted during the course of a benefit-cost analysis of drug abuse treatment. This narrative revolves around the six steps that should be conducted, and draws on the findings of the literature review as justification.

III. METHODOLOGY

The general framework for conducting benefit-cost analyses of drug abuse treatment programs was developed through a review of recent articles and books in which the estimation of the costs of drug abuse treatment, the benefits of drug abuse treatment, or both is detailed.

In order to develop the conceptual framework, we reviewed a variety of background references. We examined several references regarding methodological considerations for performing economic evaluations for health programs (e.g., Drummond, Stoddart, and Torrance, 1987; Phelps and Mushlin, 1991). We examined references concerning applied welfare economics and cost-benefit analysis (e.g., Just, Hueth, and Schmitz, 1982; Mishan, 1988; Schmid, 1989). We also considered the research regarding valuation of publicly funded goods developed by resource economists, because they have been applying modern benefit valuation techniques far longer than researchers in the substance abuse treatment field (Downing, 1988; Freeman, 1993; Smith, Desvousges, and Fisher, 1986; Brookshire and Coursey, 1987; Brookshire and Crocker, 1981; Majid, Sinden, and Randall, 1983). Most importantly we examined background references regarding methodological considerations for economic evaluations of drug abuse treatment (e.g., Cartwright and Kaple, 1991; Gerstein and Harwood, 1990; Apsler, and Harding, 1991; French, Rachal, and Hubbard, 1991; Hubbard and French, 1991).

In order to find exemplary cost-benefit analysis of drug abuse treatment, we performed key word searches on five databases¹

- Drugs and Crime Data Center and Clearinghouse;
- Econ. Lit. Index 1969-1993/Sep (c) 1993 American Economic Association;
- Health Planning and Administration 1975-1993/Dec;
- MEDLINE 1985-1993/DEC; and
- PsycINFO(R) 1967-1993/Dec (c) 1993 Amer. Psychological Asso.

In addition to these searches we solicited recommendations from health economists concerning exemplary studies performing cost-benefit, cost-effectiveness, benefits, or cost analyses of drug abuse treatment.

Criteria for reviewing a study performing cost-benefit analysis included several items regarding whether the study

- Is a recent analysis, i.e., since 1985;
- Is an empirical analysis of drug abuse treatment rather than a methodological paper or review of previous studies;
- Denominates costs and/or benefits of drug abuse treatment in dollars;
- Focuses on drug abuse treatment rather than alcoholism treatment;
- Is a high-quality comprehensive analysis (defined in the findings section);
- Specifies the perspectives for whom costs and/or benefits accrue; and
- Provides information about its assumptions and limitations.

¹These searches identified 496 items using the following key words: economic (analysis or evaluate- or cost- or cost- (benefit- or effect-) with (drug or substance) abuse or alcoholism or addiction with treatment or prevention or intervention or services.

Having examined several studies, we chose those cost-benefit, cost, and benefits studies of drug abuse treatment that demonstrate exemplary qualities as defined by the six-step framework discussed below. We considered in descending order of preference including studies that are published in (1) peer reviewed journals; (2) published monographs; or (3) reports to government agencies.

The results from this research are reported in Section IV, entitled Findings. We discuss the six-step operational framework and provide references to methodological and empirical studies to provide examples and theoretical underpinnings for our recommendations.

IV. FINDINGS

Although each step requires many sub-activities, we outline a six-step operational framework for conducting a benefit-cost analysis. A high-quality comprehensive benefit-cost analysis must complete the following:

- (1) Describe the decision-making context;
- (2) Describe the treatment program being analyzed;
- (3) estimate the benefits of the program in monetary terms;
- (4) Estimate the monetary value of the resources consumed by the program (costs) to deliver the intended results;
- (5) Conduct a comparison of benefits and costs; and
- (6) Discuss the implications and limitations of the analysis.

This six-step paradigm is similar but not identical to other benefit-cost paradigms in the literature. Drummond, Stoddart, and Torrance (1987) advocate a ten-step paradigm for a "sound economic evaluation" of a health care program, while Weisbrod (1983) follows a more

conventional three-step paradigm (estimate costs, estimate benefits, and compare costs and benefits) in conducting a benefit-cost analysis of treating mental illness.

Describe the Decision-Making Context

Describing the decision-making context means identifying the users of the analysis and the stakeholders in the context of costs and benefits. Identifying the stakeholders involves stating who will benefit and who will bear the costs. The perspective of the analysis may be the specific provider, the patient, third-party payers, or society; however, it is necessary to present a well-specified perspective (Drummond, Stoddart, and Torrance, 1987). Drummond and colleagues (1987) and Patton (1986) agree that the first step in program evaluation is to identify perspectives and stakeholders. Figure 1 presents the main questions one attempts to answer during this step.

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| <ul style="list-style-type: none">• Who are the Intended Users of the Analysis?• What are the Intended Uses of the Analysis?• What Decision-Relevant Resources do the Users Control?• Whom do the Users Represent?• What Other Perspectives do the Users Value?• Whose Perspectives do the Users Not Value? |
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Figure 1. Describe decision-making context

Describing the decision-making context entails three sub-activities: (1) identify the ultimate users of the analysis; (2) identify the stakeholders who will be considered, and explain; and (3) identify the stakeholders who will not be considered, and explain. The users will, of course, include those for whom the report is prepared; however, that is only the beginning of the list of ultimate users. Other users may include others interested in adopting the treatment under analysis. Still other users will be interested in other treatments that have similar goals. We should identify the users who are most relevant for the analysis in order to define the details and questions these users will need within the analysis. Identifying these perspectives will assist in presenting a clear and useful analysis (Drummond, Stoddart, and Torrance, 1987). Several studies examine the decision-making

context in terms of public funding for drug abuse treatment (e.g., Anglin et al., 1989; Berg and Andersen, 1992). For these studies, the stakeholders of concern are taxpayers.

When performing cost-benefit analysis, we should develop a complete list of stakeholders who share in the costs and the benefits of drug abuse treatment (see Patton, 1986). Evaluators should ask: Who has a stake in drug abuse treatment? Stakeholders vary not only by "types" of stakeholders but also by "location" of stakeholders, e.g., federal vs. state funding. For instance, one state's expenditures on treatment reduce the expected number of criminal victims not only in that state, but also in neighboring states; therefore, the stakeholders of the costs of treatment do not necessarily include all the stakeholders of the benefits or vice versa. When the costs of a public drug abuse treatment program are borne entirely by the taxpayers of one state but the benefits of diminished crime "spill over" to bordering states as well, should we use the benefits to the bordering taxpayers to off-set the costs to the paying taxpayers? Various stakeholders may experience different costs and benefits. Whose costs and whose benefits are being considered should clearly be set forth within the analysis. Without this clarity, the evaluation may confuse the costs of drug abuse with the costs of drug abuse treatment; inappropriately neglect certain costs or benefits from other viewpoints and perspectives; or become a mere assortment of costs and benefits. It is not clear, for example, that expenditures on illegal drugs represent a cost of drug abuse (i.e., Harwood et. al. 1988) from a taxpayer perspective, or that the costs of drug abuse treatment and drug interdiction are costs of drug abuse (i.e., Rice et. al. 1991).

Just as important as clearly identifying whose costs and whose benefits are being considered is the identification of whose costs and benefits will not be considered within the analysis. Criminal perspectives, for example, are sometimes considered and sometimes ignored. Berg and Andersen (1992) consider the value of stolen property to be a transfer from law-abiding citizens to criminals, rather than a cost of drug abuse. Harwood et. al. (1988), Tabbush (1986), and Anglin et. al. (1989), however, view theft value as a cost of drug abuse (and hence a benefit of treatment) rather than as a transfer.

Few cost-benefit studies include reduced medical costs as a benefit of drug abuse treatment for public funding stakeholders. Tabbush (1986) attempts to include the reduced spread of AIDS as a benefit to California. Others have suggested that hospital charges for

the labor, delivery, and postpartum care associated with fetal cocaine exposure should be included in cost-benefit analysis of drug abuse treatment programs to reduce maternal cocaine use (see Phibbs, Bateman, and Schwartz, 1991; Calhoun and Watson, 1991). Valuing the health outcomes of drug abuse treatment for benefits analysis is a developing field.

In alcoholism research, several studies examine the cost-offset of alcoholism treatment for insurers of employed populations (see Lessard, Harrison, and Hoffmann, 1985; Holder, 1987; Holder and Blose, 1986; Holder, Lennox, and Blose, 1992). Cost-offset models compare the costs of addiction treatment and subsequent medical care expenditures with medical expenses that would be expected without treatment. The reduced health care expenditures following addiction treatment "offset" the cost of treatment. Since private insurers are seldom among the stakeholders of publicly funded drug abuse treatment, these studies are not directly transferable to publicly funded treatment cost-benefit analysis.

Describe the Program Being Analyzed

Drummond, Stoddart, and Torrance (1987) emphasize the importance of describing the program so the reader knows "who did what to whom for how long and with what results." They also emphasize the necessity of providing some evidence of the programs effectiveness either within the study or by referencing the work of others who have. To describe the program being analyzed, we suggest three sub-activities: (1) describe the type of treatment (e.g., population, modality); (2) describe the study design of the analytic experiment; and (3) describe previous studies regarding the effectiveness of this type of treatment.

Describing the type of treatment (e.g., population, modality, treatment goals,) informs users of the analysis concerning the program characteristics. Costs and benefits differ for various populations and for various modalities of drug abuse treatment. For instance, addiction treatment benefits may be different for maternal drug abusers, (i.e., healthier infants and reduced medical costs), than for male criminal justice clients, (i.e., reduced crime and recidivism). Without a description, the reader of an evaluation cannot know what was or was not included in the program or in the analysis as well as whether certain alternative perspectives were considered. Anglin, Speckart, Booth, and Ryan (1989) provide a detailed

description comparing and contrasting the public and private programs in their study. If the readers do not have this information, they cannot know whether the evaluation applies to their situation or could be replicated. For example, Hoffmann and Miller (1993) explicitly state that their sample comes from private programs that predominantly treat the working middle class and that generalizations between this population and the indigent clients in public sector treatment is not justified. Apaler and Harding (1991) emphasize that ultimately judgments regarding program effectiveness should be tempered by the treatment goals for the target population.

Describing the study design and results of the analytic experiment and/or describing previous studies regarding the effectiveness of the type of treatment under study provides evidence of the program's effectiveness. In order to attribute benefits to a certain program, it is necessary to show some evidence of those benefits. Often times a "do-nothing" alternative should be considered (Drummond, Stoddart, and Torrance, 1987). Most study reports do include some supporting evidence for the benefits; however, the statistical strength and validity of the evidence varies according to the methodology applied. Hubbard and colleagues' (1989) Drug Abuse Treatment; A National Study of Effectiveness is often cited as evidence for the effectiveness of treatment; however, the chapter discussing costs and benefits of treatment has a vague description of calculations and sources for estimates. This lack of detail makes it difficult for the reader to appropriately evaluate or generalize the results.

In order to provide evidence of a program's effectiveness, researchers define what constitutes a success. Treatment success probabilities depend partially on factors other than the treatment intervention itself. This can complicate treatment outcome estimation. The study should include an observation of a control group of non-treated individuals over time to estimate the probability that a member of the drug abusing cohort will reduce drug use (or achieve any other stated measure of improvement) on their own. If the study examines the effect of any other "different" treatment, e.g., an enhanced outreach policy, it similarly has to track the progress of individuals who do not receive the enhanced outreach as well as those who do. As another example, a study can estimate an aftercare policy's impact on longer-term success only by tracking all members of the cohort—those in and outside aftercare. Unless and until controlled studies of these individuals are undertaken, parameter estimates

of the impact of various interventions and similar probabilities should be developed by making educated guesses or by reaching a consensus of expert opinion (Zarkin et. al., 1994).

Generically then, to perform economic analysis of the impact of alternative interventions, researchers should first identify the impact of alternative interventions. Effectiveness analysis assesses the relationship between a policy intervention (e.g., a new treatment enhancement) and the resulting outcomes (e.g., the proportion of drug-free patients or extent of risk reduction) after *netting-out* the change that would be expected to occur even in the absence of the intervention. Attributing the total outcome to the intervention fails to take account of the change that would be expected without the intervention; therefore, this difference must be included in the assessment (Zarkin et. al., 1994).

Appropriate experimental and nonexperimental designs are important to identify the effect of treatment interventions. The strongest evidence results from randomized, controlled, experimental study designs that have treatment and control groups that are identical except for the treatment intervention. A study by Anglin, Speckart, Booth, and Ryan (1989) is an example of a strong study design. They use random sampling to examine differences among those who experienced the closure of a publicly-funded methadone maintenance program vs. those who did not to make use of a natural experiment. They also looked at the differences among those who experienced the closure who transferred to private treatment and those who did not. Although this study is not a cost-benefit analysis, the examination of the costs for those who transferred to a private clinic, for those who did not transfer, and for those who did not experience any clinic closure provide valuable information concerning the benefits of treatments.

McLellan, Arndt, Metzger, Woody, and O'Brien (1993) use random assignment to three treatment groups to assess the effectiveness of three varieties of treatment in the rehabilitation of opiate-dependent patients. Although no economic costs and benefits are examined, McLellan and colleagues (1993) are an example of a most useful previous study for establishing effectiveness among treatment options because it is a very well designed study using random assignment to control for potential self-selection and other potential biases.

Obviously, social scientists, unlike laboratory scientists, cannot often meet the necessary requirements for such a strong design with treatment available for one group of human subjects and not available for another group. Thus, the difficulty of analysis rests on whether the change being attributed to the treatment could have occurred by chance or be the result of some other factor, (i.e., maturing out, probability of self-cure). The study's use of comparison groups, large samples, random samples, naturally occurring experiments, lengthy follow-ups, statistical analysis of the differences between and among groups, and sensitivity analysis of the results each contribute to the strength of the evidence regarding effectiveness. The study may perform these analyses or may reference previous studies. If previous studies are referenced to show effectiveness, then the researchers must demonstrate the comparability of the programs under cost-benefit analysis and those previously studied for effectiveness.

Some of the main questions to be asked and answered at this point and before the estimation of benefits or costs begins are presented in Figure 2.

- What is the "baseline" or "status-quo"?
- Is "do nothing" a viable alternative?
- Are any or all options mutually-exclusive?
- Are there any relevant/binding geographic considerations?
- What modalities of treatment are being considered? Why?
- What populations are being targeted? Why?
- What is the experimental design, if any?
- How will program effectiveness be measured and verified?

Figure 2. Describe treatment program(s) being analyzed

Estimate the Benefits of the Program in Monetary Terms

Benefits are, simply stated, the advantage or usefulness received from some good or service. What are benefits in monetary terms? In general, a consumer expresses the monetary value of the benefit of a good or service as the maximum price the consumer is willing to pay for the good or service. The reason a consumer is willing to pay for the good or

service is its usefulness as perceived by the consumer. The maximum amount the consumer is willing to pay expresses the good's value relative to other goods or services. The consumer's utility of a good or service may result from a single or several considerations. The monetary value of usefulness or utility of a good or service is not the amount *paid* but the *maximum* amount the consumer is willing to pay. Net-benefit is the surplus between the amount a consumer would be willing to pay to receive a good or service and the amount they must pay.

In the aggregate, net-benefit is the difference between what the community pays for a specific quantity of a good or service, i.e., the cost of the program, and the maximum amount the community would be willing to pay for that quantity, i.e., the value of the program. A graphic representation of the amount consumers are willing to pay for various quantities of a good or service is called a demand curve. Gross benefits for a quantity of the good or service is the sum total the community is willing to pay and is measured as the area beneath the demand curve for that quantity. At a specified price, the net-benefit is the difference between the gross benefit and expenditures. In order to estimate the benefits of a program, we should estimate the amount the community is willing to pay for that program². In order to conduct a cost-benefit analysis, we must assess both the benefits and the costs.

Drug addiction and its undesirable effects on the individual and society are complex. Consequently, drug abuse treatment is intended to address a number of problems. Tabbush (1986) describes the primary objective of drug abuse *prevention* as a delayed, reduced and/or prevented onset of drug abuse. That delay, reduction, or prevention creates, in turn, a stream of personal and social outcomes. This conceptualization of prevention outcomes is useful, and generalizable to treatment. The primary objective of drug abuse treatment becomes the attenuation of drug abuse, however measured. The attenuation of drug abuse then creates a stream of personal and social outcomes.

Using Tabbush's terminology, measures of "primary objective" success might include:

²For further detail regarding consumer surplus, the reader is referred to texts on applied welfare economics or cost-benefits analysis (for example, Just, Hueth, and Schmitz, 1982; or Mishan, 1988).

- The reduction in the number of drug abusers,
- The reduction in the quantity of drugs abused,
- The reduction in the number of months or years people abuse drugs.

This list is not meant to be all-inclusive. Common to all measures of primary treatment success is the direct relationship between individuals and their use or abuse of drugs.

Continuing with Tabbush's conceptualization, successes of the primary objective of treatment create a stream of personal and social outcomes. These potentially include, but are not limited to:

- Reduced criminal activity;
- Improvements in health of treated users;
- Reductions in the spread of communicable diseases;
- Improvements in labor force participation/reductions in reliance on welfare programs; and
- Improvements in the quality of life of users, their families, and society at large.

Stakeholders are willing to pay for drug abuse because they value certain outcomes. The maximum amount a stakeholder is willing to pay for drug abuse treatment is the benefit to that stakeholder. There are essentially two methods of estimating benefits—*revealed preference* methods and *expressed preference* methods. These are also referred to as indirect and direct methods. When markets exist wherein goods or services are traded at observable prices that reveal values, revealed preference methods are applicable.

In the case of drug abuse treatment, there are private markets for treatment. Unfortunately, there are good reasons to believe that, in fact, market prices do not reflect the societal value of treatment. Society values drug abuse treatment for its usefulness to society in terms of attenuating adverse consequences of drug use; e.g., less crime, less contagious

disease, higher employment and national income. When the activities of one person (the drug abusers) cause uncompensated spillover effects—positive or negative—on another person, those activities are said to involve externalities. Externalities or uncompensated spillover effects are advantages or disadvantages experienced by others who neither pay or are paid for them. So, while the purchase of private drug abuse treatment by an individual may reveal that the benefits to the user (e.g., greater employment outcomes, improved health) exceed the expenditure required, the value to that individual may neglect the value of the individual's treatment to others (e.g., averted victims of crime or sufferers of contagious disease). The expenditure approach has some potential, however, to value what Tabbush (1986) calls the personal benefits of treatment because by paying for private treatment the individual reveals that the personal value or benefit is at least equal to the required expenditure, otherwise treatment would not be purchased.

The other method of benefits estimation—expressed preference—involves asking affected individuals (e.g., a cross-section of society that includes both drug abusers and non abusers) how much they value effective treatment. For example, a sample of individuals might be asked to express what they are willing to pay for one out of a group of one-hundred reduction in drug abuse. The willingness to pay (WTP) technique often uses an interview or questionnaire to elicit individuals' maximum price to pay or sell for various quantities of a good (for an example of WTP methodology see Brookshire and Coursey, 1987).

State-of-the-art research estimates benefits consistent with applied welfare economics. A stakeholder's willingness to pay for implementation of an alternative (or necessary compensation to willingly forego an alternative) is the basis for estimating benefits (see Just, Hueth, and Schmitz, 1982). Gross benefits is the sum total of the maximum that consumers are willing to pay. With markets, we can observe what consumers are willing to pay when quantities change. Across individuals and over several quantity changes, we are able to estimate the net-benefit that is greater than the price paid at various prices in the market. Thus, it is easy to see that net-benefits is the difference between gross benefits (the sum across individuals of what they would pay) and expenditures (the sum across individuals of what they do pay). State-of-the-art research uses willingness-to-pay measures to estimate benefits for non-market goods and services like publicly funded projects. Therefore, one may estimate the benefits of drug abuse treatment using expressed preference willingness-to-pay

measures. The amount one is willing to pay takes into consideration the substitution effect and the opportunity cost of other possible projects.

For over a decade, researchers have been estimating benefits for public projects and environmental policies using hypothetical direct measures including survey techniques and bidding games (see Brookshire and Crocker (1981) for a discussion of advantages and see Boyle and Bishop (1988) for a comparison of direct method techniques). Majid, Sinden, and Randall (1983) note that people's expressed willingness to pay for an additional public facility is less than the amount they are willing to pay for a public facility if none already existed. This is not surprising since we observe that phenomenon for market goods and services as well. Majid, Sinden, and Randall (1983) do emphasize that the benefits estimation technique should remember to account for whether it focuses on marginal benefit estimation or gross benefits. Marginal benefit estimation examines the value of an additional increment given a specific quantity already obtained. One unit could be one more person in treatment or one more treatment program. Gross benefits estimation examines the value of the total quantity obtained.

A major problem with surveys, interviews, or bidding games methods stems from the difficulty individuals have in answering questions about what they are willing to pay for societal goods. When non drug-abusing taxpayers are asked questions about their willingness to pay for drug abuse treatment, they may tend to think about the adverse consequences to themselves of drug abuse, and how they might value reductions in these consequences. Because there are many possible indirect consequences, individuals may not necessarily give consistent plausible answers to these questions (Thompson, 1986). Also, the fact that drug abuse treatment services are, in part, medical services for which demand is derived from the demand for health further complicates the difficulty individuals have in answering this question (see Phelps, 1992). Feldman and Dowd (1993) state that consumers' valuations of medical services may never concur with expert valuations but that consumers' willingness to pay is the appropriate measure of consumer benefit. Environmental and resource economic valuations have a decade of experience researching benefits estimation using direct methods such as surveys, interviews, and auctions as well as indirect methods such as using property values, wages, and/or travel costs as revealed willingness to pay measures (see Smith,

Desvousges, and Fisher (1986) for a detailed comparison of direct and indirect methods for estimating environmental benefits).

Freeman (1993) compares his assessment of the state of the art of environmental and resource valuation with his assessment in 1979 by stating that the use of direct surveys, interviews, and bidding games as well as indirect WTP estimation of benefits using property values, wages, and travel costs has developed and improved substantially. He no longer considers the direct survey methods to be collecting inaccurate responses nor does he consider the indirect methods relying on property values, wages, and travel costs to be broadly unacceptable since so much research has been accomplished in this area. He continues to hold three qualifications or limitations: willingness to pay measures necessarily depend on the current distribution of income and using these estimates is an implicit acceptance of the existing distribution of income; certain risk relationships such as dose-response functions are unavailable; and the data requirements to measure benefits for many problems remain extremely difficult and costly to obtain. He adds that benefits measures have been sensitive to model and functional form specifications, thus increasing the uncertainty of these measures.

The lessons learned by environmental economists concerning benefits estimation are relevant to drug abuse treatment. Although direct and indirect measures of willingness to pay have been tested and developed over the past decade, these techniques have not been applied to drug abuse treatment evaluations. Using direct and indirect methods would increase the reliability of benefits estimation for drug abuse treatment since these methods are based on applied welfare economics theory.

Schmid (1989) discusses a different type of benefits estimation method he calls "systematic choice among multiple outputs of public projects without prices." The systematic choice among multiple outputs method uses systematic weights to value non-market output from projects. Publicly funded drug abuse treatment produces a non-market output, i.e., reformed addicts. He describes this method in seven steps: (1) Identify Output Categories, (2) Assign Importance Weights, (3) Standardize Importance Weights, (4) Determine Project Outputs, (5) Compute Utilities [sum of the products of output weights times measured output per program], (6) Calculate Utility-Cost Ratios [Schmid loosely calls these benefit-cost ratios],

and (7) Compute Implied Prices from current public funding budgets for comparison with utility-cost ratios. This method facilitates comparisons of effectiveness using an index (the standardized utility-cost ratios) but does not result in a monetary benefits analysis.

Wing and Gay (1990) propose the use of a Sobriety Index (SI) to compare treatment alternatives' effectiveness. The SI is comprised of five attributes common to the various programs under comparison: accomplishment of 50% or more of self-goals; reported improved self-esteem; reported peace of mind; remaining sober; and improved family relationships. Designated experts then weight the importance of these attributes. The resulting weights are standardized using a common denominator. Each program's attribute accomplishments are weighted by the standardized weights and summed across the five attributes to calculate the single measure of effectiveness. Using average cost per client with the SI allows the creation of a cost-effectiveness ratio or utility-cost ratio for comparisons among alternatives. However, this does not result in a monetary benefits analysis.

In 1979, McLellan and colleagues developed the Addiction Severity Index (ASI). The ASI was developed as a clinical/research instrument to assess the multiple problems observed in treatment clients, i.e., alcohol use, drug use, (un)employment, legal problems, family problems, and psychiatric problems. The ASI has demonstrated reliability and validity (McLellan et al., 1985). This index is a useful tool for cost-effectiveness or cost-utility analysis; however, without monetary valuation of benefits, we cannot perform a cost-benefit comparison.

Studies have not developed a complete list of effectiveness measures useful for drug abuse treatment that differentiates between populations, e.g., adolescents, women, men, criminal justice clients, narcotic, cocaine/crack, and other non-narcotic addicted populations. Without a standard index, each evaluator must develop credible criteria useful for the evaluator and/or the stakeholders requesting the evaluation.

Because of the difficulties involved in conventional methods (expressed preference and revealed preference) of treatment benefits estimation, cost-offset methodologies are often employed. Cost-offset models estimate the benefits in three sub-activities:

- Identify the negative consequences of drug abuse;
- Estimate the quantitative relationship between abuse and the consequence; and
- Estimate the dollar value of each negative consequence (or the benefit of avoiding it).

Several studies have employed this methodology (e.g., French & Zarkin, 1992; French, Zarkin, Hubbard, & Rachal, 1991). In effect, portions of the benefits of treatment are measured such as:

- The avoided costs of incarcerating individuals who commit crimes to finance their habits;
- The avoided medical costs associated with treating individuals with AIDS, TB, or other diseases often linked to drug abuse; and
- The avoided costs of welfare support or other public support.

With precautions concerning whether all the desirable outcomes for the community are represented, most if not all of the desirable outcomes of a treatment policy alternative can be expressed in dollars and aggregated to yield an approximation of the gross benefits of the policy.

Mishan (1988) criticizes methods of calculating the benefits of programs such as disease control using the averted costs of expenditures on medical care, losses of production, and the pain and suffering. He argues that the largest sum a community is willing to pay to eradicate or reduce the occurrence of a particular disease does not necessarily depend on the medical expenses of treatment. People place value on health irrespective of the costs of cure which is included in the community's willingness to pay to prevent or eradicate disease. Cost-savings models focus on estimating the minimum increased benefit for a change in producing an existing good not a new good or eradicating a bad. For instance, insurers who currently provide medical treatment for drug abusers diseases and/or injuries may assess the

cost-savings resulting from addiction treatment as the estimated *change in benefit*, not the gross benefit or net-benefit, because the insurers were willing to pay the previous cost for medical treatment. The stakeholder for this *change in benefits* is the insurer. The benefit for other stakeholders should be estimated from their willingness to pay rather than the insurers expressed willingness to pay.

Deschenes, Anglin, and Speckart (1991) gathered data on the social costs of narcotic addiction. These cost estimates could be used to estimate the benefits of drug abuse treatment with respect to reduced costs of arrests, incarceration, legal supervision, and reduced crime income following treatment; however, as the authors clearly state the reduced costs in the period after addiction may be attributable to criminal justice interventions, maturing out of the addict lifestyle, and/or to drug abuse treatment. The confounding effects of these possible explanatory factors are acknowledged as an area for future research. Rather than simplistically attributing the reduced costs to treatment effects, the authors recognize other factors influence reduced drug use. Reduced employment and income are also social costs but they are not included in the summary of social costs. Cost estimates are limited to the costs to society of drug-related crime, drug treatment, and criminal justice system intervention; however, the study does not discuss other social costs such as reduced income tax revenues, or increased publicly funded medical costs.

Phelps and Mushlin (1991) explore the issues related to placing monetary values on health benefits. They conclude that when comparing programs' cost-effectiveness or cost-benefit ratios the dominant program, the one with the highest ratio, is the same regardless whether one implements cost-effectiveness or cost-benefit analysis. However, Drummond, Stoddart, and Torrance (1987) point out that sometimes it is not possible to identify a single effect or outcome. For multiple effects, they state that we can express the outcomes using a common denominator: dollars.

This suggests another alternative for benefits estimation by valuing outcomes as benefits in monetary terms. Valuing outcomes as benefits is performed in two sub-activities:

- (1) Describe the expected outcomes for the shareholders of the Treatment Program and all sources for estimates, and

- (2) Estimate monetary values for the expected outcomes with appropriate adjustments for timing and mitigating factors.

Outcomes vary according to the alternative being considered, according to the stakeholder viewpoint, according to the time period, and may reflect quantitative as well as qualitative aspects. Each of these dimensions should be identified. Valuing outcomes as dollar benefits means considering several criteria. First, the source should be clearly identified and should avoid double counting, e.g., value of theft and illegal income, or transfers, i.e., social transfers from one group to another cancel each other from a societal perspective because the cost to one group is the benefit to another group within the same society. Second, where market values are unavailable, adjustments should be made to approximate willingness-to-pay measures. Third, the quantitative relationship between treatment and benefits should consider the presence of other explanations, i.e., mitigating factors such as the probability of self-cure or maturing out of drug abuse. Finally, monetary values for benefits should be estimated with appropriate adjustments for timing for short-term or long-term outcomes. Thus, studies need to value historical data in today's dollars by adjusting for inflation or discounting future benefits to present values for comparable costs and benefits. Studies that report benefits that occur within the same year do not need to make these adjustments.

As the preceding discussion shows, seeking to assess the value of drug abuse treatment for stakeholders other than the individual drug abuser is problematic. In listing various outcomes as benefits, evaluators are criticized for failing to account for the additional value of the whole benefit including intangibles such as human dignity and self-esteem. Evaluators can assist policymakers in capturing the value of programs; however, it is the policymakers who must decide which programs receive what amount of funding.

Estimate the Costs of the Treatment Program

Costs are, most generically, the expenditures or sacrifices required in order to obtain some good or service. It is necessary to remember that costs vary according to the alternative being considered, according to the stakeholder viewpoint, (e.g., drug abusers, the society, criminal justice system), and according to the time period, (i.e., short-term or long-term). Different stakeholders bear different costs for funding and providing substance abuse

treatment, (i.e., clients). In economic evaluation of public programs, economists generally prefer to estimate costs as the value of foregone opportunities. The cost of operating a methadone maintenance program in the very broadest sense, for example, is the benefit we must give-up by not funding an outpatient program, by not delivering food stamps, or by not reducing taxes. In practice though, the cost of providing drug abuse treatment—or the cost of providing almost any other public good—is nearly always estimated as the monetary expenditure required to provide it.

Program cost estimation can be divided into two steps:

- (a) Identify the amount of physical resources required for each program, and
- (b) Estimate the dollar value of each of the physical resources.

The resources include the labor, space, equipment, materials, supplies, utilities, and other necessary inputs. These inputs are denominated and quantified in their natural units. For example, labor would be denominated in hours, treatment space would be denominated in square feet of space, and equipment as the number of pieces, type, and age of equipment used to implement each treatment program alternative.

Upon listing all resources, the dollar value of each resource is determined or estimated. Whenever possible, resources are valued at their opportunity cost. The opportunity cost of a resource is the value placed on the most highly valued foregone alternative or opportunity. Fortunately, under certain conditions, market prices and opportunity costs are equal for goods and services traded freely (Buchanan, 1987). When feasible, researchers use market prices rather than historical or accounting costs to value costs. Evaluators must estimate the costs of the treatment program for the stakeholders with appropriate adjustments for timing and other factors.

In some important circumstances, however, the market price of a particular resource will not be observed directly. In the analysis of drug abuse treatment, this situation arises when ex-addicts volunteer their time for outreach or treatment; when building space is donated to a treatment program by a city or civic group; or when a skilled professional like a doctor or pharmacist in private practice conducts exams or dispenses prescriptions for a

nominal charge as a charitable service. When this occurs, the usual remedy is to ask, "What payment would this time, space, or service command if sold elsewhere?" or, "What would this outreach, treatment, or follow-up program have to pay for this resource if it had not been donated or subsidized?" The answers to these questions reflect the true opportunity costs of the resources and are the values that should be included in a cost analysis undertaken from the social perspective (Bradley, French & Rachal, in press; French, Bradley, Calingaert, Dennis, & Karuntzos, in press).

Bradley, French, and Rachal (in press) use financial accounting and economic frameworks including opportunity costs where possible to estimate the costs of providing standard and enhanced methadone treatment. They provide an exemplary detailed accounting of costs: those that are included, those that are excluded, and those that are variable by client or by caseload size. This study answers the questions: what does methadone treatment cost? and who provides funding for drug treatment? This study finds similar average costs per client as national studies such as the National Drug and Alcoholism Treatment Unit Survey (NDATUS) and the Drug Services Research Survey (DSRS); however, this study adds further information on incremental costs for increasing caseloads and enhancing treatment programs. The main weakness of the study as acknowledged by the authors is missing information. The authors acknowledge that data on the value of indirect costs and opportunity costs, e.g., volunteer time and the in-kind contributions of the hospital to the hospital based program, would have been a valuable addition to research on drug treatment costs.

Treatment program revenues are frequently used as estimates of treatment costs (e.g., Tabbush, 1986). Treatment revenues may not reflect the cost to stakeholders of drug abuse treatment. Revenues come from several sources including state and federal agencies (see Culhane, Hadley, and Lutterman, 1992). Unless these costs are the stakeholder costs, it is inappropriate to include the total revenues as the cost of treatment to certain stakeholders. When performing cost-benefit analysis, one must focus on the costs and benefits to the relevant stakeholders. Also, certain capital costs of operating a treatment program are frequently neglected in a revenues approach to treatment costing.

Further complicating cost estimation is the confounding of treatment costs with other program costs. For instance, Deschenes, Anglin, and Speckart (1991) report CJS incarceration costs that include costs for commitment to the California Rehabilitation Center (CRC). CRC costs may be considered drug abuse treatment costs since it is an inpatient facility for detoxification and stabilization of criminal addicts. The authors do not separate CJS costs into treatment and non-treatment costs in the summary. The difficulty centers on whether the costs of treatment may be underestimated and the costs of incarceration overestimated by designating CRC costs as incarceration rather than treatment costs.

Conduct Benefit-Cost Comparison

Plainly stated, the purpose of a benefit-cost comparison in the context of this discussion is to weigh the advantages and usefulness against the expenditures and sacrifices of providing publicly-funded drug abuse treatment (or a particular type of treatment, or a particular level of treatment). We ideally wish to: (1) characterize a meaningful working definition of the public good (e.g. the public provision of a certain type and level of drug abuse treatment in a defined community); (2) estimate the aggregate (community) demand curve for that good; (3) estimate the entire area under that demand curve, designated gross-benefits; (4) estimate the expenditure of resources necessary to deliver the stated type and level of treatment in that community; and (5) estimate the net-benefit as the difference between the gross benefits and the expenditure. If the net-benefit so-measured is positive, it is "efficient" to deliver the treatment—even though "gainers" may have to compensate "losers" in order for all affected persons to be better-off with the program in place (see Just, Hueth, and Schmitz, 1982; Downing, 1988; Mishan, 1988).

For reasons also described in the section on estimating the benefit of a program in mandatory terms, it is difficult (and rarely practiced) to estimate the community demand curve for such a good. Consequently, other benefit-cost comparisons are more normally employed to evaluate the merits of providing drug abuse treatment. Drummond, Stoddart, and Torrance (1987) clearly identify four methods for comparing benefits and costs of health care programs: *cost-minimization analysis*, *cost-effectiveness analysis*, *cost-benefit analysis*, and *cost-utility analysis*. Figure 3 summarizes when each of these methods is most appropriate.

- Cost-Minimization Analysis
 - single outcome with constant effectiveness across policy options
- Cost-Effectiveness Analysis
 - effectiveness of a single outcome varying across policy options
- Cost-Utility Analysis
 - multiple outcomes weighted by importance
- Cost-Benefit Analysis
 - multiple outcomes denominated in dollars

Figure 3. Comparison of benefits and costs

Cost-minimization analysis is the simplest form of benefit-cost comparison. Cost-minimization analysis is appropriate when two or more decision options vary in cost but not in effectiveness. It is employed when the analyst is satisfied that two or more decision options (e.g. types of drug abuse treatment, treatment vs. status quo, or other combinations) yield sufficiently similar outcomes that the outcomes can be ignored. In effect, the evaluation assumes or posits that two or more options are (or would be) equally effective at achieving some objective. The decision criterion thus becomes cost-minimization. The analyst recommends (or the decision maker selects and funds) the policy (i.e., treatment vs. no treatment; treatment A vs. treatment B; three-month treatment vs. 6-month treatment) with the lowest cost. Drummond, Stoddart and Torrance (1987) point-out that cost-minimization analysis is very similar to cost-effectiveness analysis (described below). In cost-minimization analysis, it is established or assumed that outcome differences across options are nonexistent or unimportant so that effectiveness analysis can be foregone.

Cost-effectiveness analysis (CEA) is a technique most appropriately used when comparing two or more policies, programs, or options that differ both in cost and their success in achieving some single and clearly-identified objective. In CEA, the ratio of the difference in costs between two programs to the difference in effectiveness is calculated. For example, if program A represents the baseline program and program B represents an enhancement to the program, then the cost-effectiveness ratio of program B relative to program A is equal to the ratio of the incremental costs of program B to its incremental effectiveness. This yields ratios such as the incremental cost per averted drug-related crime or per reduced drug

abuser. In comparing alternative drug abuse treatment policies, the policy with the smallest cost-effectiveness ratio can achieve the given outcome at the lowest cost per unit change in effectiveness.

We emphasize that CEA involves comparisons of incremental or differential costs and effectiveness. Far too often, researchers just divide an available cost figure by some outcome measure, but they miss the point that CEA requires a comparison of the differences in costs and outcomes between two or more policy alternatives (Zarkin et. al., 1994).

Exhibit 1 illustrates the application of cost-effectiveness, cost-utility, and benefit-cost analysis. Table A shows a baseline or status-quo program that effectively avoids 500 crimes and 800 illnesses. Three alternative programs (i.e., Metbadone Maintenance, Outpatient Drug-Free, and Residential Treatments) are presented with an incremental cost of one million more than the baseline program. To perform a cost-effectiveness analysis, it is best to have one, unambiguous objective of the intervention yielding a single outcome by which effectiveness can be measured (Drummond et al., 1987; Quade, 1989). If there are two or more outcomes of interest, cost-effectiveness ratios must be computed for each of the alternative outcomes (Drummond et al., 1987). For example, Table B in Exhibit 1 shows Outpatient Drug-Free to have the lowest crime cost-effectiveness ratio; however, Residential shows the lowest health cost-effectiveness ratio. Unless a single alternative program leads to the lowest cost-effectiveness ratio for every outcome, policymakers are left in a quandary as to the most cost-effective program. Policymakers must choose, but what is the most desirable outcome?

One solution to this quandary would be to use cost-utility comparison whereby one assigns weights to the outcomes (see Phelps and Mushlin, 1991; Schmid, 1989; McLellan et. al., 1985; and Wing and Gay, 1990). Table C reports cost-utility amounts assuming 1 avoided illness is equivalent to 3 avoided crimes. The hypothetical Residential program has the most desirable cost-utility ratio: $\$250 = (\$1,000,000 / [250 + (3*1,250)])$. If instead we use cost-benefit analysis to assign a dollar value to each outcome (one crime avoided is worth \$200 and, consistent with the 3 to 1 weighting assumed earlier, one illness avoided is worth \$600), we see that even the alternative with the most desirable cost-utility ratio (residential treatment) imposes greater costs than benefits $[(\$600*1,250) + (\$200*250) - \$1,000,000 = -$

\$200,000]. So we see that rather than indicating the most desirable policy alternative, the cost-utility analysis was only indicating the *least undesirable* alternative.

A dollar spent or received today is worth more than a dollar spent or received in the future. In the context of the economics of drug abuse treatment, it is likely that the costs to provide treatment are incurred sooner, and the benefits of treatment accrue later. This problem can be addressed by explicitly recognizing the timing of outlays and receipts and discounting all future costs and benefits to the present using an appropriate discount rate. The selection of the "correct" discount rate is controversial and beyond the scope of this paper. See Just, Hueth, and Schmitz (1982) for a thorough discussion of discounting in social policy analysis³.

Net-benefits may of course be positive, when additional benefits exceed additional costs, or negative, when additional costs exceed additional benefits. When two or more policies are being compared and two or more policies have positive net-benefits, the decision maker must decide how many policies to pursue. If the decision to implement one or more beneficial policies precludes (e.g., for budgetary reasons) the implementation of other available beneficial policies, then the decision maker should select the one or more policies within budget constraints that collectively maximize net benefits. However, the decision maker without a budget constraint should implement all policies with positive net benefits, starting with the one having the largest net benefit as dominant and selecting projects with successively smaller net benefits.

³See Harvey (1994) for a discussion of non-constant discounting for policy analysis.

EXHIBIT 1. ILLUSTRATION OF COST-OUTCOME COMPARISON METHODS¹

TABLE A. INCREMENTAL CHANGES: COSTS, CRIME, AND ILLNESSES

Policy Options	Incremental Costs (\$)	Crimes Avoided	Change in Crimes Avoided	Illnesses Avoided	Change in Illnesses Avoided
Baseline or Status-Quo	NA	500	NA	800	NA
Methadone Maintenance	1,000,000	1,000	500	1,600	800
Outpatient Drug-Free	1,000,000	1,500	1,000	1,000	200
Residential	1,000,000	750	250	2,050	1,250

TABLE B. CRIME VS. HEALTH COST-EFFECTIVENESS

Policy Options	Crime Cost-Effectiveness	Health Cost-Effectiveness
Baseline or Status-Quo	NA	NA
Methadone Maintenance	\$2,000	\$1,250
Outpatient Drug-Free	\$1,000	\$5,000
Residential	\$4,000	\$800

TABLE C. COST-UTILITY VS. NET BENEFIT ANALYSIS

Policy Options	Cost-Utility Comparison ²	Net-Benefit (Loss)
Baseline or Status-Quo	NA	NA
Methadone Maintenance	\$345	(\$420,000)
Outpatient Drug-Free	\$625	(\$680,000)
Residential	\$250	(\$200,000)

NA = not applicable.

¹All numerical values are hypothetical.

²Note: 1 avoided illness = 3 avoided crimes = utility.

Discuss Implications and Limitations

It should be apparent that most economic analyses of drug abuse treatment will raise some questions as it answers others, will rely on assumptions and estimates as well as data, and generally will not definitively conclude that one policy clearly dominates others under all assumptions and circumstances. An important final component of an economic analysis is thus an explicit discussion of the strengths and weaknesses of the analysis conducted, the implications for decision makers, a comparison of the results with those of similar previous studies, and suggestions where further research might be warranted.

Even before reminding policy makers of the strengths and weaknesses of *specific* economic methodologies, analysts should remind them that economic analysis generically is only *one of several* methods of program analysis. Daniel W. Bromley, a resource and agricultural economist at the University of Wisconsin, asserts that the potential welfare improvement criterion and many measures of economic efficiency “. . . do not accord with what public decision makers seek in policy advice from economists” (1990). Bromley also asserts, however, that the abandonment by economists of the usual economic efficiency norm which places value on marketable commodities only to which economists normally cling “. . . liberates the economist to focus evaluation and analysis on those aspects of policy choices that matter most to those in a position to decide.”

The analyst should then remind the decision maker of what assumptions were made in the analysis. Was it assumed that “*status-quo* maintenance” is or is not a feasible option? Was it assumed that the pursuit of more than one policy was feasible or infeasible? What was the assumed resource constraint, if any? Which important data elements were actually assumed, if any? Which data were estimated rather than observed?

After reminding the decision maker of the strengths and weaknesses of the economic approach in general and of the economic methodologies employed specifically, the *implications* of the results for the decision maker, as seen by the *analyst*, should be presented. If the analysis examined the costs and benefits of, hypothetically, residential treatment varying by length-of-stay, does the analyst believe that the results suggest longer stays are more effective than shorter stays? If yes, what is the

incremental effectiveness of a longer stay? Are there reasons to believe that a length-of-stay "in between" two of those examined (e.g. seven months) might actually be more cost effective than either a six-month or nine-month stay?

The results of the economic analysis should also be discussed in the context of previous similar studies. Previous studies using similar and dissimilar methodologies should be discussed. Reasons explaining why as well as how the results of the current analysis are consistent or inconsistent with other studies should be explored.

The final component of the analysis is a presentation of promising further research opportunities. This typically takes the form of identifying the limitations of the current analysis, and proposing ways to address those limitations in a subsequent analysis. Ways of addressing two types of limitations should be considered and, if feasible, proposed.

The first type is data-specific. What data are required to implement the methodology that are not available? Which data values have to be assumed for the present study, and how might they be estimated next time? Which data values have to be estimated for the present study, and how might they be "observed" next time? How could surveys or other primary data collection efforts be initiated to generate data for future similar analyses?

The second type of limitation is methodological. If there were, hypothetically, types of benefits that the analysis did not even attempt to estimate because of data limitations, what alternative methodology could be employed to estimate those benefits without relying on unavailable data? We have observed and indicated in this paper, for example, that natural resource economists have been using survey and other methodologies for over a decade to estimate the benefits and costs of public goods. We believe some of these methodologies are transferable to the economic evaluation of drug abuse treatment.

V. CONCLUSION

Cost-benefit analysis is an ideal method for comparing the advantages and disadvantages of alternative drug abuse treatment policies because it explicitly values all costs and all benefits in monetary terms so that decision makers can decide whether or not they "should" spend tax dollars on treatment. In performing such an analysis, we ideally wish to: (1) identify and characterize a meaningful and working definition of the public good to be provided (e.g. the public provision of a certain type and level of drug abuse treatment in a defined community); (2) estimate the sum total of the maximum that consumers are willing to pay for drug abuse treatment, designated gross-benefits; (3) estimate the value of resources consumed in delivering the stated treatment, designated as costs; and (4) estimate the net-benefit as the difference between the gross benefits and the costs. If the net-benefit is positive, it is "efficient" to deliver the treatment until the additional benefit of one more service is less than the additional cost (see Just, Hueth, and Schmitz, 1982; Downing, 1988; Mishan, 1988).

Since the objectives of drug abuse treatment are diverse and complex, we believe that the best way to obtain willingness-to-pay benefit estimates is to use survey methods that appraise the entire community's (i.e., every stakeholder's) willingness to pay for drug abuse treatment.

The best way to estimate costs is to obtain a complete accounting of all resources, including those that are purchased, owned, and donated, that are used to provide treatment. We should then value these resources at their market values. Merely using budgeting or funding amounts is an inadequate estimation procedure.

The benefit-cost comparison should compare total benefit and total costs to determine net-benefits ($WTP - Costs = \text{net-benefit or net-loss}$), but also should compare marginal costs and marginal benefit, (i.e., the additional benefit less the additional cost) of one program or one caseload or one individual in treatment.

The results should be examined using sensitivity analysis to determine the effects of changing the assumptions and inputs used for benefits and costs. The results should also be examined in context

with previous studies. Finally, the benefit-cost analysis should discuss the policy implications as well as potential limitations resulting from the assumptions and the data used.

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**COSTS AND BENEFITS OF DRUG TREATMENT
AND DRUG ENFORCEMENT: A REVIEW OF THE
CALDATA AND RAND STUDIES**

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BOTEC Analysis
C O R P O R A T I O N

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AND DRUG ENFORCEMENT: A REVIEW OF THE
CALDATA AND RAND STUDIES**

By:
David Boyum

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Executive Summary

Two major studies conducting cost-benefit or cost-effectiveness analyses of drug policy interventions have been released within the past year. The California Drug and Alcohol Treatment Assessment (CALDATA) involved a cost-benefit analysis of four types of treatment programs: residential programs, social model recovery houses, outpatient drug-free programs, and methadone programs (both maintenance and detoxification). Data were largely based on follow-up interviews with over 1500 participants in California treatment programs. The other study, carried out by the RAND Corporation, developed a detailed model of cocaine production and consumption, which was then used to calculate relative cost-effectiveness and benefit-cost ratios for four types of cocaine control policies: source-country control, interdiction, domestic enforcement, and treatment of heavy users.

Both studies determined that the social benefits of drug treatment far exceed the social costs. In CALDATA, benefit-cost ratios ranged from 2:1 to more than 12:1, depending on the treatment modality and the cost-benefit standard employed. In the RAND study, each additional dollar spent on treatment is estimated to return \$7.46 in social benefits and cost savings. By contrast, the RAND study estimated that additional investment in supply-control programs would not generate benefits equal to their costs. In total social benefits and cost savings, source-country control returns 15 cents on the dollar, interdiction returns 32 cents, and domestic enforcement 52 cents.

Despite their evident carefulness and seriousness, both the CALDATA and RAND studies have a number of shortcomings. The single biggest problem is that the data on treatment efficacy employed in both analyses come from studies lacking proper experimental controls. (CALDATA used data from its own interviews; the RAND study used data from the Treatment Outcome Prospective Study.) These studies found that participation in treatment is associated with sharp declines in reported drug use and criminal behavior, both during and after treatment episodes. But without a true control group, it is impossible to determine how much of the improved behavior is attributable to treatment as opposed to other factors (such as self-selection, aging, and the fact that many drug users enter treatment programs when their up-and-down cycle of drug use and crime is at a peak).

This suggests that controlled studies of treatment efficacy ought to be a drug policy research imperative. Both the CALDATA and RAND studies represent careful efforts by top researchers to assess the efficacy of different drug policy interventions. Yet, because of the lack of controlled treatment experiments, the conclusions about treatment efficacy, and in turn any comparisons between treatment and enforcement, must be considered tentative.

Introduction

Recently, two major studies have attempted cost-benefit or cost-effectiveness analyses of particular drug policies. The California Drug and Alcohol Treatment Assessment (CALDATA) conducted follow-up interviews with over 1500 publicly supported participants in four types of treatment programs in California.¹ Respondents were asked detailed questions about their pre-, during-, and post-treatment drug and alcohol use, health and health-care utilization, criminal activity, and legal employment and income. Combining the information obtained with data from state databases and provider records, the study assessed the monetary costs, behavioral effects, and economic value of the different treatment modalities. CALDATA concluded that all the major treatment modalities resulted in significant declines in alcohol and/or drug use, criminal activity, and health-care utilization, so much so that the economic benefits from these reductions easily outweighed the costs of treatment (by ratios ranging from 2:1 to 12:1, depending on the modality and the cost-benefit definition employed).²

The other study, conducted by the RAND Corporation,³ also determined that drug treatment yields a surplus in cost-benefit terms (by a 7:1 margin). The RAND study also analyzed the efficacy of supply reduction programs, concluding that treatment is much more cost-effective in reducing drug use. In fact, the differences are so great that marginal increases in source-country control, interdiction, and domestic enforcement all result in net losses from a cost-benefit perspective.

This report provides a brief critical review of the CALDATA and RAND studies, discussing their methodologies, findings, and policy implications.

¹ The study was conducted between September, 1992 and March, 1994 by the California Department of Alcohol and Drug Programs in partnership with the National Opinion Research Center (NORC) at the University of Chicago and Lewin-VHI, Inc. See Dean R. Gerstein, Robert A. Johnson, Hendrick J. Harwood, Douglas Fountain, Natalie Suter, and Kathryn Malloy, *Evaluating Recovery Services: The California Drug and Alcohol Treatment Assessment (CALDATA)*, Publication No. ADP 94-629 (Sacramento: California Department of Alcohol & Drug Programs, 1994).

² The sole exception was methadone treatment episodes ending in discharge, which resulted in net losses.

³ C. Peter Rydell and Susan Everingham, *Controlling Cocaine: Supply Versus Demand Programs* (Santa Monica, CA: RAND, 1994).

CALDATA

Methodology

CALDATA attempted to generate a random sample of recent publicly-supported participants in four types of treatment programs in California—residential programs, social model recovery houses, outpatient drug-free programs, and methadone programs (both maintenance and detoxification).⁴ A three-stage cluster sampling approach was employed. In the first stage, 16 of California's 58 counties were selected. Selection probabilities were weighted so that six large counties were chosen with certainty and even the smallest counties had at least a one in eight chance of inclusion.

In the second stage, 106 treatment providers were selected (randomly, but with adjustments to ensure adequate size and geographic diversity) from within the 16 counties. Of the 106 providers, there were 19 residential treatment programs, 23 social model recovery houses, 29 outpatient nonmethadone providers, 18 methadone maintenance providers, and 19 methadone detoxification providers. Overall, 87 of the 106 providers cooperated with the study.

In the third stage, CALDATA generated a sample of 2746 clients from the 87 cooperating facilities—about 3 percent of their total client base. Of this sample, 1643 were located and interviewed. Respondents were asked detailed questions about their pre-, during-, and post-treatment drug and alcohol use, criminal activity, health and health care utilization, and employment and income. This information was then supplemented with treatment cost and other data obtained from cooperating providers.

For the cost-benefit analysis, CALDATA divided benefits into three categories: crime, health, and productivity. The table below, extracted (and abbreviated) from the CALDATA report, lists for each category, the components, method for calculating average values, and participant data employed.

⁴ Each of these categories encompasses a variety of programs. In general, residential treatment programs provide therapy in heavily structured and controlled residential environments; social model recovery houses provide a communal sober living arrangement for recovering alcoholics; outpatient drug-free programs involve regular counseling, ranging from individual sessions to 12-Steps (such as Alcoholics Anonymous or Narcotics Anonymous); methadone programs include outpatient methadone maintenance (providing a stable daily dose of methadone and, in some cases, non-residential counseling) and methadone detoxification (for opiate withdrawal, lasting a maximum of 21 days).

Bases for Cost-Benefit Calculations

Components	Method for calculating average values	Participant data employed
CRIME		
Police Protection from Crime	Police expenditures, divided by total arrests, multiplied by arrest rate	Number of crimes, by type
Adjudication and Sentencing	Crime-related court and legal costs, divided by total arrests	Number of arrests
Corrections	Expenditures per parolee/probationer, expenditures per inmate	Time incarcerated or on parole/probation
Victim costs	Average cost of medical care, lost work days, and property damage, by type of crime	Number of crimes, by type
Theft losses	Average value of stolen cash, property, by type of crime	Number of crimes, by type
HEALTH		
Outpatient medical care	Cost per outpatient visit	Visits to doctor
Inpatient medical care	Costs per inpatient day, plus physician fees	Nights spent in hospital
Emergency room use	Costs per emergency room/outpatient visit, plus physician fees	Trips to emergency room
Outpatient mental health care	Total outpatient revenues divided by number of outpatient days	Visits to mental health counselor or professional
Inpatient mental health care	Total inpatient psychiatric revenues divided by inpatient psychiatric days	Whether admitted to inpatient psychiatric facility
PRODUCTIVITY		
Loss of legitimate work earnings	Mean income, adjusted for age, gender, mandatory and voluntary benefits	Longest legitimate full- and part-time work, wage rates, months worked
Welfare and disability transfers		Welfare and disability income

Findings

On average, respondents in the CALDATA sample reported significant improvements in their behavior during and following treatment. Comparing pre- and post-treatment behavior, criminal activity fell by two-thirds, alcohol and drug use by two-fifths, and hospitalizations by one-third. Only employment and earnings failed to show any overall improvement, although longer treatment periods—especially in residential programs—were correlated with employment gains.

There were no significant differences in treatment effectiveness according to substance, age, gender, or ethnicity. For instance, treatment of major stimulant drugs (crack, cocaine, methamphetamine) was found to be as effective as alcohol treatment, and slightly more effective than heroin treatment.

In tabulating costs and benefits, CALDATA employed two different standards for cost-benefit analysis. "Costs and benefits to total society" includes all economic impacts, whereas "costs and benefits to taxpaying citizens" includes only economic impacts on those outside the treated group. Thus, whereas welfare or disability payments are considered net losses to taxpayers, they are zero-sum transfers on a society-wide basis.

On the taxpaying citizens standard, the benefits of alcohol and drug treatment outweighed the costs of treatment for all modalities, by ratios ranging from 4:1 to 12:1. The cost-benefit ratio was highest for discharged methadone participants, lowest for residential programs. On the total society standard, calculated cost-benefit ratios were lower, ranging from 2:1 to 4:1 for all modalities, with the exception of methadone episodes ending in discharge, which produced net losses.

Problems

Possible Sample Bias

There are three basic ways in which the CALDATA findings might be slanted by sampling bias. Provider noncooperation is one possibility; cooperating and noncooperating providers might differ in effectiveness, either because of differences in program quality or because participants in cooperating and noncooperating programs differ in their responsiveness to treatment. The obvious concern is that less effective (or more costly) programs chose not to cooperate in order to conceal their records. However, with the exception of methadone programs, noncooperation rates were quite low—4.9 percent for residential programs, 9.3 percent for social model programs, and 21.4 percent for outpatient non-methadone programs. So even if there were an association between noncooperation and ineffectiveness, it would have a modest impact on most of CALDATA's findings.

A second possible source of bias is participant nonresponse; within cooperating providers, those interviewed might differ from nonrespondents in their responsiveness to treatment. One could imagine, for example, that those whose behavior was unimproved by treatment would be more difficult to locate or would be less willing to discuss their behavior. To address this possibility, the CALDATA report compared the administrative records of respondents and nonrespondents.

Differences were quite small across a wide variety of demographic and behavioral characteristics, even on those one would expect to be strongly correlated with treatment success, such as length of treatment or completion of treatment plan. While this does prove the absence of nonresponse bias, it is reassuring.

There is a third, and potentially more serious, source of bias. Those who received treatment in California programs, and thus composed the sampling frame for CALDATA, may not be representative of all drug abusers. Three possible distortions are of greatest concern. First, drug users tend to enroll in treatment when their habits are at a peak and their behavior most out of control. Thus, reductions in drug use and improvements in behavior may in part represent a regression to the mean and not just a treatment effect. Second, the decision to enter treatment involves a decision to try to reduce one's drug use, a decision that might produce gains even without treatment. Third, those who enter treatment may, because of their personalities or circumstances, be better candidates for treatment success than those who do not enter treatment.

Any of these three effects would complicate interpretation of the CALDATA findings. The first two raise the possibility that the observed treatment benefit is more apparent than real. The third suggests that even if treatment worked for those in the CALDATA sample, it may be less effective for others. In other words, efforts to expand treatment programs may have diminishing returns.

Lack of a Control Group

Only a properly matched control group would eliminate the possibility of sample bias. A control group would also minimize another potential problem: measurement error. In CALDATA, data on drug use, health, health utilization, income, and criminal activity are all based on self-reports. If there is a systematic bias (either deliberate or unconscious) in how respondents estimate changes in their behavior over time, then the data will tend to overstate or understate treatment benefits. To the extent that such a bias is not itself a product of drug treatment, a control group would control for it.

Calculation of Crime-Reduction Benefits

There are several problems with the calculations in CALDATA of benefits accruing from reductions in crime. One is that the criminal justice system savings may be overstated. CALDATA assumed that police, adjudication, and sentencing costs are a linear function of the number of arrests, and that corrections costs are a linear function of the number of probationers, parolees, and inmates. But given the current deficits in jail, prison, and court capacities, reductions in crime might not translate into proportional criminal justice system savings. In other words, if drug treatment reforms a particular criminal, the prison cell he would have occasionally occupied will be used for others, and not eliminated. (This would have some benefits in terms of marginally increased isolation and deterrence on the still-active criminal population, but not direct savings in terms of budgetary outlays for the criminal justice system.)

Moreover, the connection between the reform of an individual criminal and a reduction in the overall crime rate is quite different for drug dealing than for predatory crimes. Since drug crimes are transactional, there is a larger replacement effect. When a burglar retires, there will be an identifiable drop in the number of burglaries. But when a drug dealer quits the business, his place in the market may be replaced by another dealer, with little effect on the trade. In the CALDATA sample, involvement in drug dealing was about three times as common as involvement in predatory crime.

But if the CALDATA analysis overestimated the economic benefits of crime reduction in one respect, it underestimated them in another. Victim costs are defined to include medical costs, stolen money, lost or damaged property, and lost work. However, this methodology ignores the costs of pain and suffering, fear, and future crime-avoidance behavior, which for many crimes are much larger.

Also uncounted by the CALDATA methodology are the benefits of reduced crime to all those who are potential, but not necessarily actual, victims. Not only does crime induce spending on locks, alarms, and private security officers, but it reduces property values and forces many people to uproot their families and move to new neighborhoods.

Lastly, CALDATA excludes the value of theft losses from the calculation of "costs and benefits to total society" (on the grounds that theft losses are transfers). One could easily raise a philosophical objection to such an exclusion, which considers a thief's gain of stolen property to be equal to his victim's loss. As George Stigler argued, "society has branded the utility derived from such activities as illicit."⁵ But even in strict economic terms, the CALDATA methodology is difficult to justify. For as soon as property is stolen, its value, as demonstrated by prices for fenced goods, falls by 85-90 percent. So CALDATA's total society calculations fail to weigh avoided property depreciation as a benefit of reduced crime.

Non-Financial Benefits

As noted above, CALDATA employed two different cost-benefit standards: "costs and benefits to total society" and "costs and benefits to taxpaying citizens." What is puzzling—at least at first glance—is that the calculated benefit-cost ratios were much higher for taxpayers than for total society (i.e., taxpayers plus treated drug users). This seems to imply that although drug treatment is a good deal for taxpayers, it makes drug users worse off. Yet, this is exactly what CALDATA's figures suggest. If one tallies the study's estimated economic gains and losses, drug users are substantially worse off following treatment. The main reason: their criminal income declines sharply.

This reveals a central methodological problem with the CALDATA cost-benefit analysis. CALDATA did not include in its total society figures any estimates of the non-financial benefits of treatment to recipients (and those who care about them). Given the miserable condition of many substance abusers, and the attendant grief suffered by friends and families, such benefits are far from trivial.

⁵ George J. Stigler, "The Optimal Enforcement of the Laws," *Journal of Political Economy* 78 (1970):527.

Indeed, had such benefits been included in the cost-benefit analysis, it is hard to imagine that treatment would produce net losses for drug users. (Among other things, the cost of forgone criminal income would be substantially or completely offset by the benefit of reduced arrest and punishment.) And if treatment is beneficial for drug users, then the benefit-cost ratio would be higher for total society than for taxpayers.

The Cost-Benefit Standard

This still leaves unanswered a critical question: which cost-benefit standard is more appropriate? The CALDATA report does not discuss the relative merits of the two standards it uses.

For at least two reasons, the total society standard is the reigning norm in cost-benefit analysis. First, there is something inegalitarian about the taxpaying citizens approach, where rises or falls in the welfare of drug users are assigned no value. Second, the total society yardstick jibes with the methodology of welfare economics. If the social benefits of an intervention outweigh the costs, then it is termed by economists a "potential Pareto improvement," meaning that, in principle, resources could be redistributed so that everyone would be better off as a result of the intervention. In contrast, a policy with a positive benefit-cost ratio on the taxpayer standard is not necessarily a potential Pareto improvement.

That said, the taxpayer standard may be the more appropriate one in political terms. After all, it tells taxpayers, who will be footing the bill for the policy, whether (and by how much) they will recoup their tax dollars.

Time Horizon

CALDATA looks at the changes in the behavior of drug users during and in the year immediately following treatment. However, findings from other treatment research, such as the Treatment Outcome Prospective Study (TOPS),⁶ indicate that drug use and criminal behavior remain below pre-treatment levels for longer than a year. This suggests that had CALDATA examined a longer post-treatment time horizon, the calculated benefits of treatment would have been larger.

⁶ Robert L. Hubbard, Mary Ellen Marsden, J. Valley Rachal, Hendrick J. Harwood, Elizabeth R. Cavanaugh, and Harold M. Ginzburg, *Drug Abuse Treatment: A National Study of Effectiveness* (Chapel Hill: Univ. of North Carolina Press, 1989).

The RAND Report

Methodology

The RAND study evaluates the cost-effectiveness of four types of cocaine control policies: source-country control (coca-leaf eradication; seizures of base, paste, and refined cocaine), interdiction (import-level cocaine and asset seizures), domestic enforcement (domestic cocaine and asset seizures; arrest and imprisonment of drug dealers), and treatment of heavy users (through outpatient and residential programs).

The bulk of the study consists of a cost-effectiveness analysis of the four interventions; in particular, the analysis calculates the cost of generating a one percent decrease in cocaine consumption through each type of policy. The comparative effects of the four interventions are evaluated through a detailed model of cocaine production and consumption.

In the model, production is divided into six stages, starting with leaf production and ending with retail selling in the U.S. At each stage, the sale price is determined by calculating the total cost to producers at that stage, and dividing it by the net production of cocaine (after seizures). Total cost is a function of input price, processing costs (including efforts to avoid detection), and financial sanctions (asset seizures and compensation for risks of arrest and incarceration).

Cocaine consumption is modeled through a Markov process where individuals fall into one of three categories: non-users, light users, and heavy users. The flows among these groups are assumed to have certain base transition rates, and are further influenced by changes in cocaine prices and, in the case of heavy users, rates of drug treatment. Consumption among light and heavy users is a function of price and the incarceration rate of users (it is assumed that drugs are not used in jails or prisons). The model assumes that the long-run price elasticity of demand equals -0.5 , comprised half by consumption effects on current users and half by changes over time in the number of users.

Also part of the model are expenditures on both supply-control and demand-control programs. Enforcement is assumed to impose costs on cocaine production, and in turn raise retail prices, through drug and asset seizures and the arrest and imprisonment of dealers. Agency budget data is used to estimate—for domestic enforcement, interdiction, and source-country control—the public cost of producing these enforcement outputs (with an assumption of declining marginal productivity).

Treatment of heavy users is assumed to reduce cocaine consumption by increasing outflow from the heavy user population and by reducing the use of those enrolled in treatment. The magnitude of these changes is estimated using data from the Treatment Outcome Prospective Study (TOPS), to date the most comprehensive evaluation study of treatment effectiveness. In calculating the effects of expenditures on treatment, the model assumes diminishing returns to treatment budgets, on the grounds that as the proportion of heavy users treated increases, so too does the share of hard-to-treat clients who require more expensive residential programs.

Because the cost-effectiveness analysis only evaluates the relative (and not absolute) performance of different policy interventions, the RAND study also estimated the societal cost savings (in terms of crime and lost productivity) of the various policies. Estimates of crime and lost productivity costs attributable to drug use were taken from the work of Dorothy Rice and her colleagues.⁷

Findings

The RAND study concluded that reducing cocaine consumption by one percent would require additional spending of \$783 million on source-country control, \$366 million on interdiction, \$246 million on domestic enforcement, or \$34 million on treatment of heavy users. In other words, the least expensive supply-reduction program, domestic enforcement, costs 7.3 times as much as heavy-user treatment.

When societal costs are considered, treatment is again the hands-down winner. It is estimated that each dollar spent on treatment reduces the costs of crime and lost productivity by \$7.46. By contrast, none of the supply-control interventions break even. Source-country control returns 15 cents on the dollar, interdiction returns 32 cents, and domestic enforcement 52 cents.

Problems

Estimates of Treatment Effectiveness

As noted above, the RAND study bases its estimates of treatment effectiveness on data from TOPS. About the accuracy of the estimates, the RAND authors state:

These estimates of post-treatment effects are conservative (potential underestimates) in that clients receiving treatments that last less than 3 months are used as the "control group" in the calculations of treatment effect ... In other words, treatments lasting less than 3 months are assumed to have no effect, and the behavior of clients who receive those treatments is used to estimate what would happen in the absence of treatment. To the extent that treatments lasting less than 3 months have some effect, the calculation underestimates the effectiveness of cocaine treatment.⁸

However, those who complete less than three months of treatment are hardly a proper control group for those whose therapy lasts three or more months. Given the difficulty of the endeavor, it is not hard to imagine that those who drop (or are kicked) out of treatment programs shortly after entering are less disciplined, motivated, or otherwise amenable to treatment than those who stay in for longer.

⁷ Dorothy P. Rice, Sander Kelman, Leonard S. Miller, and Sarah Dunmeyer, *The Economic Costs of Alcohol and Drug Abuse and Mental Illness: 1985* (San Francisco: Institute for Health and Aging, 1990).

⁸ Rydell and Everingham, *Controlling Cocaine*, p. 89.

More important, we cannot assume that those who received treatment (for any length of time) were identical in circumstances and temperament at the time they entered treatment to those who did not enter treatment. In other words, there is no control group for the entire class of clients who enrolled in treatment, and thus we cannot know for sure how much of any improvement in their behavior is attributable to treatment. This is a significant methodological problem; as noted earlier in connection with the CALDATA sample, there are factors other than treatment that could in principle explain improved behavior.

First, given that individuals often enter drug treatment when their drug use is at a peak (and thus appears to them most uncontrolled), apparent treatment effects may partially or wholly represent a regression to the mean. Second, given that people who enter treatment are more likely than others to want to reduce their drug use, apparent treatment effects may partly or wholly represent spontaneous recovery that would have occurred in the absence of (paid) treatment (perhaps with the aid of a self-help group). Third, those who enter treatment may be more amenable to treatment than those who do not. (These three factors are frequently related; substance abusers often enter and are most responsive to treatment following what therapists call "turning points," representing "the shift from unencumbered substance abuse to the realization that this abuse is directly responsible for the presence of profoundly negative life circumstances.")⁹ Fourth, there may be measurement errors in the data. Even where during- or post-treatment drug use is confirmed by regular urine tests, pre-treatment drug use (and other behavior) is self-reported.

Estimates of Treatment Cost

In both its cost-effectiveness and cost-benefit analyses, the RAND study assumed that residential treatment costs an average of \$12,467 per person per year, and outpatient treatment an average of \$2,722. The residential cost figure seems low. Five years ago, the Institute of Medicine report, *Treating Drug Problems*, put the cost a typical therapeutic community at about \$13,000 per treatment year, and the cost of a model program at \$20,000.¹⁰ Among providers participating in CALDATA, full-fledged residential programs cost an average of \$22,437 per treatment year. (Outpatient programs averaged \$2,873.)

It goes without saying that higher estimates of treatment cost would lower the calculated returns on treatment expenditures. Indeed, if the RAND study had used the CALDATA cost estimates, both the cost-effectiveness and cost-benefit ratios would have been approximately one-third lower.

⁹ Howard J. Shaffer, "Denial, Ambivalence, and Countertransference Hate," in *The Dynamics and Treatment of Alcoholism*, J. Levin and R. Weiss, eds., (Jason Aronson, Inc.: 1994), p. 424.

¹⁰ Dean R. Gerstein and Hendrick J. Harwood, eds., *Treating Drug Problems*, Vol. 1 (Washington, D.C.: National Academy Press, 1990), p. 189.

Estimates of Enforcement Effectiveness

The RAND study estimates that users spent \$37.6 billion on cocaine in 1992. It is generally estimated that if cocaine were legalized (and not taxed), prices would fall to about one-twentieth their current level. This suggests that prohibition and enforcement impose costs of about \$35.7 billion on the supplying industry. The RAND report also notes that approximately \$12 billion was spent on drug enforcement in 1992.¹¹ Assuming that enforcement is fully responsible for the \$35.7 billion in imposed costs, and that the relationship between enforcement expenditures and imposed costs is roughly linear, these numbers suggest that each dollar in enforcement raises drug prices by a factor of about three. (For domestic enforcement alone, the ratio would be also be about 1 to 3; domestic enforcement comprises 78 percent of enforcement spending and domestic price markups account for about 80 percent of total price markups.)

In estimating the effects of enforcement on drug prices, the RAND study calculated that \$246 million in additional annual expenditures on domestic enforcement would impose \$750 million in costs on the supplying industry. This 1:3 ratio is identical to the ratio calculated in the previous paragraph. Clearly, the RAND estimates of the effects of enforcement on drug prices are in the ballpark.

This does not mean, however, that the estimates of the effects of enforcement on consumption are in the ballpark. In calculating the effects of drug prices on consumption, the RAND study assumes that the elasticity of demand equals -0.5. The assumption is justified by reference to estimates of the price elasticity of alcohol and cigarettes. However, heavy cocaine users often spend more than half of their disposable income on cocaine, which ought to make them more price sensitive than the mean tobacco or alcohol user.¹²

Moreover, the RAND study assumes that price is one of only two mechanisms through which drug enforcement reduces drug consumption, the other being user incarceration. Clearly, though, enforcement can limit use in other ways. As Mark Moore pointed out over twenty years ago, the demand for drugs is not simply a function of price, but also of the difficulty and risk of purchasing.¹³ These factors may have more effect in reducing drug use than do money prices, especially outside major drug-market neighborhoods. Yet the RAND analysis ignores the contribution of enforcement to raising search times and risks for drug users. It also neglects the possible contribution of enforcement to antidrug attitudes. Given these omissions, and a low estimate of cocaine price elasticity, the overall assessment of enforcement effects may be unduly pessimistic.

¹¹ Prohibition (independent of enforcement) may account for some or much of the imposed costs. How much is not clear, since it depends on what the cocaine industry would look like if cocaine dealing were prohibited but not punished. Contracts would be legally unenforceable, which would presumably increase costs (in comparison to a legal industry); on the other hand, dealers would save by avoiding taxes and the costs of complying with numerous government regulations that apply to legal businesses (such as liquor stores and pharmaceutical manufacturers).

¹² It is also possible that substitution (and not just income) effects are greater for cocaine than for alcohol or tobacco. Heavy cocaine users often use other stimulants as a substitute or supplement when cocaine is scarce or of poor quality. By contrast, alcohol and tobacco users have few pharmacologically similar alternatives.

¹³ Mark H. Moore, "Policies to Achieve Discrimination on the Effective Price of Heroin," *American Economic Review* 63 (1973):270-77.

Interdependence of Supply and Demand Policies

Another shortcoming of the RAND study is that it does not consider any interaction effects between enforcement and treatment. Enforcement and treatment are often portrayed as opposing approaches to drug policy. (And cost-effectiveness and cost-benefit analyses, which tend to model policy decisionmaking in terms of discrete choices, and calculate policy effects as if everything not directly affected by a policy intervention remains unchanged, can encourage this kind of thinking.) In fact, enforcement and treatment may be symbiotic. Drug enforcement makes it more risky and expensive for addicts to maintain their habits. Given that many addicts need help in quitting, enforcement is likely to be most effective in prompting users to quit when treatment is readily available.

It is also possible that treatment outcomes are enhanced by a climate of vigorous enforcement. After all, for those in treatment, enforcement increases the costs of failure.

Calculation of Crime Reduction Benefits

Like CALDATA, the RAND study uses the estimates and methodology of Dorothy Rice and her colleagues in calculating the benefits of reduced crime. These estimates are subject to the objections noted above in connection with CALDATA.

However, in the case of supply reduction policies, there are also some problems with the estimates of crime reduction themselves. The RAND study assumes that drug enforcement reduces crime by reducing drug use. In reality, the connection is far more complicated and uncertain.

A detailed discussion or analysis of the connections between drug enforcement and crime are beyond the scope of this review, but it is worth pointing out two effects not included in the RAND analysis: one that tends to increase the crime-reduction effects of drug enforcement, and one that has the opposite effect.

Most of those who are prosecuted for drug crimes have very high rates of non-drug offending as well. So adding a drug offender to the prison population will, in most cases, have an incapacitation effect on non-drug crime. On the other hand, by raising prices, drug enforcement may prompt some addicts to commit more crimes to finance their habits, and may also increase violent competition among dealers.

Discussion

Both the CALDATA and RAND studies conclude that, on average, drug treatment produces significant reductions in drug use and criminal behavior. However, the data on which these conclusions were based come from studies without any proper experimental controls. And as noted earlier, there are many factors other than a treatment effect that could explain part or all of the observed effects.

In fact, there is only one study of treatment efficacy that might be called "controlled." In the initial years of the California Civil Addict Program (CAP), which began in 1961, about half of CAP clients were discharged from treatment shortly after admission because of legal-procedural errors in their commitments. When the two groups were compared, the CAP clients had about half the level of drug use and criminal activity of the comparison group.¹⁴ However, both groups showed significant reductions in drug use and crime from their immediate preadmission levels. In other words, much of the post-treatment reduction in drug use and crime appeared attributable to regression to the mean and aging effects.

It should be obvious that controlled studies of treatment efficacy ought to be a drug policy research imperative. Both the CALDATA and RAND studies represent careful efforts by top researchers to assess the efficacy of different drug policy interventions. Yet, because of the lack of controlled treatment experiments, the conclusions about treatment efficacy must be considered tentative.

The determination of the RAND study that, at the margin, source control, interdiction, and domestic enforcement all fail to pay for themselves in cost-benefit terms should also be considered tentative. Supply control efforts have many effects on drug use that were not weighed in the RAND analysis, and the methodology for valuing costs and benefits leaves much to be desired. Moreover, there are a multitude of programs, strategies, and tactics comprising source control, interdiction, and domestic enforcement. Even if it were true that these efforts collectively fail a cost-benefit test, it is not necessarily the case that individually they are all losers.

This highlights another important point: the CALDATA and RAND studies are cost-benefit and cost-effectiveness analyses, not all-things-considered policy analyses. Both studies evaluate drug policy purely in economic terms, and both studies make a number of simplifying assumptions about drug policy, drug use, and crime—and the social costs of all of these—without considering the effects of these simplifications on their findings. This is not to say that such research is without value; on the contrary, cost-benefit and cost-effectiveness analyses are essential tools for informing policy. But policy must also be informed by considerations not captured in the models, including both non-economic concerns and practical issues of implementation.

¹⁴ William H. McGlothlin, M. Douglas Anglin, and Bruce D. Wilson, *An Evaluation of the California Civil Addict Program*, DHEW Pub. No. (ADM) 78-558 (Rockville, Md.: National Institute on Drug Abuse, 1977).

MANAGED CARE AND SUBSTANCE ABUSE TREATMENT

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BOTEC Analysis
C O R P O R A T I O N

MANAGED CARE AND SUBSTANCE ABUSE TREATMENT

By:
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Executive Summary

Spending on substance abuse services is now the fastest growing budget item for many corporate health insurance plans and state Medicaid programs. In an effort to limit these costs, corporations, private health insurers, and state governments are rapidly adopting managed care arrangements (usually prepaid plans and utilization review) for the provision of substance abuse services. State governments, which to date have been slow to jump on the managed care bandwagon, are now pursuing managed care with particular alacrity. Within the next few years, more than half of state Medicaid programs will employ managed care companies to deliver substance abuse services.

There is not much empirical evidence about the impact of managed care on drug treatment. What little there is suggests that managed care does indeed produce substantial cost reductions, but in ways that are concerning. Managed care results in a sharp reduction in expensive inpatient hospital-based treatment. In principle, this is a welcome development, since most hospital-based care is not considered cost effective by treatment experts. In practice, however, the reductions in inpatient care do not appear to be matched by corresponding increases in comparably effective outpatient services. Thus, managed care may result in an overall decline in treatment benefit.

What is most worrisome is that there are few checks on such a development. In most other areas of medicine, several mechanisms counteract the cost-cutting incentives of managed care companies: agreed-upon clinical standards, the threat of malpractice litigation, the possibility of adverse publicity. None of these operates similarly in the realm of drug treatment. Because few treatment modalities have been proved effective in randomized clinical studies, there are no scientifically-backed clinical guidelines, and in turn weak legal grounds for challenging seemingly inadequate care. Moreover, because of the stigma of drug abuse, it is hard to generate sympathy for a substance abuser who is denied appropriate coverage by his insurance company.

As a result, managed care companies may find little resistance to their efforts to limit drug treatment services. In fact, they are likely to face little resistance until there is much more scientific evidence matching different types of substance abusers to particular modes of treatment.

This suggests two facilitating roles for public policy. First, controlled studies of treatment efficacy should be a research priority. Second, public agencies that employ managed care companies to provide substance abuse services should collect detailed data on client outcomes so that the quality of treatment provided can be properly assessed.

Introduction

Spending on substance abuse services is now the fastest growing budget item for many corporate health insurance plans and state Medicaid programs. Increases have been especially sharp for private insurance plans; since the mid-1970s, the combination of state regulations mandating insurance benefits for mental health and substance abuse services and the widespread establishment of employer assistance programs (EAPs) has led to a dramatic expansion in private coverage of substance abuse treatment. In 1976, private sources contributed only 5 percent of total expenditures on treatment; by 1989, private sources accounted for more than 40 percent of treatment spending, of which about three-quarters was covered by insurance.¹

Medicaid has also been hit hard. In percentage terms, public insurance payments have been the fastest growing component of government expenditures on drug abuse.² And a recent study by the Center on Addiction and Substance Abuse (CASA) estimated that in 1991, Medicaid expenditures on hospital-based treatment for substance abuse totaled \$776 million.³

Not surprisingly, corporations, private health insurers, and state governments are rapidly adopting managed care arrangements for the provision of substance abuse services. Their hope is that managed care will help restrain treatment spending, as it has (to some degree) in other areas of medical care.

The prospect of substance abuse treatment being provided by (or through) managed care organizations raises both hopes and fears. At its best, managed care brings needed scrutiny to the provision of medical care, eliminating wasteful costs and improving the availability and quality of services. At its worst, managed care denies needed treatment, shifts costs to patients or other programs, and intrudes on the professional autonomy of providers and the privacy of patients.

This report surveys what little is known about the effects of managed care on substance abuse treatment, and discusses some of the related policy issues that are likely to arise in the future.

¹ Mark Schlesinger and Robert A. Dorwart, "Falling Between the Cracks: Failing National Strategies for the Treatment of Substance Abuse," *Daedalus* 121 (Summer 1992):205.

² Dean R. Gerstein and Hendrick J. Harwood, eds., *Treating Drug Problems*, vol. 1 (Washington, D.C.: National Academy Press, 1990), p. 212.

³ Jeffrey Merrill, Kimberly Fox, and Han-hua Chang, *The Cost of Substance Abuse to America's Health Care System* (New York: Center on Addiction and Substance Abuse, 1995), Report 1 (Medicaid Hospital Costs), p. 29.

The Record of Managed Care

Types of Managed Care

Managed care has become something of a buzzword. With corporate, government, and individual purchasers of medical insurance looking to managed care as the answer to rising medical costs, virtually every insurance program now labels itself "managed care." The term is not all marketing hype, however. Last year, employer medical costs actually declined (after years of double-digit percentage increases), and managed care played a significant role.⁴

Yet the term managed care is now used so widely and loosely that it no longer has any precise meaning. Broadly, managed care refers to a variety of organizational or financing arrangements that involve some form of oversight on the treatment decisions made by providers and patients. In short, managed care is *not* traditional fee-for-service insurance, where patients can seek care from any provider, and reimbursement is given with few, if any, questions asked.

There are three general categories of managed care programs.⁵ Prepaid plans (health maintenance organizations, or HMOs) provide all "necessary" medical care for a fixed fee. Care is "managed" in that patients must use physicians employed by the plan for all non-emergency services. Utilization management, or utilization review, entails the pre- or post-treatment review of medical interventions, usually by a third-party organization. Required preadmission certification for hospital admissions and mandatory second opinions prior to elective surgeries are typical forms of utilization review. Preferred provider organizations (PPOs), which offer enrollees discounts for choosing particular physicians, are another. The third, and least common, variety of managed care is high-cost case management. Under this arrangement, a professional case manager acts as a gatekeeper for a patient for the duration of a potentially costly illness. Case managers are often authorized to provide services beyond those covered by a basic insurance plan.

The Extent of Managed Care for Substance Abuse Treatment

Precisely how much substance abuse treatment is provided under the auspices of managed care organizations is not known. What is known is that managed care of substance abuse treatment is growing, and that all three types of managed care programs are now being employed in the provision of substance abuse services. Most Americans receive their health coverage through their job, and are typically enrolled in an HMO, PPO, or some form of fee-for-service coverage with utilization review. Since most states now require health insurance plans to cover substance abuse services, drug and alcohol treatment is now routinely provided to employees under the supervision of a prepaid plan or utilization review organization.

⁴ Milt Freudenheim, "Health Costs Paid by Employers Drop for First Time in a Decade," *The New York Times*, 14 Feb. 1995, p. 1.

⁵ David Mechanic, Mark Schlesinger, and Donna McAlpine, "Management of Mental Health and Substance Abuse Services: State of the Art and Early Results," *The Milbank Quarterly*, forthcoming.

However, many employers, especially those committed to substance abuse treatment through employee assistance programs (EAPs), find the substance abuse coverage provided by medical insurance plans inadequate. Thus, they sometimes supplement the coverage with additional case management. (This practice is still much more common with mental illnesses.)

Medicaid programs are also beginning to use managed care approaches in providing substance abuse treatment. For example, in 1992, under a two-year waiver from the Health Care Financing Administration (HCFA), Massachusetts hired a private firm to oversee mental health and substance abuse services for all Medicaid recipients who were not covered by other insurance. Under its contract, the firm was given modest cost-saving incentives: a target budget was agreed to, and the firm was either penalized or rewarded with 10 percent of the resulting cost difference. The company then established a PPO, negotiating discounted fees with about half of the providers who had previously served the population.

Such arrangements are still relatively rare under Medicaid, although they will shortly become common. At last count, over thirty states had either received or applied for waivers from HCFA.

The Impact of Managed Care on Substance Abuse Treatment

There is relatively little direct evidence about the impact of managed care on substance abuse treatment. Data on the quality and quantity of substance services provided under managed care are generally not available. However, much can be inferred from our experience with managed care in other areas of medical care, especially mental health care.

It is generally accepted that managed care plans provide services at a lower cost than unmanaged fee-for-service insurance.⁶ Most of the savings come from a reduction in expensive hospital visits, both by limiting lengths of stay and by substituting less expensive forms of outpatient care.

There is little question that managed care of substance abuse services has led and will continue to lead to a reduction in hospital-based care. In principle, this is a welcome development. It is widely believed, based on evidence from alcohol treatment and mental health services, that much hospital-based drug treatment is not cost effective.⁷ With alcoholism, a number of researchers have concluded that more expensive hospital-based inpatient treatments are no more

⁶ Robert H. Miller and Harold S. Luft, "Managed Care Performance Since 1980: A Literature Analysis," *Journal of the American Medical Association* 271 (1994):1512-1519.

⁷ The excessive use of hospital-based treatment modalities can be explained by the rapid growth of private insurance coverage during the 1980s. State mandated benefits tend to be more generous for inpatient than outpatient care, and many insurers favored hospital-based care because it resembled other forms of medical treatment. Thus, by 1989, sixty percent of all private insurance payments for drug treatment went to hospital-based care. See Schlesinger and Dorwart, "Falling Between the Cracks," p. 205.

effective than other less expensive treatments.⁸ The Institute of Medicine has estimated about one-third of inpatient alcohol treatment episodes are inappropriate.⁹ In the case of mental health care, evidence suggests that perhaps as much as 40 percent of all psychiatric hospitalizations are inappropriate.¹⁰

Indeed, looking at such evidence, the Institute of Medicine report, *Treating Drug Problems*, offered a fairly strong endorsement of utilization management as a method for limiting excessive high-cost services. "There should be rigorous preadmission and concurrent review of all residential drug treatment admissions, and especially of hospital admissions, and concurrent review of outpatient treatment. ... Utilization management is an appropriate way to check [cost ineffective care] because no modality of drug rehabilitation treatment as such requires continuous, onsite access to acute care hospital services."¹¹

In practice, however, reductions in hospital-based drug treatment under managed care are more concerning. Studies of mental health treatment under managed care indicate consistent reductions in hospital-based treatment. However, there often appears to be little or no corresponding increase in outpatient services.¹² What little evidence there is about the treatment of substance abuse under managed care suggests that any increases in outpatient care tend to come in the form of detoxification,¹³ arguably an ineffective treatment modality. According to the Institute of Medicine, "without subsequent treatment, researchers have found no effects from detoxification that are discernibly superior to those achieved by untreated withdrawal in terms of reducing subsequent drug-taking behavior and especially relapse to dependence."¹⁴

As an illustration of the shift from inpatient care to detoxification (and not to outpatient care), consider the Massachusetts Medicaid program. Data comparing the treatment services received by enrollees before and after the introduction of managed care are presented in the table below.

⁸ L. Saxe, with D. Dougherty, K. Esty, and M. Fine, *The Effectiveness and Costs of Alcohol Treatment*, Health Technology Case Study 22 (Washington, D.C.: Office of Technology Assessment, 1983); W. R. Miller and R. K. Hester, "Inpatient Alcohol Treatment: Who Benefits?" *American Psychologist* 41 (1986):794-805.

⁹ Institute of Medicine, *Broadening the Base of Treatment for Alcohol Problems: Report of a Study by a Committee of the Institute of Medicine, Division of Mental Health and Behavioral Medicine, Committee for the Study of Treatment and Rehabilitation Services for Alcoholism and Alcohol Abuse* (Washington, D.C.: National Academy Press, 1990).

¹⁰ I. Strumwasser, N. V. Paranjpe, M. Udow, et al., "Appropriateness of Psychiatric and Substance Abuse Hospitalization," *Medical Care* 29 (Supplement 1991):AS77-AS90.

¹¹ Dean R. Gerstein and Hendrick J. Harwood, eds., *Treating Drug Problems*, vol. 1 (Washington, D.C.: National Academy Press, 1990), 251.

¹² See Mechanic, Schlesinger, and McAlpine, "Management of Mental Health and Substance Abuse Services."

¹³ J. W. Thompson, B. J. Burns, H. H. Goldman, and J. Smith, "Initial Level of Care and Clinical Status in a Managed Mental Health Program," *Hospital and Community Psychiatry* 43 (1992):599-603.

¹⁴ Gerstein and Harwood, *Treating Drug Problems*, 176.

Managed care appears to have resulted in a dramatic drop in inpatient treatment, an almost equally dramatic rise in detoxification, and comparatively little change in outpatient treatment.

Substance Abuse Treatment Among Massachusetts Medicaid Enrollees, FY 92-93

Service type	Users per 1000 enrollees		
	1992	1993	% Change
Inpatient	9.1	3.5	-61.2
Freestanding detoxification	5.5	7.9	+45.2
Level III detoxification	0.0	2.4	n.e.
Acute residential	0.0	3.2	n.a.
Outpatient	9.6	9.2	-4.4
Methadone Counseling	5.4	6.2	+15.5
Methadone dosing	5.2	6.3	+20.2
Acute Residential (child/adolescent)	0.0	0.1	n.a.
Acupuncture Detoxification	0.49	0.4	-13.7

Source: James J. Callahan, Jr., Donald S. Shepard, Richard H. Beinecke, Mary Jo Larson, Doreen Cavanaugh, *Evaluation of the Massachusetts Medicaid Mental Health/Substance Abuse Program* (Waltham, MA: Heller School for Advanced Studies in Social Welfare, 1994).

Why Drug Treatment is Different from Other Medical Care

It is not only empirical evidence that animates the concern that managed care will result in a less than desirable level of drug treatment. In two important respects, drug treatment is quite different from other forms of medical care, and we would expect both of these differences to lead to an underprovision of substance abuse treatment under managed care arrangements.

First, in comparison to other diseases, the divergence between the private and social costs of substance abuse is very large. Because they so often engage in socially damaging or costly behavior, substance abusers impose external costs on society that cancer patients, for example, do not. From society's perspective, the optimal amount of drug treatment is a factor, not only of the benefits that may accrue from treatment to substance abusers themselves, but also of the external benefits to society. Yet in making decisions about paying for treatment, neither drug abusers, nor their employers or insurance companies, are likely to weigh potential social benefits. Indeed, this is the economic rationale behind regulations mandating private health insurance coverage of drug treatment.¹⁵

¹⁵ Gerstein and Harwood, *Treating Drug Problems*, 276.

In other words, the goal of mandated benefits regulations is to force individuals, employers, and insurance companies to purchase more substance abuse services than they otherwise would. But if managed care offers them an opportunity to reduce their purchases of drug treatment, economic reasoning suggests they will take advantage of it.

This is a particular worry with treatment provided through employer-based insurance. For many employers, it may be more cost-effective to try to limit treatment expenses (and terminate substance abusing employees who fail to recover quickly) than to underwrite costly treatment for what is likely to be a chronic, relapsing condition.¹⁶ Again, managed care may facilitate this kind of corporate decisionmaking.

There is not much empirical evidence on this issue, but one study underscores the concern. The McDonnell Douglas EAP study compared the outcomes of substance abuse treatment for employees covered by HMOs with those enrolled in fee-for-service insurance. In the three years following the beginning of treatment, job turnover was three times as high in the group covered by HMOs.¹⁷

The second substantial difference between drug treatment and other forms of medical care is that very little is known about the efficacy of different treatment modalities.¹⁸ With the possible exceptions of methadone maintenance¹⁹ and acupuncture detoxification,²⁰ there have been no randomized clinical trials of particular modes of treatment.²¹ Obviously, the absence of scientific evidence of treatment efficacy makes it easier for managed care companies to limit treatment coverage, especially for expensive services.

¹⁶ Thomas G. McGuire, Christopher J. Ruhm, and Barbara F. Shaikin, "Defining the Public Interest in Workplace Drug Abuse Policy," in *Substance Abuse Services Research Series*, No. 1 (Washington, D.C.: National Institute on Drug Abuse, 1991), 106-122.

¹⁷ McDonnell Douglas Corporation and Alexander Consulting Group, *McDonnell Douglas Corporation Employee Assistance Program: Financial Offset Study 1985-1988*. Unpublished report.

¹⁸ J. R. McKay, A. T. McLellan, and A. I. Alterman, "An Evaluation of the Cleveland Criteria for Inpatient Treatment of Substance Abuse," *American Journal of Psychiatry* 149 (1992):1212-1218.

¹⁹ V. P. Dole, J. W. Robinson, J. Orraga, E. Towns, P. Searcy, and E. Caine, "Methadone Maintenance of Randomly Selected Criminal Addicts," *The New England Journal of Medicine* 280 (1969):1372-1375; L. Gunno and L. Gronbladh, "The Swedish Methadone Maintenance Program," in *The Social and Medical Aspects of Drug Abuse*, ed. G. Serban (Jamaica, NY: Spectrum Publications, 1984), 205-213.

²⁰ Douglas S. Lipton, Vincent Brewington, and Michael Smith, "Acupuncture for Crack-Cocaine Detoxification: Experimental Evaluation of Efficacy," *Journal of Substance Abuse Treatment* 11 (1994):205-215.

²¹ Gerstein and Harwood, *Treating Drug Problems*, 186.

Conclusion

Because managed care arrangements can produce substantial cost reductions, their application to the delivery of substance abuse services will continue to spread, both in private and public insurance programs. While any predictions of the effects this will have on drug treatment are somewhat speculative, it is possible to make some well-educated guesses.

Managed care will prompt a sharp reduction in expensive inpatient treatment. However, there may not be a corresponding increase in less costly and comparably effective outpatient services (that is, services other than detoxification). Thus, overall levels of effective drug treatment are likely to decline.

Indeed, there are few checks on such a development. In most other areas of medicine, several mechanisms counteract the cost-cutting incentives of managed care companies: agreed-upon clinical standards, the threat of malpractice litigation, the possibility of adverse publicity. None of these operates similarly in the realm of drug treatment. Because few treatment modalities have been proved effective in randomized clinical studies, there are no scientifically-backed clinical guidelines, and in turn weak legal grounds for challenging seemingly inadequate care. Moreover, because of the stigma of drug abuse, it is hard to generate sympathy for a substance abuser who is denied appropriate coverage by his insurance company.

As a result, managed care companies may find little resistance to their efforts to limit drug treatment services. In fact, they are likely to face little resistance until there is much more scientific evidence matching different types of substance abusers to particular modes of treatment.

This suggests two facilitating roles for public policy. First, controlled studies of treatment efficacy should be a research priority. Second, public agencies that employ managed care companies to provide substance abuse services should collect detailed data on client outcomes so that the quality of treatment provided can be properly assessed.

Advocates of managed care have long argued that the practice of medicine involves too much art, and not enough science. In their view, managed care promotes a more rational model of medical care: through outcomes research, we learn what works and what doesn't, and providers are then held accountable for applying this knowledge in a cost-effective manner. Whether most areas of medical practice are guilty of being insufficiently scientific is open to debate; when it comes to substance abuse treatment, the charge is irrefutable. If managed care introduces more science to the research and practice of drug treatment, it will be a welcome development.

INTERNATIONAL EXPERIENCES IN HEROIN MAINTENANCE PROGRAMS

A REPORT PREPARED FOR THE OFFICE OF NATIONAL DRUG CONTROL POLICY

■ November 13, 1995 ■

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INTERNATIONAL EXPERIENCE IN HEROIN MAINTENANCE PROGRAMS

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INTERNATIONAL EXPERIENCES IN HEROIN MAINTENANCE PROGRAMS

Methadone treatment for heroin addicts is a widely accepted practice around the world, and yet it is still controversial. There is now substantial evidence that some addicts can derive considerable benefits from methadone maintenance (Ball and Ross, 1991). However, methadone programs often are criticized for being poorly administered, providing insufficient levels of the substance, and the fact that the addict trades one addiction for another (Böcker, 1991). Current knowledge of methadone maintenance suggests that it will be a lifelong process—an addiction even harder to break than the heroin addiction (Gossop and Strang, 1991). This controversy, coupled with the fact that a certain portion of heroin addicts cannot be attracted to methadone programs, has spurred Australia and several European countries to establish or discuss controlled programs that provide addicts with heroin (medical name: diacetylmorphine).

1. INTRODUCTION

The controlled prescription of opioids to counter increasing death rates and growing physical and social deterioration among heroin addicts has been discussed in Europe and Australia for many years (Stadt Frankfurt, 1993). In the past, this approach has been practiced in Italy, Israel, Sweden, the United States, Australia, and Canada and continues to be practiced in Great Britain, and yet an insufficient amount of scientific information is available regarding the benefits and drawbacks of this alternative (Noller, 1994). For example, a heroin and amphetamine prescription program was operating in Stockholm, Sweden, during 1965 and 1967. Initially serving 10 clients, the number of addicts treated rose to 71 within the 2-year period. Unsubstantiated reports released by the Church of Scientology pointed to negative outcomes that in the end resulted in a termination of these types of prescriptions in Sweden (Noller, 1992). While the program was operating, the number of addicts in Stockholm doubled, and the number of registered first time users increased tenfold; cash-generating crime did not decline, and organized crime increased

(Beck, 1994). However, the number of program participants and the information available about this program is so limited that it is impossible to draw any certain conclusion about its outcomes (Mino, 1990).

More documented information is available from current, proposed, and past experiences with the controlled provision of heroin in Great Britain, Switzerland, the Netherlands, Australia, Germany, and the United States. Research based on these experiences indicates conflicting outcomes (Beck, 1994; Gossop, 1994; Marks, 1994; Mino, 1990; Noller, 1990; Hartnoll et al., 1980; Mitcheson and Hartnoll, 1978) and shows that programmatic issues, such as logistics and costs, seem to have a considerable impact on the success of such a program (Brammer, 1993).

These studies show that one of the potential benefits of a heroin prescription program is that it provides an additional treatment option that allows some addicts, who remain unaffected by other efforts, the opportunity to stabilize their lives. Such a program might reduce the health problems these hardcore addicts otherwise suffer and provide them with a drug that is easier to withdraw from than methadone (National Centre for Epidemiology and Population Health, 1993). These programs seem especially preferable to methadone maintenance for pregnant women since newborns suffer remarkably less withdrawal symptoms and other drug-related problems. Another rationale for the controlled provision of heroin to dependent users is the assumption that it would reduce the necessity to commit crimes to obtain drugs or money for drugs.

A potential problem related to such a treatment option would be that some participants may be inclined to divert (i.e., sell for profit) the drugs provided to them. Others might be stabilized but not find the motivation to overcome the underlying problems to ultimately become drug free. Heroin prescription programs have been criticized for not pursuing drug abstinence as their goal. Critics also fear that the provision of heroin is unethical and may be physically damaging to the participants. It also has been argued that the controlled prescription of diacetylmorphine would send a wrong "message" about drug consumption, especially to youth (Stuttgarter Zeitung, 1994; Brammer, 1993).

Considering these conflicting arguments and results, the purpose of this paper is to provide an overview of the development and outcome of past, current, and proposed programs to dispense heroin to addicts, to identify the issues related to these projects, and to synthesize the information currently available. The goal is to provide an overview of the current state of knowledge about such efforts that may guide policy decisions in this area.

2. METHODOLOGY

A comprehensive literature review was compiled from publications on heroin prescription programs currently available in the United States, Germany, Great Britain, Switzerland, the Netherlands, and Australia. This literature review was complemented by contacting drug treatment experts involved in the planning, development, or implementation of alternative programs in Australia, Switzerland, Germany, and the Netherlands. These experts included Dr. Gabriele Brammer, National Centre for Epidemiology and Population Health, Australia; Dr. Horst Bossong, Representative for Drug Issues for the Senate of the City of Hamburg, Germany; Dr. Haas, Landespolizeidirektion Stuttgart, Germany; Dr. Jack T.M. Derks, Netherlands Institute of Mental Health; and representatives of the Swiss Ministry of Health.

3. OVERVIEW OF PAST AND CURRENT EXPERIENCES WITH THE PRESCRIPTION OF HEROIN

The following sections provide an overview of heroin and other opioid prescription programs documented in Switzerland, Great Britain, Australia, the Netherlands, Germany, and the United States. These countries were chosen because Great Britain and Switzerland currently operate heroin prescription programs; Australia and Germany both developed proposals for such trials; and the Netherlands and the United States experimented with such programs in the past. (Currently, the Netherlands are considering reinstating heroin prescription programs while the United States has rejected them.)

Following is a short overview of the current extent of the heroin problem and treatment responses in each country and an outline of the experiences with opioid prescription programs to date.

3.1 Great Britain

Many observers refer to "The British System" when discussing the treatment of addiction problems in Great Britain (Strang and Gossop, 1994; Manderson, 1992; Kaplan, 1983). One specific aspect of the system—the prescription of heroin and injectable drugs to addicts—has been practiced here for many decades. Despite the high attention the prescription of injectables in Great Britain receives, this form of treatment—especially the prescription of heroin—is rare. Currently, less than 1 percent of prescription programs are for heroin addicts (Gossop, 1994).

3.1.1 Extent of the Heroin Problem and Treatment Responses in Great Britain

Throughout the first half of this century and until the mid-1960s, Britain had only a very small number of opiate addicts. Home Office (i.e., the British equivalent of the Federal Bureau of Investigation) figures show fairly constant numbers of about 500 addicts until 1962; the number of addicts increased to less than 2,000 at the end of 1967. Addicts known to the Home Office until the mid-1960s tended to be older, more stable, and less socially deviant than later generations. They were described as being mostly over 30 years old, middle class, and not involved with the criminal justice system; most did not have contact with other heroin users (Gossop, 1994). After 1968 the characteristics of heroin users changed—they were likely to be younger, more involved in a drug using subculture, socially deviant, and criminally active; many of them were psychologically disturbed. Estimates suggested that by the end of the 1980s, there may have been between 75,000 and 150,000 heroin users in Great Britain (Gossop and Grant, 1990; Advisory Council on the Misuse of Drugs, 1988).

Treatment modalities available in Great Britain today include methadone maintenance, therapeutic communities, and inpatient and outpatient drug-free programs.

Prescribing injectable drugs to addicts is part of this broad range of treatment alternatives and is not a new practice. The Dangerous Drug Act of 1920 permits physicians to prescribe drugs not only for the sick but also for addicts (Glauert, 1994). Addicts seeking treatment today must turn to their local general practitioner who can transfer them to a treatment specialist—usually a psychiatrist at a specialized clinic. These specialists are licensed to prescribe methadone, heroin, cocaine, and nabilon, a synthetic cannabinoid (Marks, 1992a). Since treatment and prescription policies for heroin and other drugs in Great Britain are set by the individual health department in charge of a district, a “quilt” of different approaches can be found throughout Great Britain (Marks, 1992b). For example, addicts living in Widnes can receive heroin and cocaine, their neighbors in nearby Liverpool can receive methadone, and addicts living in North Wales have no legal way to getting drugs from any physician. However, the total number of addicts receiving a prescription for any sort of injectable drug has been and continues to be relatively small. In 1992 the total number of addicts receiving injectable heroin was 117, most of whom lived in the Widnes and Warrington areas in the Merseyside region (Gossop, 1994). In contrast, more than 17,000 addicts received prescriptions for methadone.

3.1.2 The Status of Heroin Prescription Programs in Great Britain

Throughout most of this century, the prescription of injectable drugs such as heroin and methadone has been part of treatment efforts in Great Britain. However, the percentage of addicts receiving heroin has decreased substantially since the 1970s. Battersby, Farrel, Gossop, Robson, and Strang (1992) explained that the small number of heroin prescriptions are due primarily to the relatively small heroin problem in Great Britain until the 1960s. Heroin was more widely prescribed until the 1970s when policy changes and the introduction of methadone curtailed its use. Some policy changes took effect by the end of the 1960s when demand for prescriptive drugs including heroin increased, allegedly leading a few well-known physicians to profit from this trend (Marks, 1992a). In response, the British Government interdicted the prescription of drugs to addicts by general family physicians and concentrated this activity in the hands of a few licensed clinics and practitioners located throughout the country. However, the goal of these centralized prescription programs was never clearly stated.

During the summer of 1968, at the time this policy change took effect, between 60 and 80 percent of the addicted patients received prescriptions for heroin (Stimson and Oppenheimer, 1982). In the wake of the policy change, this rate fell during the first year to 34 percent. Today the level of heroin prescribed applies to approximately 1 percent of all addicts (Gossop, 1994). Most clinics resolved to prescribe methadone instead. The switch from heroin to methadone was mainly due to general beliefs about the two drugs. Methadone was seen as more therapeutic and medicinal than heroin. More or less parallel to the shift from prescribing heroin to methadone, the prescription of injectables was increasingly replaced by oral administration. By the 1980s, it had become extremely rare for any new opiate addict to receive a prescription for injectable drugs (Battersby et al., 1992).

One of the few remaining programs was operating at the Maudsley Clinic in London between 1987 and 1989 and served clients that were chronic opiate addicts who refused to comply with an oral opiate prescription program. The aim of this program was to assist the client with reducing and ceasing injections by replacing injection with oral administration, eventually leading to ceasing all drug use. The patients received information about the consequences of injecting, correct injecting, needle cleaning techniques, and needle exchange programs, and they were constantly coaxed to change their drug use. Accompanying treatment was mainly comprised of cognitive behavioral techniques. Patients were selected based on a prior assessment, which involved two or three interviews, a physical examination, and a urine test. Sometimes it also included a test dose response to oral methadone before the decision to prescribe was made. The initial assessment also served to establish what dosage was sufficient to prevent withdrawal syndromes and the likelihood of recourse to additional illicit drugs. The assessment resulted in a management plan that outlined the drugs prescribed, the dosage, and a provisional time scale for stopping all injections. These plans were the result of negotiations between the client and the clinician (who also tried to secure the patient's agreement to abstain from using other drugs) and were formulated as individual treatment contracts. All patients were encouraged to consider outpatient or inpatient detoxification as an alternative. The final prescription decision was made by the psychiatrist, who would be managing the case, and by the consultant in charge of the clinic. This program showed negative as well as positive outcomes but did not provide conclusive

evidence of either benefit or harm (Battersby et al., 1992). (A more detailed discussion of the results of the Maudsley program appears in Section 4.1 of this report.)

Currently, the most prominent British prescription program is run by Dr. John Marks in the Merseyside area. When he became the head psychiatrist at the Department of Health for the Halton District, he also was in charge of the Widnes clinic, which had been prescribing heroin for many years. Dr. Marks was initially skeptical about the heroin prescription program established at the clinic and undertook a controlled study to evaluate the outcome of this effort. To his surprise, the study—comparing his program to that of the neighboring district—showed that the number of heroin-related death and illnesses, drug-related crime, and the number of new users had declined in the district where the heroin prescription program was in operation. The results of this study made Dr. Marks a strong proponent of controlled provision of heroin to addicts (Glauert, 1994).

The prescription of injectable heroin and other drugs at the Widnes clinic is part of a pragmatic approach to treatment that recognizes that it may be the only way to engage some addicts in a treatment program. The program assumes that heroin addiction is a process of chronic relapses that continue for several years with a rate of spontaneous remission of 5 percent per year; during that time, nothing will stop the addict from using (Marks, 1992b; Vaillant 1983). If the client stays alive, this remission rate results in a 50-percent chance of rehabilitation after 10 years (Stimson and Oppenheimer, 1982). Therefore, the goal of this program is to keep addicts alive through this period of time until they are ready for other treatment modalities (Isenegger, 1994).

Addicts entering this program know that the period for which they can receive heroin is limited, and they must participate in additional therapy. They also must have a referral from their current physician who has to support this treatment and pronounce that the patient has been living in the area for at least 1 year. The latter requirement was established to avoid the so-called "honey pot effect" that would attract addicts from other regions to the program (Glauert, 1994).

During the first visit to the clinic, addicts receive a medical checkup, and lab results are used to verify the clients' addiction. This is done to exclude nonaddicts, who may sell the

drugs they receive through the program on the black market. During the second visit, the addiction history and current consumption patterns will be assessed. Initially, the patient is given the option to participate in a medical treatment regimen that slowly reduces the daily dosage. The patient also is offered an opportunity to defer entrance into a detoxification program, followed by a rehabilitation program. Should the patient adamantly decline participation in any of these programs, the prescription of heroin is offered as a last resort. In the following negotiations, the type and dosages of the prescribed drug will be determined and the client will be persuaded to use less intrusive forms of administration than injection (Marks, 1992). The clinic found that getting addicts to make the switch from injecting to smoking and then drinking liquid heroin is not only an improvement for health reasons but the first step toward overcoming the psychological attraction of injecting, which seems to be a big part of the addiction.

After a treatment plan is established, the physician sends the prescription to a pharmacist who prepares the daily doses to be picked up by the addict. Only those who are in the program for a longer period of time and are reasonably stable can get their drugs in 3-day packages, which allows them some freedom to travel outside the vicinity of the clinic. The prescription of opioids is always combined with random drug testing and weekly group therapy to monitor progress.

In contrast to other drug treatment programs, the clinic in Widnes offers addicts immediate help. There is no waiting list, and social workers help addicts to resolve other problems in their lives. Communication between police and the clinic is well established and has proven quite helpful in problem situations; it is an important feature of this program. Initially, all arrested drug users in the Liverpool area were searched for drugs that may have been prescribed by the clinic to assure that prescription drugs were not sold on the black market. Each week hundreds of drug users are arrested in the area; however, even after 6 months, not a single case involving clinic drugs was detected. Addicts are informed from the very beginning that illegal activities will not be tolerated and that any incidents related to the clinic staff will be reported to police.

Until the late 1980s, approximately 10 percent of all district psychiatrists in Great Britain practiced a similar approach as the one taken by Dr. Marks in Widnes and

Warrington. Since the British Government published a report on AIDS (acquired immune deficiency syndrome) and drug use, the number of district psychiatrists prescribing heroin has steadily increased to approximately 25 percent (Marks, 1992a). In 1988 the Advisory Council on the Misuse of Drugs in Great Britain recommended that the prescribing of injectable drugs may be appropriate in the most exceptional cases (Battersby et al., 1992). The council stressed that prescriptions for injectables should generally be given for short periods only and that the goal of these programs should be to move addicts away from sharing equipment and toward providing treatment in the broadest sense. This may facilitate a gradual move away from injecting (Advisory Council on the Misuse of Drugs, 1988).

3.2 Switzerland

In the late 1980s and early 1990s, Switzerland—and especially Zürich—gained the unwanted reputation of providing a “haven” for intravenous drug users. Increasing numbers of heroin and other opiate users assembled daily to buy, sell, and use illicit drugs out in the open. The perceived tolerance toward drug use attracted more and more addicts until the community demanded official intervention. In 1992 law enforcement and health agencies moved to reverse this trend through increased enforcement activities, combined with a broad spectrum of support and treatment assistance. The development and implementation of a controlled heroin prescription program became part of this effort.

3.2.1 Extent of the Heroin Problem and Treatment Responses in Switzerland

By the end of the 1980s, the total number of drug addicts in Switzerland was estimated to have reached between 20,000 and 25,000 (Joset, 1992; Polizei Basel-Stadt, 1990). The number of drug-related deaths reached 280 the same year, which is a death rate of 4.2 per 100,000 inhabitants—the highest in Europe (Bundeskriminalamt, 1991). The open air drug scene in Zürich was of special concern to the community. In the evenings, hundreds of people could be seen in certain areas dealing and injecting drugs.

While the whole range of inpatient and outpatient treatment and support programs is available in Switzerland, most of which is paid for by public health insurance, the number of addicts that did not participate in these programs seemed to increase. Methadone programs were implemented in Switzerland early on; with approximately 10,000 patients in methadone programs, prescription of methadone is widespread (Bundesamt für Gesundheitswesen, 1994). Nevertheless, the increasing numbers of hardcore addicts that did not participate in any treatment programs illustrated the need for the development of another treatment alternative.

3.2.2 The Status of Heroin Prescription Programs in Switzerland

In early 1991 a proposal was developed to conduct a randomized trial that provided addicts with a diversified drug prescription concept. The rationale for this alternative was that prior research undertaken in Europe provided insufficient support for the success of methadone programs (Gmür, 1989), and experiences in Great Britain indicated that a diversified prescription program could reach a broader group of addicts (Uchtenhagen, 1994).

A 3-year national research project currently under way in Switzerland involves the diversified prescription of narcotics to heroin addicts. Its purpose is to scientifically accompany trials that use alternative approaches to identify their benefits and drawbacks. The experiment is implemented through nine pilot projects established in eight Swiss cities. Within the framework of a comprehensive care program, a maximum of 700 addicts are included in this trial; about 250 receive heroin, and the others receive methadone (Uchtenhagen, 1994). The goal of these trials is to reduce the risks for addicts and their environment, decrease their antisocial behavior, and, in the end, promote a drug-free life. The trials were introduced to study the feasibility of such an approach (Bundesamt für Gesundheitswesen, 1994).

The first project began in December 1993, and the second began in January 1994; both projects were located in Zürich. During 1994 five additional programs began in other cities; the remaining two were scheduled to open in January 1995. A public referendum had to be

held to establish a program in the City of Basel, which resulted in substantial public support for the trial (Uchtenhagen, 1994). In addition, the local medical ethics committee at each trial site was required to agree to the implementation.

From January 1994 to early November 1994, a total of 285 patients had been admitted to the prescription programs; 247 were approved to receive heroin, 47 to receive morphine, and 30 to receive methadone. A total of 197 actually received heroin, 16 received morphine, and 20 received injectable morphine. An additional 16 patients participated in a short-term study to identify the side effects of morphine prescription. The heroin trials demonstrated the feasibility of such an approach, while both the morphine and injectable methadone studies were less successful (Bundesamt für Gesundheitswesen, 1994).

All trials follow a research design that compares the outcomes of randomized and individualized prescriptions of heroin, morphine, and methadone as well as combinations of these drugs for different populations of addicts. Intravenous drugs are prescribed in combination with oral methadone to facilitate the social integration of the addict, to reduce needle dependence, and to encourage less risky drug consumption and switching to oral methadone. In addition to oral methadone, less harmful forms of opiate administration, such as smoking and oral applications, are encouraged. A large sample of patients in oral methadone programs is studied parallel to the trials as a comparison.

All participants are assessed and must sign a statement of informed consent. In addition, patients must agree to participate in a counseling program. In order to be admitted to the trial, clients must prove that they have been heroin dependent for at least 2 years, use heroin daily, and have failed two prior therapeutic efforts. They should be at least age 20 and show signs of physical or psychological deterioration as well as decreased social integration. Patients also must prove why other therapeutic programs are of no use to them. Patients with certain health conditions or acute psychotic disorders are not accepted. Violence or possession of other drugs at the program site or other infractions of house rules are reason for exclusion (Bundesamt für Gesundheitswesen, 1994).

Urine samples are analyzed once per month and complemented by frequent, unannounced checks. Strict participation guidelines ensure that only long-term addicts who

failed in other programs and who have lived in the area where the trial is implemented can enter the program. The addict incurs the cost of the heroin (15 Swiss francs per day, per addict, which is approximately \$13.11)¹ (Arbeitsgemeinschaft für risikoarmen Umgang mit Drogen, 1993). Other than what is partially practiced in Great Britain, drug addicts cannot take their daily doses home; they must come to the clinic three times per day and use the drug on the premises (Uchtenhagen, 1994). This rule is enforced because of a fear that these very pure prescribed drugs might otherwise end up on the illicit drug market. Liquid methadone may be given to some addicts to take home to counter overnight withdrawal symptoms.

The overall experiences of the heroin prescription programs thus far have shown promise. In October 1994 the Swiss Parliament passed a request submitted by the City of Zürich to expand the current number of 250 individuals who could participate in the heroin prescription program to 1,000 (Berner Zeitung, 1994). To implement the extension, the pilot programs still must overcome the obstacle of obtaining access to a sufficient heroin supply. The extended program would require the availability of 400 kilograms (kg) of heroin. However, the United Nations International Narcotics Control Board currently limits legal heroin imports to Switzerland to 35 kg, and the seizures of illegally imported heroin made by Swiss police cannot account for the difference needed (Obst, 1994).

3.3 Australia

Control over so-called "dangerous drugs" in Australia developed by the late 1920s with legislation broadly similar to that of other English-speaking countries. One central issue of this legislation was whether it would be legal for doctors to prescribe these drugs—not only for treatment of diseases but also to maintain a patient on a controlled dose of the drug of addiction (Manderson, 1992). While the British Dangerous Drugs Act of 1920 was interpreted to allow doctors to treat addicted patients in any way they chose, including maintenance, similar regulations adopted by various Australian states suggested the rejection of maintenance. However, the interpretation of these regulations varied among the states and depending on the class of addicts involved.

¹ All conversion rates in U.S. dollars are as of October 18, 1995.

While cocaine use among prostitutes and criminals attracted media attention and severe penalties, the maintenance of a sizable number of middle-class addicts continued as a set policy until the late 1960s. The Australia Department of Health's policy was that providing the amount an addict needed was maintenance and appropriate treatment within the discretionary authority of individual practitioners, provided the addicted user was prescribed the drug by a medical practitioner and supplied by only one pharmacist (Manderson, 1992). This policy of maintenance in Australia was not publicized or publicly discussed; it actually seemed as if police officers and judges were unaware of its existence (Manderson, 1992). The maintenance of noncriminal addicts survived virtually unchallenged until the early 1960s. Medically maintained addicts formed a sizable portion of all illicit drug users; for example, the Queensland Government stated in 1959 that all known addicts receive their supplies from licit sources by licit means and that no problems arose in policing the authorized supplies (Manderson, 1992).

In the early 1960s, the practice of legally supplying addicts with drugs, which was followed throughout Australia, came to be discredited. The practice of maintenance declined, however, not due to changes to the laws but due to the changing profile of drug users. In prior years drug addicts were mainly middle-aged individuals from the middle class, but by the late 1960s, this had changed dramatically: most addicts were under age 34, students, and/or unemployed (Manderson, 1992). Police activity at the same time rose markedly. For example, police in New South Wales arrested 9 individuals on drug-related charges in 1959, 31 in 1965, 98 in 1966, and 1,151 in 1972 (McCoy, 1980).

The legal and treatment communities were unable to cope with the changing demography of addicts. In most jurisdictions maintenance had been applied without direct government supervision and with little public or political recognition of its existence. The small number of mostly white middle-class or aging Chinese addicts had been handled in a very low-key, personalized treatment modality. Larger numbers of young cannabis and heroin users, on the other hand, garnered quite different reactions. In addition, maintenance with heroin had become impossible after the Commonwealth government prohibited the importation of heroin in 1953. It may be argued that the maintenance of addiction in Australia worked before 1960 only because of the small numbers of addicts involved, while the great expansion in users during the 1960s made the existing ad hoc system unacceptable.

However, the central reason for the demise of maintenance in Australia was the social unacceptability of the "new" users. Neither the medical profession nor the bureaucracy was prepared to treat young, poor, unemployed, criminal, or otherwise deviant users the same way as middle-class, middle-aged users.

In 1989, after a 16-year history of renewed government consideration of heroin maintenance treatment, the regional government of the Australian Central Territory (ACT) appointed a tri-party Select Committee to inquire into and report on incidents related to HIV (human immunodeficiency virus) infections, illegal drugs, and prostitution to evaluate the effectiveness of current responses to these issues and to study alternative social, medical, or legal proposals that may assist in restricting these problems (National Centre for Epidemiology and Population Health, 1995). The committee's recommendations included a feasibility study of the controlled availability of opioids (Brammer, 1993). In this recommendation, the committee was particularly influenced by information provided by practitioners and administrators from the Merseyside area in Great Britain, where heroin had been prescribed for many years. Upon the request of the committee, the National Centre for Epidemiology and Population Health agreed to undertake a feasibility study as well as a trial of the controlled provision of heroin.

3.3.1 Extent of the Heroin Problem and Treatment Responses in Australia

To identify the prevalence of opioid dependence, the Australian National Campaign Against Drug Abuse conducted a general population survey in 1988, which indicated that 1 percent of the overall population reported lifetime heroin use (Commonwealth Department of Community Services and Health, 1988). The 1993 National Drug Household Survey (National Drug Strategy, 1993) found that 2 percent of the population had tried heroin and cocaine or crack-cocaine, while 1 percent had used these substances during the past year. Estimates based on these and other studies indicate that there are approximately 30,000 to 50,000 dependent users and an additional 60,000 irregular or recreational heroin users in Australia (Mattick and Hall, 1993).

The capital of Australia, the City of Canberra, where the heroin trial is proposed to be established, has an estimated 1,000 dependent heroin users and about three times as many nondependent users among its approximately 285,000 inhabitants (Brammer, 1993). Amphetamines are taken by a large number of illegal drug users, and this population overlaps to some extent with the heroin using population. Cannabis is used by nearly all of those who consume other illegal drugs. Heroin is usually injected, which is also a common route of administration for amphetamines. The smallest amount of heroin that can be purchased in the region is a "deal" for 50 Australian dollars, which would be sufficient to provide one "hit" for an inexperienced nondependent user. More experienced or dependent users would need twice the amount to achieve the desired effect (Brammer, 1993). The incidence of HIV associated with injected drugs in the region is low; the best estimates suggest 20 cases.

A range of both government and nongovernment agencies provide treatment or support for illegal drug users. These include needle and syringe exchange programs, self-help groups, detoxification centers, oral methadone programs, therapeutic communities, halfway houses, counseling, referrals, and information services. A survey of opiate treatment agencies undertaken in 1992 showed that an average opiate user entering treatment in Australia could expect to be comprehensively assessed, detoxified on an inpatient basis with the aid of medication, and offered either a series of outpatient appointments that may or may not include methadone maintenance or treatment in a therapeutic community. However, after completing treatment, little formal aftercare is provided. In December 1991 there were over 10,000 patients enrolled in methadone maintenance programs in Australia (Mattick and Hall, 1993). The oral methadone program established in Canberra had 350 treatment slots in 1995 (with about 85 percent on maintenance and 15 percent on withdrawal regimens). The program plans to increase the dispensing of methadone through pharmacies and to introduce prescriptions through private general practitioners (National Centre for Epidemiology and Population Health, 1995).

3.3.2 The Status of Heroin Prescription Programs in Australia

A proposal for two controlled pilot trials to provide heroin to dependent users in a controlled manner is currently under consideration for implementation in Canberra (Brammer, 1993). The proposal for a trial to provide diacetylmorphine and other opioids to dependent users in a controlled environment has generated a great deal of interest and speculation. Research is currently under way to determine the feasibility of such a trial. A four-stage strategy for conducting the research was developed in collaboration with the Australian Institute of Criminology. Stage 1, conducted between May and July 1991, focused on general theoretical issues; stage 2, which began in January 1992, was to consider the logistic feasibility of a trial. The results were reported in mid-1995. Stage 3 was scheduled to be a smaller pilot study, and a full-scale trial was scheduled for stage 4 (Brammer, 1993). Due to a number of unresolved questions and political opposition, the accompanying research required more studies than anticipated. After 4 years, the research results were summarized in a stage 2 report, which was presented to the Minister of Health in the ACT by the end of June 1995. A decision about the start of the pilot trial is currently pending (National Centre for Epidemiology and Population Health, June 1995).

The report proposes to conduct two pilot studies in Canberra. The proposals explicitly stress that these trials will be carefully controlled and accompanied by strict law enforcement of illicit activities and prevention efforts. The initial 6-month pilot, which will include 40 participants, will be followed by a second 6-month pilot, including 250 participants. These pilot studies will determine whether a multicenter, 2-year trial in 3 Australian cities with 1,000 participants should be undertaken.

The two pilot studies will assess the addition of heroin to a maintenance regime. Selected volunteers must be residents of the ACT who have either dropped out of a previous methadone program or who are current methadone clients and would prefer the expanded treatment option. A number of criteria for success have been established for both pilots, which must be met if the 2-year trial is to be introduced. These criteria include establishing a stable maintenance dose; improvement in the health, criminal behavior, and social

functioning of the addict; increased reentry of former program dropouts; and improved retention rates.

The 2-year trial will target three groups of dependent heroin users: those who have never been in treatment, those who have dropped out of treatment, and current methadone clients who would prefer an expanded treatment option. To identify if the addition of injectable heroin improves the program outcomes in each of these groups, a control group with the single option of oral methadone maintenance will be established (National Centre for Epidemiology and Population Health, June 1995).

One important aspect of the research activities that accompany this effort is the stimulation of informed debate about different approaches for addressing illicit drug use in Australia. A range of research projects has been undertaken, and input was sought from citizens, minority groups, the law enforcement community, the medical community, drug users, representatives of city government agencies that might be impacted, the media, and politicians. Surveys on this subject have found that there is considerable community support both in the ACT and nationwide for new approaches to the problem of heroin dependence. Of all the special interest groups involved, it is the law enforcement officers who are the most concerned about a heroin prescription trial program. Police are concerned that the trial might attract addicts from other regions, heroin dispensed by the program might be diverted to other addicts, and participants might drive cars after taking heroin. The pilot programs and the later trial are structured to eliminate these problems.

Individual research project results are published in a newsletter, and seminars are held to inform decisionmakers and other interested parties on the progress of opioid treatment research. Sessions with invited speakers from the international law enforcement and medical communities, as well as community leaders and service providers, were held to discuss the findings, gain input from key interest groups, and identify other issues related to trial programs, such as cooperation with law enforcement and community impact. Extensive media coverage is sought to further the discussion, gain feedback, and develop the public support needed to implement a trial program (National Centre for Epidemiology and Population Health, 1992).

Other related research projects identify the various ways of estimating the number of heroin users in the region, study the development of criteria that ensure that only long-term area residents participate in the trial and how to enforce these criteria, review the literature and previous experiences in other countries, survey former users to identify factors that led them to stop using, develop statistical tests of alternative trial designs, analyze the area drug market and any impact a trial would have (especially on the economics of this market), and survey crime victims (National Centre for Epidemiology and Population Health, 1992-95).

The thorough collection of scientific information not only provided a relatively solid base for the implementation of the trial, which is likely to reduce problems and avoid unrealistic expectations; it also represents an intricate information campaign involving all possible stakeholders and opponents to slowly build the public support needed for policy change. This process is an extraordinary example of a structured approach to change the drug policy pursued in one region, which, by itself, is worth studying.

3.4 Germany

In 1990 the City of Frankfurt organized an international drug conference that brought together drug experts and politicians from four large European cities: Amsterdam, Frankfurt, Hamburg, and Zürich. As a result of this meeting, the "Frankfurt Resolution" was developed, which outlined a more pragmatic drug policy that favored harm reduction over the "drug-free" demands most national drug policies follow. Since the conference was held, a total of 15 cities signed this resolution, and a network of nearly 60 cities that share a similar view began to develop throughout Europe (Münster, 1993). The cities of Frankfurt and Hamburg submitted proposals to establish heroin provision trials to the German Parliament and to the Federal Department of Health. Both proposals have been rejected so far, but further decisions are currently pending in the German Parliament and in the Supreme Court.

The trend toward more harm reduction also is expressed in new legislation passed in 1992, which allows the prescription of drugs for maintenance purposes and the dismissal of charges, even for possession of hard drugs if the accused enters a treatment program (Körner,

1993). In addition, the Supreme Court decided in 1994 that laws against the possession of small quantities of marijuana and hashish should no longer be enforced (Bundesverfassungsgericht, 1994). The current drug policy in Germany favors nonenforcement of casual use of soft drugs, treatment for addicts, and increased enforcement of drug trafficking and related crimes.

3.4.1 Extent of the Heroin Problem and Treatment Responses in Germany

The number of first-time heroin users registered by police in Germany rose dramatically, from 4,827 to 10,452 between 1988 and 1992. Even more disturbing is that the number of drug-related deaths rose from 670 in 1988 to 2,125 in 1991. Since 1991 the numbers have decreased for both indicators but are still at a very high level (Bundeskriminalamt, 1994). Kreuzer, Römer-Klees, and Schneider (1991) estimated that the cost of drug-related crime in Germany reaches 4 billion German marks annually (approximately \$2.8 billion).

There are no reliable data on the number of hardcore addicts living in Hamburg, one of the cities that proposed to implement a heroin prescription trial. It is estimated that between 9,000 and 10,000 individuals consume hard drugs and that approximately 50 percent of them are at different stages of addiction. Police and social workers estimated that 500 to 800 individuals are hardcore addicts that have reached a high level of physical and social deterioration (Der Drogenbeauftragte des Senats, 1994). The number of deaths related to drug consumption has increased dramatically in Hamburg over the last 10 years, from 22 in 1983 to 153 in 1993. Hamburg was one of the first cities to initiate free needle exchange programs, and hence the percentage of HIV and AIDS cases is considerably lower than in other cities, ranging from 5 to 6 percent of the total population of heroin addicts.

Frankfurt, another city that submitted a trial proposal, was once called the drug capital of Germany. A large, open-air drug market, which drew up to 1,000 addicts daily, contributed considerably to this reputation and attracted even more users to the city. Between 1985 and 1991, the number of heroin-related deaths rose annually, by between

30 and 50 percent. Since 1991 this number has declined by 60 percent, which is attributed to a substantial change in the city's drug policy (Nimsch, 1993).

Until the mid-1980s, inpatient detoxification and abstinence programs were the only treatment options available in Germany (Der Drogenbeauftragte des Senats, 1994). Several therapeutic inpatient and outpatient programs have been developed since then, and needle exchange and support programs have been established to provide addicts with opportunities to shower, wash their clothes, eat, and receive drug-related information in addition to information about treatment. The prescription of methadone was legalized for the first time in 1992; it is estimated that currently about 5 percent of all addicts participate in a methadone maintenance program. Methadone maintenance, as well as other treatment modalities, are covered by the German public health care system.

The development of treatment modalities in Hamburg reflects treatment trends for all of Germany—a broad range of therapeutic inpatient and outpatient programs has only developed since the late 1980s. Maintenance programs in Hamburg use methadone and L₇-polamidon in combination with socio-psychological therapy. Between 1,800 and 2,000 individuals currently participate in these maintenance programs. In addition, a number of private doctors prescribe codeine to heroin addicts (Der Drogenbeauftragte des Senats, 1994).

In 1988 the Frankfurt police department was the first city government agency to demand new approaches to counter the increasing drug problem in the city (Schneider, 1993). Previously, police had responded with traditional arrest strategies, which had no impact. Since 1988 harm reduction has gained increasing support, and a number of crisis intervention, support, and treatment programs were developed. Methadone programs for 900 addicts were implemented in Frankfurt in 1992. As a result, the number of heroin-related deaths, emergency responses to overdoses, and drug-related crime rates decreased. Of the approximately 1,000 known long-term addicts that frequented the open-air drug market, approximately 100 to 200 have not been reached by any treatment program. This smaller market and the fact that methadone is provided only to city residents also reduced the number of addicts that would migrate to Frankfurt from other places (Presse- und Informationsamt der Stadt Frankfurt, 1993). Frankfurt currently spends 10 million German marks (approximately \$7 million) on drug treatment and support programs, and private

contributions account for another 1 million German marks (approximately \$708,000) that are available for these efforts.

3.4.2 The Status of Heroin Prescription Programs in Germany

In 1992 the City of Hamburg introduced a bill in the German Parliament to allow for a scientific trial and subsequent controlled prescription of heroin, marijuana, and other drugs. The bill was passed by the German Bundesrat; however, the German Government decided against it. The purpose of this bill was to develop an alternative treatment modality for those addicts that could not be reached by methadone or other programs. The trial was proposed to serve up to 200 addicts. Its main goal was to get hardcore heroin addicts to participate and provide additional socio-psychological treatment to encourage them to switch to methadone or other treatment modalities (Der Drogenbeauftragte des Senats, 1994). Further parliamentary decisions are pending.

A similar proposal was submitted to the Federal Ministry of Health in 1993 by the City of Frankfurt; it, too, was declined. In an attempt to overturn this decision, the City of Frankfurt filed an appeal in federal court. The court decision is still pending. The City of Frankfurt proposed to undertake a 5-year trial offering diamorphine in injectable, drinkable, or smokeable form to 100 hardcore addicts (Stadt Frankfurt, 1993). It is interesting to note that the proposal submitted by the City of Frankfurt purposefully uses the medical term *diamorphine* instead of heroin to avoid any notion that heroin legalization would be supported. The main goal of this proposed trial is to reduce drug-related harm and stabilize the addicts physically and socially; drug abstinence is only a secondary, long-term goal (Stadt Frankfurt, 1993).

The main argument against both proposals was that they did not comply with Germany's current drug policy, which requires that the goal of all treatment programs is drug abstinence (Bundesgesundheitsamt, 1994). Even though both proposals were turned down, other cities in Germany, such as Stuttgart and Karlsruhe, also expressed their intention to implement controlled heroin prescription programs.

Should the German Parliament decide that a trial with heroin can be established, it is likely to resemble the methadone programs in Germany (i.e., only physicians in private practice or at hospitals who participated in special drug education and in quarterly drugs and AIDS working groups would be allowed to prescribe heroin) (Bausch, 1993). As with the Swiss model, the drugs would be dispensed for onsite consumption three times daily at a program facility. Counseling therapy would support the program. Heroin would be prescribed only to hardcore addicts who cannot be reached by any other effort, to addicts who show physical signs of deterioration, to HIV-infected addicts, and to pregnant women. It is also likely that the prescribing physician would have to consult with an expert commission before a prescription can be issued and that addicts' drug use would be monitored with urine tests. In addition, both proposals submitted included evaluation designs that would allow for scientific observation of the program outcome. Overall, proponents of controlled heroin prescription in Germany agree that such a program should only be considered for a very limited number of addicts (Stadt Frankfurt, 1993).

While the governments of several larger cities in Germany are ready to implement a trial, the decision to authorize a trial belongs to the German Government. It is difficult to predict the outcome of the pending discussion in Parliament or the federal court decision. Should the court decide in favor of a trial, it is more than likely that opponents would take the decision up to the Supreme Court. This route was taken when a lower court declared the illegality of hashish unconstitutional, an opinion that was not shared by the Supreme Court. In 1994 the Supreme Court decided that possession of cannabis is illegal. However, it was also decreed that laws against the possession of small quantities of marijuana or hashish should no longer be enforced (Kreuzer, 1994). Considering these and other related Supreme Court decisions, it is uncertain whether a trial would gain Supreme Court approval. However, it is possible that the combined votes of the opposition parties in Parliament (i.e., Sozialdemokratische Partei Deutschland and the Green Party) and the smaller government party (i.e., Freie Demokratische Partei Deutschland) would gain sufficient parliamentary support for a trial. It is likely that such a decision would again be presented to the Supreme Court and possibly turned down. On the other hand, increased public concern about hardcore drug use and any positive results experienced in Switzerland may gain public support for a trial.

3.5 Netherlands

The Dutch drug policy has resulted in the explicit liberalization of soft drugs (marijuana and hashish) and mainly follows a harm reduction philosophy even for hard drugs rather than a repression-oriented approach (Leuw, 1991). The Dutch Ministry of Public Health is responsible for developing the national drug policy, which accounts for the predominant view of drug abuse as a health problem. There is no pledge to solve the problem but to make pragmatic attempts to cope, to manage, and minimize the risks and damage associated with the drug phenomenon (Leuw, 1991). The initial approach also to tolerate hardcore drug use was based on less successful experiences and was revised (Leuw, 1991); while assistance and treatment will be available to hardcore drug users, individuals will not be exempt from responsibility for their acts. Forced treatment, as well as large-scale prescription of heroin and legalization of hard drugs, has been rejected as not fitting with the basic philosophy of the Dutch drug policy (Leuw, 1991).

3.5.1 Extent of the Heroin Problem and Treatment Responses in the Netherlands

The number of drug addicts in the Netherlands increased sharply between 1974 and 1980, reaching a level that has been maintained ever since. There are an estimated 15,000 to 20,000 opiate and cocaine addicts in the Netherlands. The age of this relatively stable group has increased, indicating that fewer young people are becoming addicted (Van de Wijngaart, 1990). Most hardcore drug users in the Netherlands are opiate users. While recent studies indicate considerable use of cocaine among heroin addicts, there is very little indication of hard drug users who only use cocaine (Grapendaal, 1989). A majority of Dutch drug addicts (i.e., 60 to 80 percent) is estimated to be in regular contact with specialized health and welfare institutions (Wever, 1989). As a result, the mortality of drug users is relatively low when compared to other European countries. In addition, since the level of intravenous drug use is relatively low—even among the heroin-using population (about 40 percent)—HIV infections also are comparably low (Buning, 1989).

The traditions of the welfare state and the booming economy of the 1960s and early 1970s provided the means to support the Dutch drug policy through an extensive, easily

accessible network of medical and social assistance (Leuw, 1991). Shelter projects, free methadone maintenance, free needle exchange programs, material support, social guidance, and medical psychological care are available. Methadone programs often form the core of such efforts. Low-level methadone programs are widely spread in the Netherlands. Today it is estimated that approximately 60 percent of all addicts participate in a methadone maintenance program (Derks and Daansen, 1994). Since methadone programs are so widespread in the Netherlands, the demand for alternatives is low. The development of heroin prescription programs has been discussed for many years and recently has been considered for implementation in several cities. However, heroin prescription programs would have to prove at least as successful as methadone programs in order for the Dutch Government to establish such programs (Derks and Daansen, 1994).

3.5.2 The Status of Heroin Prescription Programs in the Netherlands

Dispensing heroin to addicts had been discussed on an official level in the Netherlands since 1974. At that time, even though it was illegal, heroin was sold and officially tolerated at Amsterdam's alternative drug treatment center. The initial restriction to sell heroin only to registered addicts could not be upheld, since growing numbers of addicts from all parts of the Netherlands and other countries demanded admission. The uncontrolled selling of heroin resulted in a high diversion rate into illegal channels. The program failed and the clinic was closed in 1982 (Derks and Daansen, 1994).

Discussion about heroin prescription programs nevertheless continued. From 1979 to 1982, one of the physicians who had worked at the alternative treatment center in Amsterdam prescribed morphine and amphetamines to five addicts and saw positive results (Havas, 1983). In the 1980s his experiences finally led to the development of an experimental scheme for chronic addicts in Amsterdam, which involved the prescription of injectable morphine (Derks, 1990). Thirty-seven addicts received morphine for up to 2 years. Forty-three percent shifted to methadone, and most of them participated in the accompanying counseling program to the end of the study period. Those who remained on morphine developed less physical problems than the others (Derks and Daansen, 1994).

Even though heroin prescription programs do not currently exist in the Netherlands, their development is still under consideration. The Netherlands Health Council issued favorable advice on heroin dispensing programs, and a parliamentary decision is expected for the fall of 1996. Twelve Dutch cities indicated their willingness to participate in a heroin prescription experiment, and the Minister of Health supports such a project. During a telephone conversation with this author in August 1995, Dr. Derks of the Netherlands Institute of Mental Health indicated that while the political environment is favorable, the high costs of heroin prescription programs and the limited need for another alternative treatment modality will pose problems if such programs are implemented. To cover the costs of these programs, participating municipalities may have to carry part of the expenditures, and while practitioners in the Netherlands would like to experiment with this alternative, a recent national survey undertaken by Dr. Derks and his colleagues indicates that heroin addicts showed little interest in such a program.

3.6 United States

Despite years of intensive enforcement and prevention, drug abuse in the United States is still at a relatively high level. Prevention progress in reducing casual abuse has been reported; however, in some areas the situation is worsening. According to the most recent *Monitoring the Future* study, casual drug use is increasing among youth. While heroin use in the United States is still low compared to cocaine use, there are clear indications that heroin consumption is increasing among existing heroin users (Boyum and Rocheleau, 1994). In addition, more teenagers and young adults are using heroin, with some also shifting to injecting as a primary route of administration (Office of National Drug Control Policy [ONDCP], 1994).

3.6.1 Extent of the Heroin Problem and Treatment Responses in the United States

U.S. Government officials estimate that the number of heroin addicts nationwide was about 500,000 in 1994 (ONDCP, 1995). According to one study, the number of casual (i.e., less than weekly) users and heavy (i.e., at least weekly) users declined from 1988 to 1992 but increased in 1993 (ONDCP, 1995). A recent increase in heroin consumption also

was reported by the Drug Enforcement Administration, indicating that domestic heroin consumption was on the rise not only among existing heroin users but also among users of other primary drugs of abuse (National Narcotics Intelligence Consumers Committee, 1994). Furthermore, according to the Drug Abuse Warning Network, the number of heroin-related emergency episodes is increasing (ONDCP, 1995).

While a broad range of inpatient and outpatient treatment programs is available in the United States, Department of Health and Human Services estimates indicate that more than 1 million individuals seeking treatment are unable to access a program in a timely fashion (ONDCP, 1995). Observations made by the General Accounting Office (GAO) indicate that this lack of access is not necessarily due to a lack of overall treatment slots but to an insufficient coordination of available programs (GAO, 1990).

Approximately 100,000 heroin addicts received methadone maintenance treatment in over 650 programs in 1988 (GAO, 1990). In addition, naltrexone, LAAM (levo-alpha-acetylmethadol), and buprenorphine may be prescribed to heroin addicts or are currently used in clinical trials. While methadone programs generally are accompanied by comprehensive therapeutic counseling and assistance, this is not always the case. Provisions for aftercare are especially insufficient. Accordingly, the effectiveness of maintenance programs in the United States has been criticized. A study undertaken by the GAO (1990) indicated considerable continuation of heroin use by clients in maintenance programs; however, much of the variation in results shown in this study is due to considerable program differences and administrative shortcomings.

At the same time, other research indicates that 15 percent of all heroin users in the United States had never participated in any substance abuse treatment program; of the remaining 85 percent, only one-third was currently enrolled in a treatment program. Considering the significant health threat this population of addicts represents, as well as the high likelihood of an association with criminal behavior, it would be worthwhile to appraise alternative methods for increasing and stabilizing treatment participation in the United States.

3.6.2 The Status of Heroin Prescription Programs in the United States

In the early 20th century, as drug control legislation was introduced in the United States, a total of 44 narcotic clinics were established across the country that dispensed both heroin and morphine, initially on a maintenance basis and subsequently on a rapid-reduction basis as antimaintenance legislation was introduced (Council of Mental Health, 1966). Between 1919 and 1923, these State-run clinics were widespread. Most of these clinics were ad hoc local responses to widely varying local drug problems. Accordingly, their structures and operations varied, as did their efficiency (Reinarman and Baumohl, 1994). There was evidence of clinic failure as well as success (Reinarman and Baumohl, 1994). A negative example often used to imply the failure of these clinics is the heroin clinic that operated in New York. However, Noller (1994) points out that this clinic was totally overwhelmed with its task to serve 7,500 addicts and, therefore, was closed only a couple of month after it was opened. Musto (1973) stressed that these clinics were closed down as a result of the activities of the Federal Narcotic Division of the Prohibition Unit, not as a result of any scientific findings related to their benefits or drawbacks.

The idea of opiate maintenance did not die with the Supreme Court's *Doremus, Webb*, and *Behrman*² decisions in 1919 and 1922 (249 U.S. 86, 1991; 258 U.S. 280, 1922; 249 U.S. 96, 1991) or the Narcotics Bureaus' successful crusade against these clinics. Reinarman and Baumohl (1994) report that between 1931 and 1941, both California and Washington seriously considered new laws providing for opiate maintenance, and the New York Academy of Medicine unsuccessfully proposed an experimental opiate maintenance plan as late as 1956. Again, none of these efforts were successful, and this was due to political opposition rather than negative scientific evidence (Lindesmith, 1965; Reinarman and Baumohl, 1994). Another unsuccessful effort was made by the Vera Institute in 1972 when it developed a plan for a scientifically supported trial in New York.

² In *Webb v. USA* (1919, 249 U.S. 96), the Supreme Court reasoned, without hearing medical argument, that opiate maintenance was not a legitimate medical practice and, therefore, not permitted by the Harrison Act.

In 1977 the Drug Abuse Council published a discussion paper about the benefits and drawbacks of heroin prescription programs. It stressed that the relatively low risk of physical damages related to heroin use of program participants may be set off by possible psychological and social risks in the long run. The article also cited a high mortality rate among clients of British programs and conflicting arguments about the economical impact such programs had on the illicit drug market. Overall, the paper was not supportive of such trials (Drug Abuse Council, 1977), and no such programs or trials are currently considered in the United States.

4. THE IMPACT OF HEROIN PRESCRIPTION PROGRAMS

The above reported experiences provide incomplete yet important information on the effectiveness and impact of heroin prescription programs and the issues related to program implementation. This section will summarize the available information to identify the following:

- The impact such programs have on heroin users regarding their compliance with the program, health and social stabilization, and criminal activity;
- The impact on the community regarding the overall crime rate, drug market development, and implications for the acceptance of illicit drug use; and
- Programmatic considerations, such as logistical and cost implications.

4.1 The Impact of Heroin Prescription Programs on Heroin Users

Reinarman and Baumohl (1994) report a conversation with Dr. Mary Jeanne Kreek of Rockefeller University. Dr. Kreek worked on methadone maintenance from the very beginning, and after three decades of highly regarded medical science research on opiate addiction treatment and related topics, she is a strong opponent of opiate maintenance using drugs other than methadone. The first and primary reason for her opposition is based on

tolerance. Experiments of maintaining long-term heroin addicts on morphine showed that they needed increasing doses as they grew more tolerant of the drug's effects. If administered morphine doses were high enough to prevent withdrawal, the patients would become "sleepy" and therefore insufficiently functional in society to hold down a job (Reinarman and Baumohl, 1994). In addition, the half-life of heroin in the human body lasts only about 1 hour, while the half-life of morphine lasts 6 hours, methadone lasts 24 hours, and long-acting methadone (i.e., LAAM) lasts 48 hours (Reinarman and Baumohl, 1994). Accordingly it is reasoned that heroin and morphine maintenance would not stabilize addicts long enough for them to function as productive members of society.

To overcome this obstacle, heroin and other opiate prescription programs have resolved to provide multiple daily doses to addicts. A study of the Amsterdam program that provided morphine to 37 patients showed high satisfaction rates. Nonetheless, six of the subjects died during the study period. It was concluded, however, that the program overall resulted in more progress than deterioration (Derks, 1990).

Battersby et al. (1992) studied the outcome of 40 subjects who used injectable opiate prescriptions during 1987 and 1989 at the Maudsley Hospital in London. The subjects in this study were comprised of 27 men and 13 women, ages 42 to 60, whose opiate use duration was 4 to 43 years. One-half of the patients were dependent on methadone, and the other half was mainly on heroin. The subjects attended the clinic for an average of 45 weeks in a range of 1 to 104 weeks. At the end of the study period, Battersby et al. reported that 35 of the 40 subjects continued to receive an injectable prescription, or they injected illicit drugs. The stability in the lives of eight subjects (20 percent) had deteriorated. One subject died from an overdose after leaving.

The study also noted that older addicts were less likely to respond positively to the treatment (Battersby et al., 1992). The treatment seemed unsatisfactory to 65 percent of the subjects who left the prescription program for other doctors. Considering the fact that these patients had the choice to go to other doctors who would prescribe an opioid, Battersby and his colleagues argued, it is very likely that this outcome would be different in countries where such an opportunity did not exist. It was also reported that 14 participants (35 percent) made positive life changes. Nine (22.5 percent) decided to enroll in inpatient programs and

became drug free during their stays. Furthermore, the mean prescribed dosage had been reduced. The overall results did not provide conclusive evidence of either the benefit or harm of this intervention.

Information from the Merseyside area program, however, suggests that heroin prescriptions to heroin addicts has beneficial effects, including reduced criminal activities and improved quality of life (Brammer, 1993). The Merseyside region is located near a large sea port with much trade with West Africa and a high number of prostitutes and addicts. While other cities, such as London or Edinburgh, had no drug prescription or needle exchange programs in the early 1990s and therefore have high rates of HIV infection, this is not the case in the Merseyside area. Furthermore, while the overall death rate among addicts in Great Britain ranges between 10 and 20 percent (Marks, 1992a), it has been reduced to virtually zero in the Merseyside region. However, the assertion based on the Merseyside example (Marks, 1994) that prescribing heroin reduces addicts' mortality rates to zero and acquisitive crime substantially is not consistent with other studies conducted in Great Britain (Hartnoll et al., 1980; Gossop, Strang, and Connell, 1982; Battersby et al., 1992; Strang et al., 1994).

Other studies indicate that prescribing morphine or heroin to pregnant addicts is preferable to methadone because the withdrawal symptoms of newborn babies are less severe, and no considerable developmental difference to nonaddicted babies could be detected after 3 years of followup (Mino, 1990; Hellenbrecht, 1992). Mino (1990) also mentions that pediatricians in Liverpool reported only one-third of newborns showed withdrawal symptoms when their mothers smoked diamorphine, compared with 70 to 85 percent of babies born to mothers who injected heroin. In addition, because they aim to get addicts to change their modes of administration, these diamorphine programs show considerable advantages over methadone programs.

While it is still too early for the Swiss experiences to provide conclusive results, preliminary observations from the first 9 months of program operation show satisfactory results. Patients for the trials were easily recruited and treatment was well accepted. Heroin was more acceptable to and was better tolerated by patients than both morphine and

methadone.³ Patient compliance for the heroin trials was reportedly good. Only approximately 10 percent of the heroin patients dropped out or were excluded from the program, while 10 percent moved to other treatment options, such as oral methadone and abstinence-oriented programs. The retention rate was close to 80 percent, and the participants' health status stabilized and improved, as did their overall social integration (Bundesamt für Gesundheitswesen, 1994).

Initial results from the City of Zürich trial showed that the demand for such a program was tremendous. Program participants, whose average age was 30, were long-term addicts with profound health and social problems. Compliance with the accompanying counseling program is high; only 1 of the 100 participants left the program for a traditional methadone program (Uchtenhagen, 1994). The Swiss Department of Health concluded that the initial experiences at all trial sites "seem to indicate that the prescription of narcotics, especially of diamorphine, could be an effective means to improve health and living conditions of heavily addicted patients for whom other treatment efforts have failed so far" (Bundesamt für Gesundheitswesen, 1994, p. 6).

4.2 Impact on the Community and the Drug Market

The heroin prescription program of the Merseyside area in Great Britain reportedly led to a steady decline in drug-related crimes and a nonexistent illegal market for heroin (Isenegger, 1994). Because neighboring districts did not experience such trends, it can be assumed that the drug prescription program has much to do with this outcome.

However, it has been argued that such a program may negatively impact the illegal market by increasing the purity of illicit heroin available as a retaliation of traffickers against the program, which may lead to increased overdoses. It may, however, also have a stabilizing effect on drug purity and thereby improve the health status of nonprogram heroin users (National Centre for Epidemiology and Population Health, October 1993). None

³ Patients who received heroin experienced frequent minor histaminic reactions. Morphine patients, however, experienced strong histaminic reactions, and patients were generally less accepting of this treatment. The provision of intravenous methadone was problematic due to the large volume of the substance that was injected.

of the programs implemented so far provide sufficient information to identify any such outcome.

Controlling the cost of a substance is one way of controlling its accessibility and availability. Accordingly it is argued that the controlled prescription of heroin disrupts the illicit drug market because it deprives dealers of their most lucrative customer—the hardcore addict (Adams, 1994). In addition, as long as drug dealing and uncontrolled consumption remain illegal and socially unacceptable, the entrance rate of new users will not change. With the number of low-level drug users remaining constant and high-level consumers come off the market, the overall market will be considerably smaller. However, the financial collapse of the illegal drug market is likely to take some time, especially since large drug trafficking organizations have vast resources for continuing their activities and competing for clients in a smaller market.

The results from the Merseyside program indicate that such prescription programs have the potential to impact the local drug market. The considerable benefit of the Merseyside program has even convinced the local chief of the narcotics unit of its widespread influence. Not only has drug-related crime decreased substantially, drug-related prostitution has also declined, and drug dealers have no market in the area. It is estimated that the illegal drug market loses about £5,000 (approximately \$7,900) per 100,000 population per week due to the program. Even the number of new addicts is decreasing (Glauert, 1994). Criminal activities are reduced 15 times over, between the 12-month period prior to program entrance to the end of the first year in the program (Marks, 1992a).

Researchers in Germany predict an immediate impact of heroin prescription programs on drug-related crime rates in program jurisdictions. Kreuzer et al. (1991) estimated that hardcore addicts in Germany commit an average of four acquisition offenses per day. This number coincides with the average number of offenses reported in the United States that range from several crimes per week to 2–10 crimes per day (Ball et al., 1981, 1982; Johnson and Wish, 1988; Johnson, Kaplan, and Schmeidler, 1990; Chaiken and Chaiken, 1990). Assuming all 200 participants in the trial program proposed in Hamburg no longer commit cash-generating crimes, 288,000 fewer offenses would be committed in the City of Hamburg per year. Even when more conservative estimates of crime rates prior to entering the

program are applied—and if it is assumed that not all participants will abstain from criminal activity—the reduction in crime is likely to be substantial, even with the limited number of clients in the program. This result would not only considerably lower the burden to society but also allow law enforcement officers to focus on large-scale dealers and drug trafficking organizations (Adams, 1994). Since it can be expected that the smaller market prompts a number of sellers to leave the market (especially those who deal occasionally), police can focus even more efforts in these areas.

Removing the need for illicit drugs should lead to reduced crime if economic motives are important, and studies that have examined the consequences of prescribing heroin substitutes to addicts have supported this theory (Bennett and Wright, 1986; Schut et al., 1975). However, Klee and Morris (1994) also point to the fact that although criminal acts can decline when interrupting illicit heroin use, these acts often do not stop altogether. In addition, because heroin and other programs that prescribe injectable drugs reach a relatively small portion of the addict population, little impact on national drug crime rates can be expected. Each country that operated opioid prescription programs experienced increased imports of illegal drugs comparable to those in other countries as well as still-flourishing illegal drug markets and little registered impact on drug prices (Beck, 1994).

Another concern is that the controlled provision of heroin to users may negatively impact communities by sending a wrong “message,” especially to youth, about drug consumption (Brammer, 1993; Stuttgarter Zeitung, 1994; Eylmann and Kusch, 1994). The Australian feasibility study suggested that strict law enforcement of illicit drug use should be upheld to avoid any perception of increased permissiveness of drug use due to the program implementation (National Centre for Epidemiology and Population Health, May 1994). In response to similar concerns, the trials in Switzerland, the methadone programs in the Netherlands, and the trials proposed in Germany stress the responsibility of drug addicts for their actions and all strongly uphold the illegal status of hardcore drugs. This point is emphasized both in Switzerland and Great Britain by a close cooperation between prescription programs and local police.

The Australian feasibility study, as well as the Swiss trials, the German proposals, and the British programs also expressed concern that the controlled provision of heroin in one

jurisdiction may attract users from other parts of the country (Brammer, 1993). Such migration occurred in instances when methadone programs were threatening to shut down or when one market was located in a permissive atmosphere, instances which occurred in Zürich and Amsterdam (National Centre for Epidemiology and Population Health, May 1994). To prevent migration, the Australian feasibility study recommended residence requirements for program participants. The same residence requirements were integrated into the trials operating in Switzerland, were practiced in the Merseyside programs, and were considered in the program proposals submitted in Germany.

4.3 Programmatic Considerations

A number of logistical problems must be considered before such trials are implemented to reduce possible conflicts and problems. The experiences of programs in the United States, Sweden, Great Britain, the Netherlands, and Australia indicate that much program outcome is related to how well the effort is structured and organized to serve a population in a specific jurisdiction. Logistical and cost implications that consider site-specific needs must be assessed to develop successful programs. The consequences of a possible user migration should be considered; in addition, potential negative effects due to an increased visibility of the illicit drug scene and any related impact on local criminal activities requires examination as well as increased demand for drug-related and other health and support services. As a result, constructing such a program needs an assessment on how the population served is composed and how many addicts the program can adequately handle.

4.3.1 Logistical Implications

The Australian feasibility study highlighted and summarized the British and Swiss programs' difficulties during development of appropriate service provision. It mentioned that potential programs must contemplate where and how drugs will be distributed and administered. The choice is to dispense the drug at a specific program site (as practiced in Switzerland) or through pharmacies (as in Great Britain). Furthermore, because heroin has a relatively short half-life and needs to be administered several times over a 24-hour period to keep the client stable, programs should decide on either requiring that the drug to be

consumed onsite or be provided as a take-home product. In designing a program, the ritualistic aspects of drug use need to be recognized and integrated (Brammer, 1993). The ritualistic aspect of injecting a drug is an argument against the onsite administration of drugs. Concerns also were raised that providing drugs only onsite would contribute to an "institutionalization" of users by taking control over how they structure their lives, disrupting them, and making it difficult for participants to attend school or maintain a job. In addition, any facility that attempts to serve a large number of drug users who take their drugs onsite several times per day faces many logistical difficulties.

The tradeoff of allowing drug users to administer treatment drugs at home is the increased risk of drug diversion and therefore an increased drug control problem for law enforcement. Surveys undertaken as part of the Australian feasibility study showed little support from the community, law enforcement, service providers, and even users and former users for this option (Brammer, 1993). Interestingly, similar results were obtained when addicts in Frankfurt, Germany, were asked if they favored such an option and the majority responded negatively, favoring a controlled program within a therapeutic environment (Stadt Frankfurt, 1993). Because experiences in England and results from morphine programs in the Netherlands showed that little control over prescribed drugs increases risk of diversion into the illicit drug market, the German proposals allowed only onsite consumption of prescription drugs (Adams, 1994; Stadt Frankfurt, 1993; Der Drogenbeauftragte des Senats, 1994). The British experiences, although limited to a small number of addicts, indicate that initially administering drugs onsite and later allowing daily, take-home, multiple dosages for weekends or special circumstances (e.g., travel) are a sensitive option.

Another area to be resolved concerns the way the drug will be administered (e.g., injected, smoked, inhaled, or provided in a liquid or tablet form to be consumed alone or in combination with other drugs, such as methadone). The Swiss and British programs allow for multiple combinations depending on participants' needs with the goal to move them to less harmful modes of administration and to other treatment modalities. As part of these efforts, the Swiss programs also are investigating inhalant preparations and slow-release oral tablets.

Other issues that should be addressed before a program trial is implemented is the extent of law enforcement cooperation, potential security problems for the treatment facility and participants, possible congregation of trial participants and other users outside the distribution site, logistical problems related to providing heroin three times daily to a large number of users, the problem of trial participants driving under the influence of heroin, and any liability issues for the trial clinic (National Centre for Epidemiology and Population Health, 1994).

In addition, because the United Nations limits the provision of heroin to scientific or medical purposes, the manner of providing heroin in a controlled program is limited. The Australian research team involved in the feasibility study visited the United Nations' International Drug Control Programme in Vienna to confirm that the planned heroin trial would not breach international treaty obligations, because it was conducted for medical and scientific purposes (National Centre for Epidemiology and Population Health, 1992). However, gaining access to a sufficient amount of heroin through legal manufacturers is another problem issue that must be considered. Switzerland, for example, reportedly has problems accessing a sufficient supply of heroin for its expanded prescription program that can only be solved through negotiations with the United Nations International Narcotics Control Board, which regulates the amount of drugs that can legally be imported into a country (Obst, 1994).

4.3.2 Cost Implications

While a number of studies have supported the cost-effectiveness of general drug treatment (Gerstein et al., 1994; Ryan, White, and Ali, 1995), studies have not determined whether prescribing heroin is affordable. Experiences in Great Britain and Switzerland and calculations undertaken in Australia indicate that such a program is more expensive than methadone, but cheaper than placing users in therapeutic communities, a relatively expensive yet still affordable option (National Centre for Epidemiology and Population Health, 1995). Calculations undertaken for the Australian pilot study suggest that providing heroin treatment would add 10,000 Australian dollars (approximately \$7,500) per participant to methadone maintenance program costs (Brammer, 1995). This is, however, about

one-tenth of the cost an untreated heroin addict poses to the community (a cost estimated to range between 75,000 and 130,000 Australian dollars per year, which is approximately between \$57,000 and \$99,000) and considerably less than incarceration, which costs an estimated 48,000 Australian dollars per year (approximately \$36,000).

The high cost of program heroin—due to the small quantity of the drug needed for treatment and its limited production by legal commercial producers—adds to the already high cost of heroin prescription programs. The need for high security during production, packing requirements, shipment, storage, and dispensing also add to the costs of treatment, making injectable heroin twice as expensive as injectable methadone (National Centre for Epidemiology and Population Health, 1992). For the Australian and Swiss programs, in which heroin is or will be administered at a special clinic, there are substantial costs associated with staffing the treatment centers and keeping the centers open for extended hours. In Great Britain, where heroin is dispensed at pharmacies, high costs are associated with packing the drug in sterile ampules and with dispensing fees.

Furthermore, a large staff is needed to administer these heroin prescription programs, since they include more counseling and social assistance than provided in a standard methadone program; however, a larger staff also adds to program costs. If the program is successful in attracting more addicts, maintaining them over a longer period of time, and linking them to other social services, the costs will increase even further. The savings resulting from decreased crime and reduced enforcement and health care costs as a result of addicts' improved health conditions are difficult to estimate, as are other long-term improvements. Considering that a relatively small number of addicts will participate in these trials, any overall savings are likely to be small.

The concern about long-term costs of such programs has recently influenced individual prescribers to stop or limit this form of treatment in Great Britain (National Centre for Epidemiology and Population Health, 1995) and are likely to restrict the trials planned in the Netherlands (according to Dr. Derks, August 1995).

5. CONCLUSIONS

Results from studies on the advantages and disadvantages of a range of treatment services with different approaches show that one treatment or service does not work for everyone at all times. Mino (1990) concluded from his review of the existing literature that drug-free treatment programs, methadone maintenance programs, and heroin prescription programs all show comparable drug abstinence results for different groups of addicts. Therefore, not only are a range of treatments required but various supports are needed for addicts who request assistance without formal treatment.

Conclusions drawn from research studies on heroin and methadone prescription programs do not indicate superiority in either approach. Both treatments have advantages in some areas but at the expense of disadvantages in others (Hartnoll et al., 1980; Mitcheson and Hartnoll, 1978; Battersby et al., 1992). Prior research also indicates that prescribing heroin has a very limited role in the development of treatment alternatives.

These programs are generally seen as a way to catch and hold the small number of patients that otherwise are not amenable to treatment efforts (Battersby et al., 1992). Hartnoll and his colleagues (1980) argued that prescribing heroin is generally not superior to methadone but can supplement a methadone program for crisis situations or for specific sections of the addict population. For example, such prescription programs are especially beneficial for pregnant women, since studies indicate that heroin prescriptions are less harmful to the fetus than using methadone.

Even if the opiates with short half-lives, such as heroin and morphine, are insufficient in stabilizing addicts, in view of the high percentage of intravenous drug users among HIV cases, it must be considered that the currently available treatment modalities reach only a limited number of users and "cure" an even smaller number. It has been suggested that heroin maintenance has a preventive effect with regard to the spread of HIV (Gossop, 1994). Reinerman and Baumohl (1994) point out that heroin maintenance might allow a larger number of addicts to avoid exposing themselves and others to death by disease and the criminogenic and violent illicit drug market. Their lives would be far more stable and some

addicts might be enticed into methadone and other treatment programs. Heroin programs may provide a considerable benefit to society by increasing the stability in addicts' lives and decreasing pressure on them to support a costly drug habit with illicit activities.

Gossop (1994) points out that the British response has been characterized by a rejection of the search for illusionary master strokes that offer a radical solution to the drug problem. Instead, a greater willingness exists to secure multiple small gains, in pragmatic and flexible ways to meet the demands of changing circumstances. Recent literature reviews undertaken in Switzerland and Germany also conclude from current empirical data that the controlled provision of heroin and morphine is sensible, responsible, and feasible (Noller, 1990; Mino, 1990). However, if heroin prescription programs are to be developed, they require careful planning and managing according to the jurisdiction's and the addict community's needs in order to achieve success. These programs have considerable logistical and cost implications. They are likely to be more expensive than traditional methadone maintenance programs but also less costly than other currently accepted treatments, such as therapeutic communities. Finally, they are certainly less costly to a community than incarceration or nontreatment.

When considering heroin prescription programs, it must be considered that due to the small number of addicts involved in such a program, the overall impact on a country's drug problem also will be small. The Australian feasibility study warned that measuring the effectiveness of such a program can be difficult since the illicit drug market and its workings are still poorly understood (National Centre for Epidemiology and Population Health, May 1994). Considering the small number of addicts involved, the study suggests concentrating on program impact at the individual level rather than on the overall drug market.

It is especially important to note that none of the implemented or proposed experiments supports the legalization of drugs. However, all programs and proposals stress the need to strictly enforce drug crime and include close cooperation with local police departments (Adams, 1994; Marcks, 1992; Presse- und Informationsamt der Stadt Frankfurt, 1993).

In conclusion, heroin prescription programs can provide an additional treatment modality but only for a limited group of hardcore addicts that are otherwise not amenable to treatment. Such programs must be carefully controlled, well managed, and integrated with therapeutic and other assistance services to stabilize addicts' lives and influence them to become drug free in the long run. Heroin prescription programs are not a solution to a national drug problem; however, if they are implemented hand-in-hand with education and prevention programs, a broad range of treatment alternatives, and drug enforcement, they may represent a successful, long-term approach to reducing the considerable societal burden that hardcore heroin addicts place on a society.

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Treatment Protocol Effectiveness Study



Executive Office of the President
Office of National Drug Control Policy
Barry R. McCaffrey, Director

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