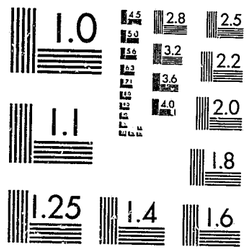

MANAGING CORRECTIONAL RESOURCES

Economic Analysis Techniques

by

Billy L. Wayson
Gail S. Funke
Gregory P. Falkin

Managing Correctional Resources

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Program Models are a synthesis of research and evaluation findings, operational experience, and expert opinion in a criminal justice topic area. Each report presents a series of programmatic options and analyzes the advantages and disadvantages of each. The intent is to provide criminal justice administrators with the capability to make informed choices in planning, implementing, and improving efforts in a program area. The Models may also serve as a basis for testing and demonstration efforts.

The following individuals provided information and assistance in the conduct of this study.

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Foreword

This Program Model provides new and valuable information in an area of great concern to correctional administrators: the use of economic techniques -- cost, cost-effectiveness and cost-benefit analysis -- in program evaluation. Like other Program Models, it synthesizes research and evaluation findings, operational experience and expert opinion. But this Model presents information that is of utility across criminal justice topic areas. In addition, it utilizes a twin focus: the identification of the decisions which can be informed using economic analysis; and an explanation of how to use each technique.

Several project activities were used to develop the model: literature research; telephone survey; site visits; collection of relevant surveys; advisory board; and, advice from NIJ staff. Thirty jurisdictions which sponsor applied correctional research were identified by the American Correctional Association (Jay Worrall, Strategies for the Utilization of Correctional Research and Evaluation) and were interviewed through a telephone survey. The results (Appendix A) showed that about 50 percent had conducted economic studies, but more commonly used the techniques as a component of a larger evaluation. Most respondents expressed interest in greater use of economic analysis but cited insufficient personnel and inadequate skills as constraints. Another source for state-of-the-art information was a survey of 750 probation departments being conducted by the California Probation, Parole and Correctional Association and funded by the Law Enforcement Assistance Administration. One purpose of this survey was to identify and collect economic studies which the Association shared with IEPS staff. The findings from this survey bore out the results of the telephone survey: economic analysis was used, sometimes in isolation, but usually as part of a broader analysis; in addition, many agencies lacked the resources or skills to adequately conduct economic analysis.

The site visits then focused on gaining an in-depth understanding of the state-of-the-art of economic analysis as applied in the field of corrections and to receive viewpoints and suggestions for the Program Model. Visits were made to Florida, Virginia, Colorado and California (states representing a spectrum of research capabilities and applications of economic analysis techniques).

The major findings of the on-site studies were that there is a considerable need to clarify definitions pertaining to economic techniques, to explain the methodology behind the techniques and to describe which technique is the appropriate one to use. As a result of the field interviews, the Program Model began to take on a decision-oriented focus. It became clear

that the Model would need to address three issues. The first was the lack of understanding about the utility of economic analysis to inform a wide variety of decisions, in fact a much wider set than commonly believed. Second, information was needed on the kinds of decisions which can be facilitated by the use of economic information. Last, there was considerable ambiguity about how to actually use the techniques.

From these revealed needs and the advice of the advisory board and NIJ staff (and their concern that agency administrators and program managers be a principal audience), the dual focus of this Program Model was developed. It is directed toward decisions that can be informed by using results from cost, comparative cost, cost-effectiveness and cost-benefit studies, but also provides a detailed explanation of the techniques. The decision focus of this Program Model is derived from the various surveys and interviews with program managers. The "how to do it" sections are derived from actual program analyses collected independently by Institute staff and developed as case studies to stress both the decision focus and provide clear direction on actual application of the technique.

The volume begins with a chapter on decisionmaking, followed by chapters on the techniques -- cost, cost-effectiveness and cost-benefit analysis. There are three central decisionmaking themes: using cost analysis for budgeting; using cost-effectiveness analysis for assessing effectiveness in meeting correctional objectives; and, using cost-benefit analysis for assessing the return on investments in corrections. Each technique is introduced by discussing the decisionmaking theme it most appropriately addresses. Then, one or more applications of each technique are presented to show how the analysis is done. The general pattern is to begin with examples to show managers what technique is appropriate for what type of decision. For example, deciding whether to fund program A or program B may require cost analysis if the decision is one of cost minimization; if the decision is to maximize "output," then the appropriate technique would be cost-effectiveness analysis. Each example or cost study is presented to stress the context in which decisions are made. More abstract concepts are presented for the analyst in "Points to Remember" at the end of each chapter. A final chapter summarizes the critical points and the bibliography lists published and unpublished reports on the application of economic analysis to correctional issues.

At a time when budget constraints, resource allocations and public pressures have combined to make correctional agency decisionmaking ever more difficult, this Program Model provides critical, needed information on budgeting, analyzing program effectiveness, and selecting programs which represent the best management of scarce resources.

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Alexandria, Virginia
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Acknowledgements

This Program Model could not have been written were it not for those who have contributed to the field of correctional economics. We have attempted to synthesize their work and have relied heavily on a select number of studies. The studies selected for explanation were drawn from the work of a research community that has in the last decade produced economic analyses of increasingly greater quality.

We would like to thank each of the Advisory Board members. This Program Model benefited tremendously from the different perspectives yet mutual concerns of William Brennan, American Correctional Association; David Craig, Connecticut Department of Corrections; Sally Familton, Governor's Commission on Law Enforcement and the Administration of Justice, State of Maryland; Robert Morford, Tennessee Department of Corrections; and David Weimer, University of Rochester. As authors, we could not have asked for a more encouraging and supportive Advisory Board.

During the course of preparing the Program Model we had two project monitors. Frank Shults (currently the Congressional Liaison for the Drug Enforcement Agency) played an active role in the developmental stages of the Program Model. Thomas Albrecht of the National Institute of Justice helped us through a smooth finish. We greatly appreciate their assistance and support.

Finally, we have saved to last our deepest gratitude for the two people who did the hardest job of all. Jan Coffinberger and Joan Peterschmidt typed, proofread, edited and retyped several drafts of the Program Model. The printed page -- as fine as it may read -- cannot tell of the pleasure they are to work with.

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Chapter 1

INTRODUCTION

In the past few years correctional officials have become aware more than ever before of the problem of economic scarcity. The demands placed on correctional resources in a time of rising crime have been escalating faster than correctional budgets. Correctional officials often have to do more with less. They have to meet professional standards without increases in resources. They have to accommodate increased correctional populations often without a commensurate increase in funding. The pressures to do well, that is, to manage resources efficiently and to produce effective results, have become paramount concerns among correctional officials. This Program Model is intended to assist correctional decisionmakers in allocating resources through the use of economic analysis. An illustration of how economic analysis can inform the allocation of correctional resources will highlight some important points about its use.

Over the last four years a commissioner of correction faced four key decisions in allocating resources to the department's halfway houses. Beginning in fiscal year 1976, a new release policy was established that would increase the number of parolees in community release centers. Plans were developed to convert an old hotel into a halfway house designed to hold 50 clients. The commissioner had to present his budget to the governor with a justification for the new halfway house and an analysis of the conversion cost and its operating cost.

The commissioner called upon the budget staff to prepare the cost estimates. The budget staff estimated that it would cost a quarter of a million dollars to rehabilitate the hotel and $300,000 to operate it as a halfway house during the year. The governor felt that this was too much to spend -- resources for all government programs were becoming relatively scarce -- so the commissioner's budget was reduced. The department would get enough money to renovate one floor of the hotel and operate it with 25 clients. The cost analysis showed the commissioner and the governor the economic consequences of the release policy. As a result, the commissioner revised his policy so that fewer prisoners would be placed in halfway houses.

During the following year, there was again a need to increase the number of individuals placed in halfway houses, and the same funding issue resurfaced.

This time the governor's budget staff acquiesced and agreed to renovating the second floor of the hotel for a quarter of a million dollars. However, the governor's assistant for criminal justice raised the issue of whether there were any viable alternatives to expanding the department's halfway house operation. In particular, he wondered whether it would cost the state less if the Department of Correction contracted with private halfway houses instead of operating one itself. The budget staff conducted a comparative cost analysis and found that it would cost $22.50 per client per day if the department operated the halfway house and $24.00 per day if it contracted with the private sector. The comparative cost analysis pointed to the fact that although there would be a $1.50 savings on the average, contracting would not require any additional correctional positions. Since the governor was trying to hold down government employment, a decision was made to contract with private halfway house operators.

In the third year, FY 1978, the question of the effectiveness of the release policy was raised. There again had been an increase in the release rate and the governor's staff began to wonder whether it was worth having the department operate another halfway house or contract with the private sector. They raised the issues of whether residential programs were really more effective than non-residential alternatives and whether residential programs were worth the extra cost. The commissioner contracted with an independent consulting firm to compare the cost-effectiveness of residential and non-residential programs.

The analysts determined that there were three objectives of all prerelease programs. These objectives are to reduce recidivism, to assist ex-offenders in finding employment and to help them readjust to community life in general. These objectives (or desired effects of the program) were measured against the following criteria: the rearrest rate; the number of jobs acquired; and the number of hours of counseling provided. The conclusions drawn from the cost-effectiveness analysis were that non-residential programs were more cost-effective in securing jobs, residential programs were more cost-effective in providing counseling, and both were equally cost-effective as far as recidivism was concerned. Based on the study, the commissioner expanded the use of non-residential programs in FY 1978; he did not increase halfway house capacity.

In FY 1979, the same issue resurfaced. A few of the department's smaller halfway houses in the state's largest city were becoming dilapidated. Therefore, the commissioner wanted to close them down and build a new halfway house for 50 clients. A cost-benefit analysis was conducted to determine whether investing in a new halfway house was economically prudent. The analysis showed that the benefits outweighed the costs (by a ratio of 1.5 to 1) and a decision was made to build the new halfway house in place of repairing the old ones.

The preceding story highlights two important points. First, it shows that economic analysis can inform correctional decisionmaking when the allocation of resources is involved. In this regard, economic analysis can be a powerful tool in several significant ways. It can provide correctional decisionmakers with the information they need to make informed choices when allocating resources. In addition, economic analyses have often been used quite effectively to persuade legislators that funding a particular program is justified. Thus, economic analysis can be a major force in acquiring resources for corrections as well as in allocating them to programs.

Second, this example shows that the particular questions that decisionmakers have determine the kinds of analyses that should be conducted. There are several kinds of resource-related questions, and consequently the choice of the appropriate technique (e.g., cost analysis, cost-benefit analysis) may be as important as the answers sought.

1.1 The Focus of the Program Model

This Program Model is intended to foster a greater awareness of the role of economics in correctional decisionmaking and a greater understanding of how to apply its various techniques to correctional decisions. It is written for both the decisionmaker and the analyst, because each needs to better understand the requirements of the other. This chapter provides an overview of the Program Model by describing its focus, development and organization. The major premise on which the Program Model is based is that correctional decisions that involve resource allocations will be improved if they are based on a more realistic understanding of their costs and consequences.

This Program Model is intended to improve correctional decisions by providing the basis for a more accurate assessment of their economic implications. In this respect, the Program Model serves a dual purpose. It is designed to clarify for correctional decisionmakers how economic analysis can be used to inform their decisions, and it explains in lay terms for correctional practitioners and researchers how to apply economic techniques to correctional decisionmaking.

The Program Model has two primary focuses, namely, the uses and techniques of economics as they pertain to corrections. These two emphases are mutually reinforcing. Correctional decisionmakers who read the Program Model will learn when economic analysis is useful and which technique is most appropriate to the decision being made. Correctional researchers and analysts will learn how to apply various economic techniques in a way that will be responsive to the concerns of decisionmakers. Decisionmakers who become

more aware of the importance of economics are likely to ask for more analyses. As their staffs become more proficient in applying economic techniques, they will be better able to provide decisionmakers with the economic analyses decisionmakers need.

1.1.1 Decision Focus

This Program Model, then, focuses on public sector decisions which may be informed by the use of economic analysis. Economic analysis concerns itself with decisions involving resource allocations. Examples of these decisions are how much money to allocate to a drug treatment program, whether to fund a residential program or a non-residential program, whether to invest in a prison, and so on. Thus, the range of correctional decisions which can be informed by economic analysis is quite broad. The focus of this Program Model, then, is twofold and addresses decisionmaking and analytical needs. The Program Model will:

- identify the economic analysis techniques required to inform decisions involving resource allocations; and
- explain how to use each technique.

The type of decision being made dictates the type of economic analysis technique which should be used to provide information. In other words, prisons do not require a different analytical technique than probation or jails. Rather, the type of analysis used depends on the question being asked.

The critical question that this Program Model addresses is: What do decisionmakers want or need to know before making choices that involve resource allocations? The answer can be gleaned from the focus of the decision. In all, there are four distinct decision focuses:

- how much to allocate to a single program;
- whether to allocate to one program or another;
- how effectively will the objectives of a program be achieved;
- how efficient is the expenditure.

Clearly, these questions can be asked of any sector of corrections.

Each successive decision focus involves a more sophisticated choice and requires a greater amount of economic information. The first decision focus is on the cost of a particular program. For example, the commissioner of corrections may need a cost estimate for a new prerelease center to decide whether to request funds. The second decision focus is on two or more alternatives. In this situation, the commissioner may be deciding whether to have the department operate a halfway house or contract for these services with the private sector. In any event, the first two decision focuses require cost estimates only.

The last two decision focuses require information on the outcomes of resource allocations. The third decision focus is on the effectiveness or performance of programs. In other words, the decisionmaker needs to know what will be achieved for a given expenditure. The specific decision generally involves two or more programs. For example, the commissioner may want to know whether it is more effective to have the department operate the halfway house or provide non-residential services. Decisions of this nature involve resource allocations, but the focus is on the effects of programs as well as their costs.

The last decision focus is on efficiency. An efficient allocation of resources is one that produces the greatest benefits for the least cost. The decision may be whether to increase, reduce or stop funding a halfway house. In this case, the decisionmaker may want to know how well the goal of reintegration is being achieved. In other words, are funds being expended in an efficient manner? Consequently, information on the costs and benefits of the program will be needed. In conclusion, the particular focus of the decision determines the kinds of economic information that are needed.

1.1.2 Analytical Focus

The second focus of the Program Model is on providing decisionmakers with the economic information they need. Not only does economics look at resources, scarcity and choice, but it also approaches these by looking at the relationship between inputs, processes that change these inputs and the results. This concept of input-process-output is analyzed in public sector programs using several techniques:

- cost analysis -- if the decision focuses on the cost (input) of a particular program;
- comparative cost analysis -- if the decision focuses on the costs (inputs) of alternative programs, processes, operations, or organizations;

- cost-effectiveness analysis -- if the decision focuses on multiple effects or objectives (outputs) of programs and compares the performance of alternative programs;

- cost-benefit analysis -- if the decision focuses on efficiency (outputs), particularly the return on investments.

A major purpose of the Program Model is to explain when and how to use these various techniques. Figure 1-1 highlights the main features of each technique. The "simplest" form of economic analysis is cost analysis because it provides information on inputs or resources. When information on outputs (i.e., what is being "produced") is required, then cost-effectiveness or cost-benefit analysis is the appropriate technique. Each type of analysis incorporates the technical requirements of its predecessor but also introduces new procedures. Cost analysis values the inputs -- labor, plant and equipment, supplies -- used in a particular activity, for example, the costs of a drug treatment program. Comparative cost analysis assesses the difference in the value of the inputs for two or more alternative activities or programs. Comparative cost analyses could be conducted for a drug treatment program in the community versus one operated by a prison, two halfway houses, three non-residential treatment programs, new construction versus renovation. Cost-effectiveness analysis is used when outputs (units of service delivered, jobs secured, recidivism) can be measured and evaluated against the costs of the inputs used to "produce" them. Finally cost-benefit analysis compares the cost of the inputs with a monetary measure of the outputs (increases in earnings, reduction in criminal justice costs).

1.2 Development of the Program Model

This Program Model originated from the concerns of officials at the National Institute of Justice that corrections was entering a new era. Fiscal reality would necessitate that correctional policymakers pay greater attention to economics. Furthermore, their staffs would be required to conduct more economic analyses than ever before. It was envisioned that a document explaining how to apply economic techniques to correctional decisions would enhance the position of correctional policymakers and the capabilities of analytical staffs. Several developments in criminal justice have converged to make this a propitious time for disseminating a Program Model which will assist correctional decisionmakers in making the difficult economic choices facing them.

The expanded use of halfway houses since the mid-Sixties was commonly justified on the basis of cost as compared to prisons, independently of any treatment benefit they produced. Tax payments, family support, and agency

Figure 1-1

Economic Analysis Techniques

Technique	Decision Focus	Analytical Focus	Examples
Cost Analysis	How much does an existing program or activity cost? How much should be allocated to one program or another?	Assesses the cost in inputs (i.e., the value of resources) used in a process, program or activity.	Cost of a drug treatment program. Cost of a prerelease center. Cost of a prison.
Comparative Cost Analysis	Whether to allocate resources to one program or another?	Compares the cost of inputs used in two or more programs or activities.	Compares costs of a prerelease center staffed by DOC with private sector operation. Compares new construction costs with renovation.
Cost-effectiveness Analysis	How can program results be maximized, given a budget? How can costs be minimized, given a desired level of results?	Measures the effects of two or more programs and relates them to inputs (i.e., cost).	Compares residential programs with non-residential programs. Compares prisons offering intensive counseling, training and education with prisons that emphasize security.
Cost-benefit Analysis	How efficient is an expenditure? Is an investment economically sound?	Measures the dollar value of program benefits and relates them to cost (return on investment).	Assesses the return on investments on - prisons - halfway houses - diversion projects - jails - prison industries.

reimbursements were other economic arguments used to support both community centers and work furlough programs. The advent of pretrial programs in the Seventies was justified, in part, by the assumption that they were less costly than holding someone in jail while awaiting trial. However, it was not until 1974-75 that a consistent set of cost estimates was made for these and other correctional programs. But, even these estimates begged the ultimate question of which option was most cost-effective.

The major obstacles to answering this question have been the scarcity of information on clients following program termination and a paucity of evaluations by social scientists other than economists on the effects of different correctional alternatives. The first obstacle is slowly being mounted by the installation of compatible information systems in more and more criminal justice agencies. As graduate-level education in criminal justice and operating-agency research have grown, so too have the number and quality of program evaluations.

A final development has been an increased interest in and research on measuring the performances of correctional agencies. This has served to clarify operating-agency goals and objectives, to define measurements for these goals, and to describe how performance can be assessed.

Improved information systems, more program evaluations, refined performance measures and consistent approaches to cost-estimation can each contribute to using economic analysis to address questions of effectiveness and efficiency at a time when answers are needed.

In general, Program Models are intended to provide criminal justice administrators with the capability to make informed choices in planning, implementing and improving programs. Based on a synthesis of research findings, operational experience and expert opinion in the area, Program Models analyze the advantages and disadvantages of program options. They provide administrators with sufficient information with which to "model a program." It was envisioned that the Program Model on economic techniques would also be designed to improve programmatic decisions but that it would be somewhat different from the others.

This Program Model is atypical primarily in the sense that it does not provide a model to follow in developing a program. For example, given the fact that budgets are becoming more constrained at a time when costs are rising, efficiency is a worthwhile, indeed, essential value for corrections. It would be misleading, however, to suggest that by following the prescriptions of a document such as this one an organization would automatically become efficient. The best we can hope to offer is some direction and guidance along that route. By beginning to use the Program Model as a source

for increasing the use of economic analysis in a wide variety of decisions, an agency will make great strides towards efficiency. Thus, rather than set forth a number of prescriptions to achieve efficiency, we will demonstrate how various economic techniques can be used to:

- estimate the costs of programs;
- compare resource costs among programs;
- evaluate the performance of programs in economic terms;
- assess the efficiency of investments in corrections.

Just as it is impossible to provide prescriptions for efficiency, we cannot provide a single model to follow in conducting an economic analysis. No single model can be used because the specific factors or variables on which decisions are based determine the analysis. For example, it would be impossible to apply a cost-benefit model of a prison industry to a juvenile diversion project. Since the model will vary depending on the program being analyzed, a major purpose of the Program Model is to provide guidelines for applying the economic techniques in various situations.

As with other Program Models, it was prepared by following a fairly standard protocol. In the first phase, thirty states were contacted in a telephone survey. The purpose of the telephone interviews was twofold: (1) to gain insights into the nature and functions of correctional research in departments of corrections throughout the nation, and (2) to assess the "state-of-the-art" in the application of economic techniques to substantive research in corrections. Approximately half the states contacted have used economic techniques in their research, primarily in program evaluation, budgeting and fiscal impact statements. Although many states did not use economics most of them expressed an interest in doing so. (A synopsis of the telephone survey and the survey instrument are contained in Appendix A.)

In the second phase of the project we conducted on-site field studies in a few states selected from the telephone interviews. The purposes of the site visits were to gain an in-depth understanding of the state-of-the-art of economic analysis as applied in the field of corrections and to receive viewpoints and suggestions for the Program Model. The major findings of the on-site studies were that there is a considerable need to clarify definitions pertaining to economic techniques, to explain the methodology behind the techniques and to describe which technique is the appropriate one to use. As a result of the field interviews, the Program Model began to take on a decision-oriented focus.

The emphasis, as we explained earlier, would be on providing decisionmakers with more accurate assessments of the economic implications of their decisions. Thus, the final phase of development was to pull together a number of examples of how economic techniques have actually informed correctional choices. Having had considerable experience in precisely this area, the Institute for Economic and Policy Studies, Inc. (IEPS) was prepared to write a Program Model.

1.3 Overview of the Program Model

The Program Model is organized around the theme of using economic techniques in correctional decisionmaking. Its dual focus requires that it be written for both decisionmakers (users) and analysts (technicians). Accordingly, the Program Model is organized around the needs of both kinds of readers. Chapter Two describes cost analysis and comparative cost analysis; Chapter Three explains cost-effectiveness analysis; Chapter Four describes cost-benefit analysis; Chapter Five summarizes the techniques.

Each chapter is divided into three sections: (1) theme, (2) applications, and (3) points to remember. Chapters are written around a central theme which is explicated in the first section. The theme in Chapter Two is how cost analysis can be used in the budget process. The theme in Chapter Three is how cost-effectiveness analysis can be used to assess the effectiveness of correctional programs in meeting their objectives. In Chapter Four the theme is the use of cost-benefit analysis to assess the return on investment in correctional programs. After discussing the themes, one or more actual applications of the technique are described. For example, we show how cost analysis can be used to develop a model budget and how cost-benefit analysis can be used to assess the return on investment in a diversion project. All the applications in the Program Model are taken from analyses that have actually had some bearing on correctional decisionmaking in the past. Only minor modifications in the analyses (such as changes in data) have been made to simplify the explanation of some of the complex studies. Finally, general guidelines for conducting analyses are presented. In this manner, the reader learns first of specific applications of the technique and then how to apply it to other areas which may be of concern to decisionmakers.

Chapter 2

COST ANALYSIS

In this chapter, we describe the most basic and most widely used economic technique. Cost analysis is at the heart of virtually all economic analyses because economists are first and foremost concerned with the value or cost of resources. It is the most simple analytical technique to apply, and perhaps for this reason it is the one most commonly used. Although cost analysis has tremendously wide applicability to corrections, we will demonstrate its use primarily as it can be applied to budgetary decisions.

2.1 Cost Analysis in the Budget Process

Decisionmakers have two related concerns about budgeting. They are concerned with allocating resources to programs or activities and with acquiring funds. The decision as to how much to allocate or budget for programs is often influenced by political reality, that is, by the availability of funds. However, the development of sound budgets requires information on the costs of programs. Furthermore, budget requests are more supportable and more likely to be viewed as reasonable if they are justified on the basis of cost analyses. Therefore, economic analysis can play an important role in the budgetary process.

Budgetary decisions require two sources of information which cost analysis can provide. First, all budgetary decisions require information on the price of resources. By "price of resources" we refer to the value of the capital and labor used in corrections. For example, it may cost an agency $12,000 per year to employ a correctional officer with a certain level of job skills and experience. Cost information such as this is usually readily available because most salaries are standardized according to civil service regulations. Other costs, such as the cost of prison security or probation services to the court, are not nearly as obvious. Indeed, estimating such costs may require a considerable amount of expertise on the part of the analyst. Thus, the first purpose of cost analysis in the budget process is to provide decisionmakers with information on the resource costs of existing programs and activities.

The second function of cost analysis is to project costs so that resources can be allocated. In this context, decisionmakers are concerned with how much to allocate to an organization or a program. For instance, the commissioner of corrections may wish to establish a new halfway house. He or she will want to know how much it will cost so that a request for funds can be included within the department's budget. Cost projections are essential information to a decisionmaker considering a new program such as establishing halfway houses, building prisons, setting up drug treatment programs, and so on.

2.2 Applications of Cost Analysis

To demonstrate how cost analysis can be applied to correctional budgeting, we describe five examples where it has been used successfully in the past. The purpose of presenting the applications is twofold. First, the reader will gain insights into the areas in the budgetary process that cost analysis can inform. Second, several different cost analysis techniques will demonstrate how cost estimates are developed for various kinds of decisions and from alternative data sources. Together, the examples show how economic information is prepared and utilized in the decisionmaking process.

A brief explanation of the five examples will put them in context. As we mentioned earlier, cost analysis is used for pricing existing programs or estimating future costs of planned programs. The first two examples demonstrate how to estimate the cost of existing programs. In the first example, we explain how to calculate the average daily cost of a House of Corrections. In the second example, we show how to prepare a program budget for a prison system. The techniques for estimating costs in these two examples have wide applicability for corrections. In short, they can be used to inform policy choices in all spheres of corrections.

The last three examples show how cost analysis can be used to provide decisionmakers with information for planning purposes. We show how to estimate the cost of (1) expanding prison capacity using a variable cost function, (2) providing probation services to the court using the model budget technique, and (3) establishing a new halfway house using the sample budget technique. Whereas the first four applications are strictly cost analyses, the last one is a comparative cost analysis. As with the cost analysis techniques for estimating the costs of existing programs, techniques such as model and sample budgeting have wide applicability for correctional decisionmakers.

In addition to the various cost analysis techniques, the reader should pay particular attention to our treatment of the following concepts: capital,

cost allocation, workload measures, opportunity cost, variable cost and fixed cost. Each of these concepts is explained intuitively in the examples and their general application is made explicit in the section on points to remember. In addition, the reader can refer to the glossary for quick, concise definitions of these and other economic concepts presented throughout the Program Model.

To clarify the various uses and techniques of cost analysis, we begin each application with a concise explanation of the decision focus. We then provide some background information to put the decision in context. The next subsection explains the analysis in detail. We conclude with a discussion of how the analytical findings would be used to make the decision.

2.2.1 Average Daily Cost

The county sheriff operates a House of Corrections which holds sentenced misdemeanants. The state has been facing serious overcrowding in its prisons and has an immediate need for more bed space. The Department of Corrections (DOC) would, therefore, like to purchase the House of Corrections (HOC) from the county and utilize it for state prisoners. If such an arrangement should take place, the DOC would accept county prisoners and charge the county $28.00 per day.

Decision Focus. The focus of the decision is whether it would be financially prudent for the county to sell the HOC and pay the state $28 per day to hold county prisoners. The current average daily cost as reflected in the HOC budget for fiscal year 1981 is $25.84 per inmate per day. If this figure is accurate, then the county would lose $2.16 on the average if the HOC were run by the state. However, the sheriff and the DOC claim that the average daily cost reflected in the budget understates the true operating cost. If the actual cost is higher than $28, then the county would save money by paying the state for holding county prisoners. Thus, the critical decision variable is the real average daily cost to the county for operating the HOC.

Background. The HOC holds approximately 225 sentenced misdemeanants serving an average sentence of 9 to 10 months and about 70 pretrial detainees. Currently, pretrial detainees are held in a separate part of the HOC which serves as the county jail. However, the sheriff plans to move the jail (pretrial) population in the near future into a new facility in the courthouse. There are 107 staff for the HOC and 78 positions are authorized for jail operations. The HOC is somewhat understaffed, while the jail now has excess staff; so it is not uncommon for the HOC to borrow jail staff.

The HOC is an older, medium security facility located in a semi-rural section of the county on 178 acres. Adjacent to this land is an additional 190 acres controlled by the HOC but not utilized in its operation. The HOC is located in a section of the county zoned "rural-residential" where land is valued at approximately $5,000 per acre. The county population, which is clustered in urban areas is 1.4 million. The approved county budget for fiscal year 1981 is $32.7 million or approximately $23.43 per capita. Of this, 11.9% or $3.9 million is allocated to corrections (i.e., $2.81 per capita).

There are three components to the count correctional budget: HOC, sheriff, and jail. These budgets are presented in Table 2-1 for fiscal year 1981. The total HOC budget is $2.1 million. It combines seven objects of expenditure and methods of payment budget components: personal services, contractual services, supplies and materials, current changes, equipment, and structure and improvements. In addition to the HOC budget, the county has separate budgets for the sheriff and the jail. The sheriff's budget is $167,500; it finances salaries and transportation. Transportation services (which include court trips, hospital trips and movement of prisoners) are included in the sheriff's budget. A special unit of eight transportation officers was set up because the vagaries of transportation planning created excessive overtime under HOC administration. The jail, which is operated and financed independently of the HOC, has a budget of $1.6 million. The total county correctional budget is over $3.9 million.

From the background information presented so far, we can draw the following conclusions. The HOC budget of $2.1 million translates into an average daily cost of about $26 since there are roughly 225 prisoners per day. (Average daily cost is calculated by dividing total cost, $2.1 million, by the average number of prisoners per day.) The HOC budget excludes costs associated with the sheriff's office and the jail. HOC costs are, therefore, understated to the extent that the sheriff and jail budgets finance HOC operations. We can quickly surmise that the average daily cost cannot be calculated accurately from the HOC budget alone. The following subsection will analyze the three budgets to calculate the real economic cost of the HOC to the county so that the decision to transfer control to the state can be made on the basis of the true average daily cost.

Cost Analysis. The economic analysis essentially follows a two step procedure. First, the HOC budget is restructured. This is done because the accounting categories (i.e., objects of expenditure and methods of payment) are inconsistent and because expenditures for new plant and equipment are erroneously included in current operating costs. Second, costs that are not reflected in the HOC budget are calculated and added to the HOC budgetary costs. There are seven categories of cost which are not included in the HOC budget:

- jail staff at HOC

Table 2-1

County Correctional Budgets, FY 1981

A.	House of Corrections		
	1. Personal Services	$1,447,686	
	2. Contractual Services	110,650	
	3. Supplies and Materials	417,675	
	4. Current Charges	38,735	
	5. Equipment	88,012	
	6. Structure and Improvement	28,700	
	TOTAL		$2,131,458
B.	Sheriff's Budget		
	1. Personal Services	21,400	
	2. Transportation Services		
	2.1 Personal Services	108,900	
	2.2 Vehicle Maintenance and Repair	37,200	
	TOTAL		167,500
C.	Jail		
	1. Personal Services	1,436,586	
	2. Contractual Services	21,400	
	3. Supplies and Materials	137,550	
	4. Current Charges	22,336	
	TOTAL		1,617,872
	TOTAL		$3,916,830

- fringe benefits;
- sheriff's salary;
- transportation;
- administrative overhead;
- federally funded programs;
- land, plant and equipment valuation.

We begin the cost analysis by adjusting the HOC budget for long-term capital costs. Capital refers to physical plant, land and equipment. Capital costs may be incurred as operating capital costs (i.e., annual costs associated with using an existing capital stock) and new costs (spent on capital improvements or additions to the stock). These costs are budgeted in the year that the capital stock is utilized, improved or expanded. Capital improvements and expansion may be incurred as one-time expenditures and are included as line items in the budget. However, new capital costs overstate the operating cost for the year because the life of the capital stock is increased with capital improvements and expansion. Therefore, from an economic perspective, new capital costs should be distributed over the life of the capital (amortized) rather than be included in the operating costs the year they are incurred. Regardless how much is spent on capital during a year, the annual operating cost (and average daily cost) should only include costs associated with the use of capital for the year.

New capital costs for the HOC include plant and equipment acquisitions. Additions to plant include a new water main costing $4,500 and kitchen and dormitory renovation, repairs to the water tank, and permanent athletic improvements costing $16,350. Purchase of equipment (e.g., automobile, electrical kitchen) will cost $46,150. The combined total for new capital costs is $67,000.

As we suggested earlier, it would be inappropriate to include $67,000 for new capital in FY 1981 operating costs. The capital improvements and additions will last far beyond 1981. The proper way to handle this is to determine the life of the capital and depreciate new capital costs. There are several different methods of depreciation. For example, a straight line depreciation would show that if the $67,000 spent on new capital (equipment) would last 25 years, then the cost in FY 1981 would only be $2,680. The straight line depreciation is calculated by dividing the total capital ($67,000) by the number of years (25) that it will last. Different kinds of capital have different lifetimes (e.g., office furniture may be 10 years, buildings may be 50 years). For the purpose of this analysis, it was determined that the equipment would last 25 years; therefore, only $2,680 of the $67,000 expended for new capital should be attributed to FY 1981. Accordingly, the HOC budget should be adjusted downward by about $64,000.

It is worth noting that $2,680 in new capital costs adds only a few pennies to the average daily cost. Major capital improvements or additions could add significantly to average daily cost. Rather than add the depreciated value of new capital to operating costs, we exclude the full amount ($67,000) from operating costs. We exclude it primarily because if the state takes over the HOC, the full amount of new capital costs is likely to be figured into the value of the HOC in agreeing on a purchase price.

After the budget is adjusted for capital expenditures, several cost components still not included in the HOC budget should be added to HOC costs. We should note that cost estimates should normally be made from expenditures which are actual outlays, rather than budgets which are only intended allocations. In this example, however, we use budgetary data because we are interested in the average daily cost which is based on the budgets. Some jail staff, for example, work at the HOC but are funded from the jail budget. Table 2-2 shows that two senior correctional officers and 9 correctional officers funded from the jail budget are allocated to the HOC. Since they work at the HOC their salaries ($121,209) should be added to HOC costs.

Table 2-2

Jail Staff Allocated to the House of Corrections

Position	Number	Salary
Senior Correctional Officer	1	$ 13,573
Senior Correctional Officer	1	13,650
Correctional Officer	1	11,246
Correctional Officer	1	10,649
Correctional Officer	1	10,719
Correctional Officer	6 (@ $10,228)	61,370
TOTAL	11	$121,209

Fringe benefits are also excluded from the HOC budget. They are paid by the county from the treasury and should, therefore, be included in HOC costs. Estimates of fringe benefits were made by interviewing officials of the county personnel office and converting the data into reasonable approximations of fringe benefits. Table 2-3 shows the calculation of fringe benefits. Medical insurance is paid at the rate of $764/year for married employees and $303/year for single employees. Since approximately

Table 2-3

Fringe Benefits

A. Medical Insurance

Employees	Rate	Cost
103 Full-time HOC	$533.50	$54,950.50
11 Half-time HOC	266.75	2,934.25
11 Full-time Jail	533.50	5,868.50

B. Retirement

Total Eligible Salaries		
$1,407,696	.07	$98,539

C. Total Fringe Benefits

Medical Insurance	$ 63,574
Retirement	98,539
TOTAL	$162,293

half of the employees are married, the average insurance rate is $533.50. The insurance rate for half-time employees is $266.75. The total medical insurance fringe benefit costs the county $63,754. The county also pays a retirement match of 7% of annual salaries. The cost of retirement benefits is $98,539. The total cost of fringe benefits is, therefore, $162,293.

The sheriff spends about half his time operating the HOC. His annual salary of $21,400. Therefore, about $10,700 of his salary should be included in HOC costs. In addition to his salary the county pays fringe benefits. Since the sheriff is married, his medical benefits cost the county $764 per year. His retirement benefits cost $1,498 (7% of $21,400). Thus, the total fringe benefit costs $2,262. Of this, half should be allocated to the HOC. The total cost of the time the sheriff spends administering the Hoc is $11,831. This should be added to HOC operating costs.

Transportation costs are reflected in the sheriff's budget. Part of these costs should be allocated to the HOC. Table 2-4 shows the number of trips, the average time per trip and the total hours for transporting HOC and

Table 2-4

Transportation Cost Allocation

A. House of Correction	Number of Trips	Average Time	Total Hours
1. Court	3	6.0	18.0
2. Hospital	27	4.75	128.25
3. Transfers	6	6.0	36.0
TOTAL	36		182.25
B. Jail			
1. Court	84	2.75	231.0
2. Hospital	6	3.75	22.5
3. Transfers	0	-	-
TOTAL	90		253.5
C. TOTAL	126	-	435.75
D. HOC Share	29%	-	42%

jail prisoners. The total transportation budget (from Table 2-1) is $146,100. Part of this should be allocated to the HOC. The critical issue is using an appropriate method of allocation. The allocation could be made according to the number of trips or the time it takes to make the trips. The latter is the preferred method because transportation costs always depend on how long trips take, not merely the number of trips made. The HOC share of total trips is 29%; however, this would understate HOC costs because HOC trips take longer than jail trips. The HOC share of total hours is 42%. Since the transportation budget depends on both the number of trips and their length of time, 42% of the transportation budget should be allocated to HOC costs. Thus, HOC transportation costs $61,362.

Administrative overhead is next added to HOC costs. Overhead costs include the resources that agencies such as the treasurer's office spend administering HOC budgeting, personnel, and other matters. Administrative overhead may be viewed as an opportunity cost. In essence, if the HOC is transferred to the state, overhead costs could either be used to administer other county programs or reduce the total county budget. There are several

ways to estimate the value of services provided to the HOC by various county offices. Ideally, a workload analysis of the commissioner's staff, treasurer's office and similar administrative agencies would be used to determine the proportion of the costs to be allocated to the HOC. In the absence of a workload analysis, we allocate the proportion of the administrative agencies' budgets that is associated with overseeing the HOC operation, issuing HOC paychecks, auditing HOC books, etc. The HOC budget for FY 1981 is estimated at about $2,420,000 or 7.5% of the county budget ($32.7 million). The administrative overhead for the HOC is 7.5% of the commissioner's and treasurer's budgets which total $607,363. Thus, administrative costs for the HOC total $45,552.

Program staff funded by the county are included in the "personal services" budget category. However, 85% of the HOC program staff are not picked up in any of the HOC budget categories because they are federally funded. The county has already absorbed 14 of the 48 program staff previously funded by LEAA. Their salaries and fringe benefits are included in current operating costs. Of the balance (34 persons) half will be picked up by the county during the next fiscal year. The economic question is: how much will they cost the county? Salaries and fringe benefits for FY 1981 will be $228,997.

Table 2-5 shows the total cost and average daily cost for the HOC as each of the factors discussed previously are taken into account. The original HOC budget is reduced by $67,000 to adjust it for new capital costs. Then six cost components (jail staff through federally funded programs) are added. For each cost, the average daily cost is computed. Since there are 226 prisoners on the average day, the average daily cost is calculated by dividing each cost component by 226 (prisoners) and 365 (days).

Conclusion. The average daily cost is $32.68 which is considerably higher than the $25.84 average cost reflected in the budget. Furthermore, it is about $4 higher than what the state would charge the county if the HOC was operated by the state. In conclusion, there would be a savings to the county of about $386,000 if it transferred control of the HOC to the state.

Before negotiating a price with the state, the county would need an estimate of the value of capital (i.e., building, equipment and land). These are estimated at $9,000,000, $225,000 and $1,840,000 respectively. Land was valued, for example, at $5,000 per acre by contacting real estate firms. Three hundred sixty-eight acres are, therefore, worth nearly two million dollars. The value of the building was estimated by contacting both the commissioner's office manager and an insurance company and then averaging their valuations. The total value of capital is slightly more than $11 million.

Table 2-5

House of Corrections Costs

Cost Component	Total Cost	Average Daily Costs
Original HOC Budget	$2,131,458	$25.84
HOC Budget Adjusted for Capital	2,064,458	25.02
Jail Staff	121,209	1.47
Fringe Benefits	162,293	1.97
Sheriff	11,831	.14
Transportation	61,362	.74
Administrative Overhead	45,552	.55
Federally Funded Programs	228,997	2.78
TOTAL	$2,695,702	$32.68

In addition to the value of capital, the selling price should include the value of foregone taxes, which may be viewed as opportunity costs. In other words, if the county demolished the House of Correction and allowed builders to construct homes on the land, the county's tax base would increase. The land could be parceled into 290 residential units. This would yield about $200,000 in taxes to the county each year and should be included in the value of the House of Correction when the county decides on a selling price. In the next example, we describe how the value of correctional programs is estimated.

2.2.2 Program Budgeting

A new commissioner has been appointed to head the Department of Correction. Shortly after she takes charge, the commissioner must submit her budget for FY 1981 to the legislature, along with a statement of priorities. In the past, the department has used a line item budget similar in structure to the House of Correction budget in the preceding example. In other words, the budget includes line items for salaries, supplies, equipment and so on, but it does not provide any indication as to what programs the money is being spent on. The commissioner would like to have the budget staff reformulate the budget so that she can be certain that it reflects her priorities prior to submitting it to the legislature.

Decision Focus. In this example the focus of the decision is on the costs of the department's programs. Priorities may be viewed as a ranking of program objectives. In this case, security is given greater priority than rehabilitation programs. Although it is not essential that programs of greater priority receive more funding than programs of lesser priority, we are not surprised to see more money spent on security. Thus, the focus of the decision is on the actual amount each program costs relative to the other programs. In short, we need to determine program costs. With this new budgetary information, the commissioner will be able to ascertain whether her priorities are reflected in the budget.

Background. The department's budget for FY 1981 totals $285.5 million or an average of $15,050 annually for each prisoner.[3] These are operating costs only and do not include prison construction. The state prison system is one of the largest in the country, employing over 12,000 persons. Of the $285.5 million spent for prison operations only 77 percent comes from the department's budget. As Figure 2-1 shows, four other funding sources comprise the balance. Fringe and pension benefits ($60 million) are funded from a "miscellaneous" budget. Federal funds spent by the department total nearly $5 million. The State Department of Mental Hygiene and the Office of Drug Abuse add slightly over $1.5 million to prison system expenditures. Most of the money is used to pay salaries. Four-fifths of total operating expenditures finance salaries and fringe and pension benefits; the remaining fifth is spent on food, supplies, uniforms, raw materials for industries and the like.

As in most states, the prison system has several levels of security. The prisons are divided into five categories according to their security classification and custody: Group I is maximum security prisons for men; Group II is medium security prisons for men; Group III is a maximum security prison for women; Group IV is minimum security camps; and Group V is minimum security community facilities. Table 2-6 shows that the maximum security facilities for men are the least costly to operate. Although one might think that security costs would decline as the level of security declines, the reverse seems to hold here. This is evident by comparing the average annual cost column with the inmate to security staff column. As the ratio of prisoners to staff declines, operating costs increase. For example, the two most expensive operations (Groups III and V) have the lowest inmate to staff ratios (1.1 and .9, respectively). Since approximately 80 percent of prison system operating costs comprise salaries and benefits, costs are higher when there is a greater number of staff relative to inmates.

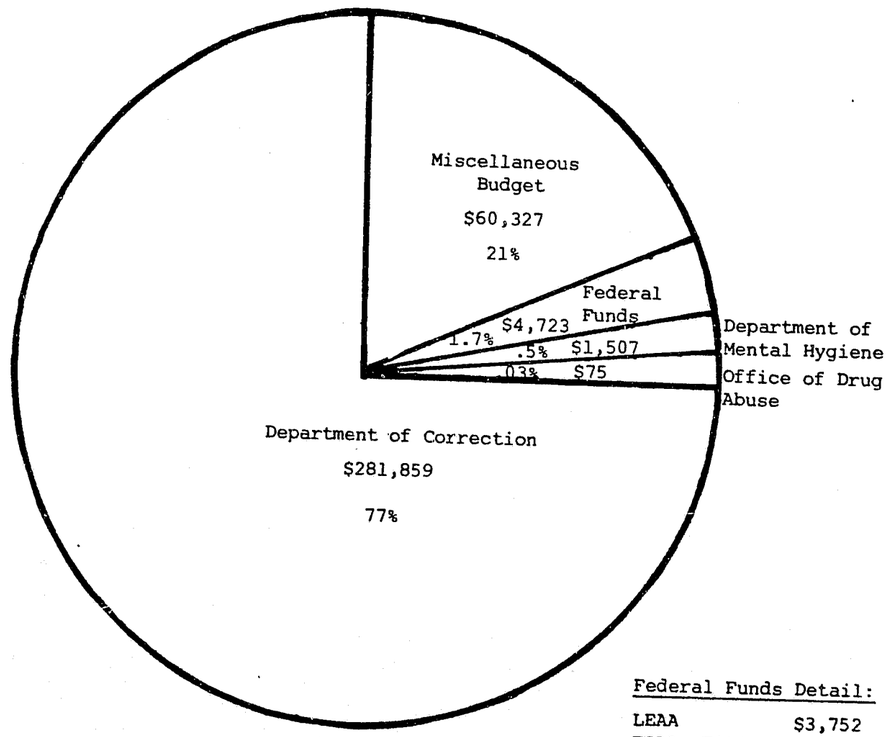
Table 2-6 also shows a heavy emphasis on security staff relative to program staff. In general, there are more security officers per prisoner than psychologists, social workers, teachers, religious counselors and program

Figure 2-1

State Prison System Expenditures

(in thousands)

Total Expenditure $285,490



Federal Funds Detail:

LEAA	$3,752
ESAA, Title I	700
LSCA, Title I	38
CETA	120
NIC Grants	3
Action Grants	109

Source: Adapted from Douglas McDonald, The Price of Punishment, p. 16.

coordinators. The new commissioner would like to place a greater emphasis on programs than current staffing patterns would seem to indicate. However, she has no basis for determining how much of the funds are allocated to programs from the current line item budget. As we mentioned earlier, the line item budget only shows budget allocations for gross categories of expenditure such as salaries, fringe benefits, supplies, equipment and capital. The commissioner would like to know how much is spent on security, programs, etc. With this information, she will be able to revise the budget so that it reflects her programmatic priorities.

Table 2-6

Prison System: Population, Cost and Staffing

Group/Custody	Security Level	Average Pop.	Average Annual Cost per Prisoner	Average Number of Inmates per Staff Person		
				Total Staff	Security	Program
I/Male	Max.	10,800	$10,856	2.2	3.5	13.4
II/Male	Med.	6,515	16,386	1.5	2.5	9.3
III/Female	Max.	430	20,779	1.1	2.1	7.6
IV/Camps	Min.	715	11,614	2.3	6.0	22.8
V/Community Facilities	Min.	500	17,244	.9	2.1	3.5

Source: Douglas McDonald, The Price of Punishment, pp. 18, 19, 22.

Analysis. There are numerous budgeting techniques, but the one that would provide information on program costs is usually called "program budgeting." Developing a program budget for a state such as the one in this example requires three broad steps. First, the department's activities are divided into programs (e.g., security, food services, health services). This step should be done by the analytical staff (usually the budget staff) in conjunction with the decisionmakers who review the budget. The specific programs will be different for each correctional sector. In other words, some of the programs in prisons (e.g., food services) will be different from probation (e.g., services to the court). Furthermore, some of the program categories for prisons will vary from state to state depending on the services provided and the budgetary needs of decisionmakers. In short, no set of programs can be prescribed. They must be developed by each agency.

The second step in developing a program budget is to collect data for all the programs. Data include staffing, workload measures, inmates served, costs of salaries, supplies, equipment and so on. The data are collected by interviewing department heads to find out their program responsibilities and needs. In addition, cost data are collected from receipts for expenditures, payroll distribution sheets, etc. The two key variables for formulating a program budget are workload requirements and the cost of inputs (i.e., labor, supplies and equipment).

The final step is to convert the workload requirements, input costs and other data into program costs. A simple example will demonstrate how this might be done for the academic education program. The program budget would begin with a statement of objectives and a program description. For example, the statement of objectives might read that, "In FY 1980, about 80 percent of the prisoners released had no high school education. The FY 1981 budget includes sufficient funds to quadruple the number of released prisoners who have passed the High School Equivalency Exam." The program description would explain how the education program works. For example, it might state that "inmates attend classes in reading and mathematics. Some lower level students are in federally funded remedial instruction courses. VISTA volunteers also teach basic literacy to about 1,000 prisoners."[4] Additional information pertinent to the budget review would be provided.

The analysis would show, for example, that in order to meet the program objectives roughly 5,000 prisoners would have to be in education classes that involve salaried instructors. They attend an average of 10 hours instruction per week, and there are roughly 15 students per instructor. The total number of teachers required would be 400. (This is calculated by dividing 150,000 hours of annual instruction by a workload of 15 students per instructor and 40 hour work week.) Salaries for instructors vary according to civil service classification, but the average salary is $12,000. Fringe and retirement benefits would add an average of roughly $3,000 to operating costs. Based on an average salary (including benefits) of $15,000, the cost of instruction salaries would be $6,000,000. One would have to add supplies, equipment, other instruction expenses, education administration, and inmate library costs to find the total academic education program cost. In general, the program cost is calculated by multiplying the workload times the resource requirement times the resource cost.

After the costs of all the programs are estimated, the program budget can be prepared. Table 2-7 shows the program budget for the prison system. There are seven program categories: security, administration, plant operations, prisoner processing, prisoner necessities, program services, and prison industries. (Typically, fringe benefits should be distributed among the programs according to the proportion of salaries.) Table 2-7 shows the detail for security and program services. Security costs include guarding prisoners ($110 million), emergency units ($40,000), uniforms ($1.4 million) and

Table 2-7

Program Budget: Security and Program Services Detail

Program	Total Cost	Annual Cost Inmate[a]	Daily Cost/ Inmate
Security			
Guarding Prisoners	$109,918,691	$ 5,795	$15.88
Emergency Units	39,681	2	.005
Uniforms	1,403,479	74	.20
Identification & Misc.	96,472	5	.01
Total	111,458,323	5,876	16.10
Administration[b]	23,354,858	1,231	3.37
Plant Operations	24,396,206	1,286	3.52
Prisoner Processing	1,455,655	77	.21
Prisoner Necessities[c]	34,033,629	1,794	4.92
Program Services			
Coordination	5,364,648	293	.77
Psycho-therapeutic	1,866,635	98	.27
Drug	75,000	4	.01
Academic Education	6,653,419	351	.96
Vocational Education	5,295,095	279	.76
Religious	1,344,850	71	.19
Temp. Release & Misc.	1,529,134	81	.22
Total	22,128,781	1,167	3.20
Prison Industries	13,998,134	740	2.02
Miscellaneous	555,069	29	.08
Fringe Benefits	60,326,732	3,180	8.71
Total	$281,707,387	$14,851	$40.69

Source: Douglas McDonald, The Price of Punishment, pp. 25, 26, 35

a/ All estimates based on average daily population of 18,968.
b/ Includes central office as well as facility administrative expenses.
c/ Includes food services, health services, recreation, inmate wages and miscellaneous.

identification ($96,000). Program services include seven programs costing a total of $22 million.

Conclusion. Table 2-8 shows the advantage of a program budget. The vertical rows show six categories that would be found in almost any line item budget. The columns represent three programs that appeared in the program budget (see Table 2-7). The advantage of the program budget is that it gives the breakdown of line item costs for each program. A traditional line item budget would only show the line items for the total agency budget (as in Table 2-8, column 4). It is worth noting that a program budget like the one depicted in Table 2-8 shows that certain programs such as security are labor intensive whereas plant operations are capital intensive.

With this information, the commissioner can reorder the budget so that it reflects her priorities. The commissioner can reorder priorities in one of two ways. She can request additional funds for program services, or she can reduce the budget for security, for example, and add that amount to program services. It is not important for our purposes to know her specific priorities or how she will revise her budget. The essential point is that with a program budget (such as the one shown in Table 2-7) she has the information she needs to make certain that the budget reflects her programmatic priorities.

Table 2-8

Program Budget (Excerpt) with Line Items
(in thousands)

	Program Categories			
Line Items	Security (1)	Prison Industries (2)	Plant Operations (3)	Total (4)
Personnel	$ 85,430	$ 4,410	$ 56	$ 89,896
Maintenance	50	25	125	200
Utilities	150	500	3,210	3,860
Supplies	10,800	2,413	123	13,336
Equipment	15,028	6,500	8,100	29,628
Capital Charges	-0-	150	12,782	12,932
TOTAL	$111,458	$13,998	$24,396	$149,852

2.2.3 Variable Cost Analysis

Whereas the two preceding examples dealt with the costs of existing programs, this one explains how the costs of planned activities can be estimated. As has been happening in many states across the country, legislation to change the sentencing structure was recently passed in a small New England state. The Department of Correction wants to assess the impact of the sentencing bill on the prison population and costs.[5] The impact assessment would be used for planning and budgeting purposes. The impact assessment was conducted in two phases. In the first phase, the research staff assessed the impact of the legislation on the prison population. It determined that the population would increase to about 750 over the current 2,000 population. The director of the department wants a cost projection to submit to the legislature with the budget.

Decision Focus. In the second phase, the budget staff would be required to estimate the costs of a 750 population increase. In this application we are concerned with future costs, namely, the costs of expanding and operating a larger prison system. Thus, we need to assess the additional capital costs and the operating costs for a prison system with a capacity of 2,750.

Background. The state prison system currently has a capacity of 2,120. There are four prisons holding a total of 2,000. Three of the institutions have populations at design capacity. One facility has 120 unused beds, which resulted from a recent expansion of community programs. All of the facilities have some space that could be converted into housing. For example, the hospital unit in one prison has space for 30 beds. The planning staff estimates that if all conversion units were utilized, the prison system would have capacity for an additional 380 beds. Combined with the 120 unused beds, the prisons could hold a maximum of 500 more prisoners.

Beyond the additional prisoners, the department will need 250 beds if the population rises to 2,750. Additional bedspace could be acquired either by converting an existing facility in the state into a prison or by building a new 250 bed prison. Since the governor opposed prison construction, the director has decided that he would prefer to renovate a facility so long as one is available. There is such a facility available and the architect for the prison system has assured the director that it is feasible to rehabilitate it. Renovating this facility would add an additional 250 beds to the prison system bringing the total capacity for the prison system to 2,750. This would be adequate to meet the population increase likely to be caused by the sentencing bill. The critical issue is: how much will all this cost?

Analysis. The analysis proceeds in two steps. First, a general model of costs is built around the various options the department has for increasing

capacity. Second, the costs are estimated for each option. There are four types of institutional alternatives to the department if inmate populations increase and there are no compensating changes in release rates or use of community alternatives:

A) utilize excess capacity at existing institutions;

B) convert non-housing units at existing institutions to correctional (inmate) use;

C) convert other (free-standing) facilities to correctional use;

D) build new correctional institutions.

These alternatives may be considered as a continuum of responses: they increase in cost and time required to implement them as one moves from A to D. Absorbing small population increases at existing facilities is the least costly and most readily available response. The substantial "fixed" costs of physical plant, security force and baseline program components have already been expended on behalf of the existing inmate population, and, technically, new inmates could be accommodated immediately. Some additional costs will of course present themselves: food, clothing, supplies and possibly some small increments to security and program staff to maintain inmate staff ratios.

Once this option has been utilized and no more space remains at existing institutions, more costly alternatives must be utilized. Again, these range in cost because of variations in construction, equipment, administration and general staff requirements. The least costly of these three options is the conversion of facilities presently on the grounds of a correctional institution. As with option A, many costs have been incurred on behalf of the existing facility and will not require duplication. A partial list includes:

- perimeter security (fences, towers, tower coverage, etc.);
- administration (superintendent, other managerial);
- intake and out-processing services;
- records, bookkeeping;
- armory, other emergency;
- building and grounds maintenance;
- utility lines;
- special custody areas (administrative, disciplinary, segregation);
- vehicles and maintenance;

- prison industry and other program equipment;
- recreation facilities.

Some of these items may require supplementing but will not be totally duplicated. Emphasis will vary according to the specific institutional arrangement and preference. The major expenses which will be incurred in utilizing alternative B include:

- renovation (i.e., conversion of facilities to reflect spatial arrangements of main institutions, utility lines, etc.);
- security hardware, other special equipment;
- additional security personnel;
- other items as noted under alternative A above (additional program staff, food, supplies).

The planner has considerable latitude in implementing this option. Clearly, the more services that can be provided through the existing institution, the lower the cost. A separate recreation, visiting, or medical area may be convenient for staff but costly in resources. Some duplication may be necessary, but otherwise represents a preference which may be too expensive to incurr.

Alternative C subsumes all the costs for the alternatives preceding it and a few more, primarily those notes in alternative B as <u>not</u> representing additional costs. New costs beyond those noted might include:

- acquisition of site and existing facilities;
- additional central office staff to oversee new units;
- additional transportation costs (hospitals, courts, prerelease planning, meetings, etc.) if facility is remotely located.

There are many costs which are only implicitly addressed here, either because they are obvious or depend on internal departmental efficiency and scale of operation. For example, if new officers are hired, it is clear that they will require training. What is not readily apparent is the point at which this would necessitate an increase in training staff, enlargement of facility, etc. Or, if inmate populations substantially increase, at what point might this require revamping of the prison industries if markets are saturated? Texas, for example, in the face of its increased offender population, no longer has enough TDC farmland to grow all its own food. Likewise, at what population level might totally new provision methods for

food service, education and the like be considered? It is inappropriate to assume that one can simply keep multiplying by a factor of population, staff and facilities and keep such support considerations intact. It is not possible here to predict the points at which this will occur or the potential costs; however, it is critical to keep in mind that such changes will happen.

Alternative D, construction of new facilities, again encompasses all the costs of the preceding options, plus new costs for site acquisition, preparation and physical plant. If standards of the Commission on Accreditation for Corrections are followed, new facilities may not house more than 500 inmates. Thus, an expected population increase of 750 would have to be accommodated in two institutions.

We exclude option D from further discussion in this section for a few reasons. First, the 750 population increase will occur in the near future, that is, before a prison can be built. Second, estimating prison construction costs is a process too complex to explain in a Program Model such as this one.[6] Finally, a major point of this example is to show the cumulative costs of several options for expanding capacity -- none of which involve major investments in construction.

The total costs of the options will depend on the actual inmate population being accommodated at any one time. Certain costs will be regarded as fixed while others will vary according to the resident population. In option A, for example, we are concerned with the cost of adding 120 prisoners to the institution. This is the variable cost, which is above the fixed cost of operating the prison for 980 inmates. We assumed, for example, that the average variable food cost will be identical to the average fixed cost for food because quality should remain constant. In other words, if it costs an average of $400 per year to feed each of the first 980 prisoners, then it should also cost $400 per year to feed each of the additional 120 prisoners as long as they are served the same quality food.

In summary, ultimate fiscal impact depends on actual inmate populations, the facility options selected to accommodate these populations, and other effects on operations arising from increased populations and additional facilities. Within a particular facility option, the costs depend on size, preference about duplication of services or functions, fixed costs and type of construction. The range of additional costs incurred varies with the options selected.

It is possible to represent the various cost options in the form of model(s). This model focuses on the costs associated with constructing and operating total facilities, since a "cost per inmate" is but a derived figure. An average daily inmate cost of $50 does not mean that the cost of two beds in an institution is thus $100. It is more useful in planning to consider

population changes in larger increments. As noted above, operating a facility at less than capacity reduces some costs, but the large portion of costs (particularly those associated with security) remain fixed.

In the model, total costs are considered to be a function of the actual inmate population, the facilities in use, and a factor for effects on correctional operations as populations and facilities increase. The total cost includes four objects of expenditure: personnel, supplies, equipment and capital. Each one of these costs can be incurred in any or all of the following functional areas:

- administration;
- food services;
- care and custody;
- medical and dental;
- education and training;
- prison industries;
- counseling;
- general services;
- recreation;
- other (including alcohol and drug programs and inmate pay).

Within any of these areas capital costs can be incurred through:

- renovation of existing facilities;
- new construction;
- maintenance and repairs.

From the preceding information, it is possible to develop cost models for each option. Table 2-9 shows three cost models. In each model the total cost of an alternative is based on the increase in the cost of housing additional prisoners. For example, the cost of option A includes supplies for food services, care and custody, education, etc. Option B requires that the facilities be renovated; therefore, capital costs for care and custody will be incurred. The specific variables included in each model are selected on the basis of the analysts' judgement and data availability. Thus, models pertaining to other correctional systems would quite possibly be somewhat different from this one.

Table 2-9

Cost Models

Option	Cost	Administrative	Food Services	Care & Custody	Medical & Dental	Education	Training	Prison Industries	Counseling	General Services	Recreation
A	Personnel										
	Supplies		✓	✓	✓	✓	✓				
	Equipment										
	Capital										
B	Personnel			✓		✓	✓		✓	✓	
	Supplies		✓	✓	✓	✓	✓		✓	✓	✓
	Equipment		✓	✓							
	Capital			✓							
C	Personnel	✓	✓	✓	✓	✓	✓		✓	✓	✓
	Supplies	✓	✓	✓	✓	✓	✓		✓	✓	✓
	Equipment	✓	✓	✓	✓	✓					
	Capital	✓	✓	✓	✓	✓	✓				

Source: Gregory P. Falkin, Fail S. Funke, And Billy L. Wayson, "Revising Connecticut's Sentencing Laws," pp. A7 and A8.
a/ Other includes pay to inmates, alcohol and drug programs, etc.

As we mentioned, the second part of the analysis is to estimate the costs of each option. Option A is to utilize all beds in existing facilities. Table 2-10 shows the department's expenditures in six relevant cost areas (for the institution that has 120 unused beds) and the average cost per inmate. The table shows that the costs of food for 980 inmates was $471,380 or $481 per inmate. Data for these cost components are collected from department records of expenditures. The combined cost of supplies is $1,069 per inmate. Therefore, it would cost an additional $128,280 to house 120 more inmates in this prison.

In option B, space within existing institutions is converted to increase capacity. There are four institutions in the state with a potential of expanding capacity to 380. Table 2-11 shows the cost components for converting the North Building in one institution into housing for 100 inmates.

Table 2-10

Option A: Cost Components at a Correctional Institution[a/]

FY 1980-81

Supplies	FY 1980-81 Expenditures	Cost per Inmate
Food	$ 471,380	$ 481
Medical	130,340	133
Care and Custody	153,860	157
Education and Training	1,960	2
Other	290,080	296
TOTAL	$1,047,620	$1,069

a/ The institution currently has a population of 980, which is 120 under the design capacity of 1,100. Average cost is calculated on the basis of a population of 980.

For every 100 prisoners the institution currently has an average of one correctional captain, six lieutenants, twenty-six correctional officers and other personnel listed in Table 2-11. Therefore, adding 100 beds in the North Building would require the additional resources listed in the

Table 2-11

Option B: North Building Conversion Costs

Resource	Quantity	Unit Cost	Total Cost
Personnel			
Correctional Captain	1	$23,344	$ 23,344
Correctional Lieutenants	6	21,179	127,074
Correctional Officers	26	15,718	408,668
Food Supervisor	1	19,333	19,333
Correctional Nurse	1	19,196	19,196
Correctional Rehabilitation Sustems Officer	1	17,546	17,546
Clerk Typist	1	10,546	10,546
Clerk III	1	11,509	11,509
Correctional Maintenance Officer	2	17,546	35,092
Subtotal	-	-	$672,308
Supplies			
Food	100	1,051	$105,100
Medical	100	109	10,900
Care and Custody	100	229	22,900
Education and Training	100	463	46,300
Other	100	276	27,600
Subtotal	-	-	$212,800
Equipment			
Care and custody	-	-	$ 15,700
Food	-	-	20,000
Subtotal	-	-	$ 35,700
Capital Renovation	-	-	$ 49,950
TOTAL	-	-	$885,108

"quantity" column. Under supplies, for example, we see that it presently costs $1,051 to feed an inmate; therefore, it will cost an additional $105,100 to feed the prisoners housed in the North Building. The important technical point is that all the cost projections for the North Building (except capital renovation costs) are derived from current operating practices.[7] The $49,950 capital cost projection is estimated from architectural plans for renovating the North Building. The total costs for renovating and utilizing the North Building of this one institution is $885,108.

Table 2-12 shows the costs if all facilities are renovated (i.e., if 380 beds are added). The conversion costs for each conversion unit were calculated the same way as explained in Table 2-11 for the North Building.

Table 2-12

Option B: Conversion Costs

Conversion Unit	Additional Capacity	Personnel	Supplies	Equipment	Capital	Total
G Room	60	$ 246,313	$ 64,140	$ -0-	$ 15,000	$ 325,453
Hospital	30	123,156	32,070	-0-	7,500	162,726
G Block	30	123,156	32,070	-0-	9,000	164,226
BOQ	40	132,639	32,880	-0-	5,000	170,519
Firehouse	30	127,133	43,840	-0-	16,000	186,973
South Block Basement	40	110,460	76,440	-0-	5,000	191,900
North Block Basement	50	114,247	95,550	-0-	30,000	239,797
North Bldg.	100	672,308	212,800	35,700	49,950	970,758
TOTAL	380	$1,649,412	$589,790	$35,700	$137,450	$2,412,352

Source: Gregory P. Falkin, Gail S. Funke and Billy L. Wayson, "Revising Connecticut's Sentencing Laws," pp. A19 - A29.

Personnel and supply costs are based on costs for the existing population; however, a word of caution should be noted. A single conversion within a facility, such as the conversion of the G Block, may not necessitate any new staff for food services. Existing staff can handle the increased workload (i.e., feeding 30 more prisoners). However, when a few small units are converted within an institution (e.g., G Room, the hospital and G Block) the total increase of 120 prisoners may create sufficient demand for additional food service personnel and other staff. Capital costs are estimated from architectural designs for the conv[illegible] equipment for the North Building is for care and custody and fo[illegible]es. The total cost of adding 380 beds to the prison system would be about $2.4 million.

Option C is the conversion of an entire facility (a surplus military base) into a prison. Table 2-13 shows the details of the conversion costs. These costs could be derived using any one of several techniques: sample budgeting, model budgeting (to be explained in the following section). The costs are presented here primarily for illustrative purposes. They show, for example, that capital costs include both renovation costs and upkeep costs (i.e., maintenance and repairs). The total first year conversion cost would be $5.7 million.

With the discussion of the costs for the three options, we are now prepared to analyze the cost of the sentencing bill. It is estimated that the sentencing bill will increase the population by about 750. Table 2-14 shows the costs of expanding and operating the prison system at progressively greater capacities. Under the columns labeled "Opiton Costs" are the capital and operating cost for each option individually. Starting with the current population of 2,000, we see that the average cost per inmate is $11,824. By utilizing all beds within the prison system the average annual cost for the last 120 prisoners is only $1,069. The marginal or variable cost declines as facilities reach capacity because the major expenses (i.e., correctional officers, administration and other personnel) are already paid, that is, they are fixed costs. Similarly, most of the operating costs for opiton B (converting facility space) are in the $4,000 to $5,000 range because a substantial amount of costs are fixed. For example, one does not have to add security officers just because 30 or 40 new prisoners are admitted. However, when there is a large influx of prisoners (option B_8), average operating costs rise because additional security personnel for example, may be required. The average cost for option C is almost as high as for the current population. This is understandable since option C (conversion of a military base into a 250-bed prison) requires the full array of costs that operating existing institutions requires.

Table 2-13

Option C: Resource Costs

	Personnel	Supplies	Equipment	Renovation	Capital[a/]	Maint.[b/]	Other
Administration	$ 88,557	$ 2,000	$ 10,848	$ 32,500		$ 1,319	
Food Services	67,876	228,125	-0-	416,000		248	
Care & Custody	1,773,129	61,805	52,200	1,532,245		1,671	
Medical	108,960	13,000	25,806	104,000		16,105	
Education	62,621	1,250	11,900	-0-		-0-	
Training	see counseling	see education	-0-	-0-		-0-	
Counseling	140,632	-0-	8,041	39,000		-0-	
General Services	51,858	270,250	249,761	39,000		48,634	
Recreation	15,857	509	12,513	221,000		-0-	
Other						49,198[c/]	
	$2,309,840	$576,939	$371,069	$2,383,745	$67,887	$49,198	

TOTAL Conversion and First Year Costs: $5,752,678

ANNUAL Costs:[d/] $2,954,666 PER CAPITA Costs: $11,819

a/ Includes contingency and contractors fees at 30%
b/ Annual maintenance of plant and equipment based on per capita costs at an existing institution
c/ Includes per capita drug/alcohol treatment costs x 25% population
d/ No inflation factor included

Table 2-14

Correctional Costs and Facility Options

Option	Population	Option Costs		Cumulative Costs	
		Capital	Operating Cost per Inmate	Capital	Operating
Current	2,000	$ -0-	$11,824	$ -0-	$23,649,070
A	2,120	-0-	1,069	-0-	23,777,350
B_1	2,180	15,000	5,174	15,000	24,087,790
B_2	2,210	7,500	5,174	22,500	24,243,010
B_3	2,240	9,000	5,191	31,500	24,398,740
B_4	2,280	5,000	4,138	36,500	24,564,260
B_5	2,310	16,000	5,699	52,500	24,735,230
B_6	2,350	5,000	4,673	57,500	24,922,150
B_7	2,400	30,000	4,195	87,500	25,131,900
B_8	2,500	85,650[a/]	8,851	173,150	26,017,000
C	2,750	2,754,814[b/]	11,800	2,927,964	28,967,000

a/ Includes equipment purchase of $35,700
b/ Includes capital renovation and equipment purchase, but excludes annual capital maintence costs.

Conclusion. The columns labeled "Cumulative Costs" show the total capital and operating costs for the level of population attained with each option. Option A, for example, adds roughly $128,300 to current operating costs, bringing the total prison system operating costs to $23,777,350. Looking at the bottom line, we see that adding 750 beds to the prison system would require about $2.9 million in capital costs and adding 750 prisoners would require nearly $29 million in operating costs. The cost of the sentencing bill would be about $32 million in the first year.

2.2.4 Model Budgeting

In this application we show how a line item budget can be developed for each program in a probation office. Ever since the county's probation office was established, it has been managed on a caseload basis. Each probation officer is assigned a certain number of cases, and he or she provides whatever services the clients require. The probation officers conduct presentence investigations, supervise probationers, and do whatever else is necessary to handle their cases. At this time, the chief of probation has decided to adopt a community resource management approach. Briefly, the approach entails a reorganization of the probation department along functional lines. As of fiscal year 1981, probation officers will work in one of three divisions: probation administration, services to the courts, and services to probationers. In addition, resources (personnel) are allocated to the various functions on a workload basis instead of a caseload basis. Allocating resources on the basis of workload is preferable because it takes into account the time that it takes to complete an activity such as a long form presentence investigation. The chief of probation wants the budget officer to conduct a cost analysis of these three functions prior to submitting the reorganization plan and FY 1981 budget to the county commission.

Decision Focus. The focus of the chief of probation's decision is on the cost of the reorganization. Implicitly, the reorganization is motivated by two factors: a belief that specialization will result in a more efficient operation and that services to the courts and to probationers will improve. Budgets for years prior to FY 1981 did not base personnel and non-personnel costs on the workload or caseload imposed on the resources. A cost analysis of administration, court and probationer services will assist the chief in allocating resources to each of the functions according to the demand for resources (i.e., the workload in each functional area). The end result will be a line item budget reflecting the costs of community resource management.

Background. The Probation Department will be organized into two units (court services and services to probationers) that will be managed by an administrative division. The administrative division is responsible for overseeing operations in the two service units, maintaining standards of performance, and carrying out all administrative functions such as budgeting,

hiring, ordering supplies and so on. The administrative unit is staffed with a director, assistant director, budget officer, statistician/researcher, manager of field services, manager of court services, and secretarial and support staff.

The court services unit is responsible for two functions: (1) presentence investigation and reporting, and (2) probation processing and reporting. The presentence function consists of conducting interviews of the offender and others, collecting and verifying relevant background information and formulating recommendations as to surveillance level and a treatment plan. The processing function includes reporting to the court on the completion of sentences, recommending early termination of sentences for probationers who demonstrate good behavior or revocations for bad behavior cases, and responding to court requests.

The services to probationers unit provides two kinds of services: (1) needs assessments, and (2) supervision. The needs assessment function consists of identifying the needs of probationers, classifying them in accordance with risk, and developing a service plan, including community resource referrals. Probationers are classified according to both risk of crimes while in the community and needs for services (which determines the time probation officers have to spend supervising their cases). There are four classifications:

- minimum risk;
- medium risk/low service needs;
- medium risk/high service needs;
- maximum risk.

The supervision function consists of supervising probationers, providing counseling and other in-house services, and referring probationers to community agencies. The last aspect represents the major shift in the style of management. The community resource management approach emphasizes the use of community resources to meet the needs of probationers. For example, probationers with drug problems might be referred to drug treatment centers and probationers lacking job skills might be referred to training programs.

Prior to the reorganization, the Probation Department was managed on a caseload basis. Caseload management, as we suggested earlier, gives no indication as to the kinds of services performed by the department. In FY 1980 there were:

- 4,000 active probation cases;

- 250 cases received per month;
- 240 cases closed per month;
- 300-400 presentence investigations.

The FY 1980 budget appears as Table 2-15. The director has overall responsibility for the department. The assistant director aids the director and monitors day-to-day operations. The budget officer is responsible for budget preparation and execution and for statistical reporting. The manager of field services coordinates and supervises the staff providing services to probationers. The statistician is responsible for data collection and analysis and report preparation. The personnel specialist administers the recruitment and hiring process and maintains employee records. The probation supervisors assign cases to probation officers and review their work (i.e., presentence investigations and case reports). The probation officers perform presentence investigations, supervise cases and prepare reports (e.g., presentence investigation reports and revocation of sentence reports). Support staff includes receptionists, secretaries, etc. The combined salaries and fringe benefits for these personnel is almost $1.3 million. Non-personnel costs (rent, supplies, travel, etc.) are slightly over $150,000. Total operating costs are, therefore, nearly $1.5 million.

For managerial purposes, it is worth calculating the average cost of supervising cases and conducting presentence investigations. Each probation officer's working hour costs $15.73. This is computed by dividing total operating costs ($1,465,851) by the number of probation officers (57) and dividing the result by the average hours probation officers work during the year (1,634.5).[10]

Probation officers supervise an average of 71 cases per month and conduct an average of 7 presentence investigations each month. About 1.3 hours per month are devoted to supervising each case, and it takes about 6.4 hours on the average to complete a presentence investigation. These figures are derived as follows. From interviews, it was learned that probation officers spend about two-thirds of their time on supervision and about one-third on presentence investigations. The number of hours per month (136) that probation officers work was multiplied by the proportion of time they spend on supervision and presentence investigation; then each result was divided by the workload (71 cases and 7 presentence investigations per month) to produce the time estimates. Finally, multiplying the hourly rate ($15.73) times the time it takes to supervise cases (1.3 hours) and conduct presentence investigations (6.4), we see that it costs:

- $20.45 per month or $245.31 per year to each supervise case;
- $100.67 to complete each presentence investigation.

Table 2-15

Probation Department Budget, FY 1980

Item	Budget	Percent of Total Operating Costs
Personnel		
Director	$ 22,331	1.5%
Assistant Director	20,451	1.4
Manager Budget/Statistical Reporting	19,976	1.4
Manager, Field Services	18,570	1.3
Statistician/Research Analyst	11,590	.8
Personnel Specialist	11,577	.8
10 Supervisors	148,080	10.3
57 Probation Officers	677,559	47.0
29 Support Personnel	191,400	13.3
TOTAL Salaries	$1,121,534	77.7
Fringe Benefits	168,230	11.7
TOTAL Personnel Costs	$1,289,964	89.4
Non-personnel		
Rent, Utilities, Maintenance	54,344	4.0
Communications	21,973	1.6
Supplies	21,389	1.5
Travel	15,549	1.1
Training	8,906	.6
Purchased Services	16,644	1.1
Other	10,512	.7
TOTAL Non-personnel Costs	$ 153,317	10.6
TOTAL OPERATING COSTS	$1,465,851	100.0%

With the reorganization, the director would like the budget officer to prepare the FY 1981 budget so that it shows the budget allocation to each unit. In addition, he would like to know the cost breakdown for each function (e.g., short form and long form presentence investigation reports) so that he can allocate resources accordingly and manage them efficiently.

Analysis. An appropriate technique to use in situations such as this is model budgeting. In model budgeting, the analyst derives personnel and non-personnel costs when there is no way to collect such data from similar organizations. Generally, costs are estimated by first estimating the workload (e.g., 400 presentence investigations) and the time that it takes to complete a unit of work (7.5 hours per presentence investigation). These two measures combined essentially represent the demand for resources. In other words, if it will take 1,362 hours per month to complete all work, then there is a demand for 10 probation officers (assuming each one works 136.2 hours per month). From the demand for resources (quantity demanded) and the price of resources, one can readily prepare a budget that will be adequate to fulfill the responsibilities (i.e., carry out the functions) of the Probation Department.

Table 2-16 shows the model budget for the administrative division. The personnel all fulfill the administrative functions described earlier, and their salaries are the same as in Table 2-15. There are no probation officers or line supervisors included in the administrative division. Personnel costs make up 91 percent of total operating costs for this division. The method for calculating non-personnel costs is discussed shortly.

The budget for the services to the courts division is presented in Table 2-17. Staffing for the division was done on a workload basis. Workload estimates for FY 1981 were projected from FY 1980 experience. The projections are as follows:

- 250 short form presentence investigations per month;
- 150 long form presentence investigations per month;
- 154 regular completion cases processed per month;
- 16 revocations processed per month.

The next step would be to estimate the time it takes to complete each of these functions. In order to develop estimates for time, a time use study should be conducted. In a time use study, a sample of events or activities is timed from start to completion. For example, in each of three months, 100 short form investigations are timed to see how long it takes for probation officers to complete them. Table 2-18 presents the results of the time use study for the breakdown of the service to the courts function. It

Table 2-16

Administrative Division Budget, FY 1981

Item	Budget	Percent of Total Operating Costs
Personnel		
Director	$ 22,331	16.4%
Assistant Director	20,451	15.0
Manager, Budget/Statistical Reporting	19,976	14.7
Statistician/Research Analyst	11,590	8.5
Personnal Specialist	11,577	8.5
3 Support Personnel	19,800	14.6
TOTAL Salaries	$105,725	77.7
Fringe Benefits (15%)	15,859	11.7
TOTAL Personnel Costs	$121,584	89.4
Non-personnel		
Rent, Utilities, Maintenance	$ 5,440	4.0
Communications	2,176	1.6
Supplies	2,040	1.5
Travel	1,496	1.1
Training	816	.6
Purchased Services	1,496	1.1
Other	952	.7
TOTAL Non-personnel Costs	$ 14,416	10.6
TOTAL OPERATING COSTS	$136,000	100.0%

Table 2-17

Services to the Courts Division Budget, FY 1981

Item	Budget	Percent of Total Operating Costs
Personnel		
Director	$ 18,570	4.2%
3 Supervisors	44,424	10.0
18 Probation Officers	213,966	48.5
10 Support Personnel	66,000	15.0
TOTAL Salaries	$324,960	77.7
Fringe Benefits (15%)	$ 51,444	11.7
TOTAL Personnel Costs	$394,404	89.4
Non-personnel		
Rent, Utilities, Maintenance	$ 17,647	4.0
Communications	7,058	1.6
Supplies	6,618	1.5
Travel	4,853	1.1
Training	2,647	.6
Purchases Services	4,853	1.1
Other	3,088	.7
TOTAL Non-personnel Costs	$ 46,764	10.6
TOTAL OPERATING COSTS	$441,168	100.0%

shows, for example, that the preliminary case review takes one-third longer for a long form presentence investigation than for a short form. It takes a total of 7.5 hours to complete a long form investigation but only 4.5 hours to finish a short form.

Table 2-18

Services to the Courts Division: Unit Workload Values

Function	Hours per Case	
	Short Form	Long Form
Presentence Investigation		
Preliminary case review	.50	.75
Interview with defendant	.70	1.00
Interview with others	.50	.90
Collection of background information	1.10	2.10
Verification	.70	1.10
Report dictation	.60	1.00
Court reporting	.30	.50
Other	.10	.15
TOTAL	4.50	7.50
Regular Completion Processing	.25	
Early Termination Processing	.40	
Revocation Processing	6.50	

Table 2-19 presents the derivation of the resource requirements for the services to the courts division. As we mentioned earlier, the demand for resources is calculated from the workload and the time it takes to complete a case. Table 2-19 shows that if there are 250 short forms to be completed and it takes 4.5 hours to complete each one, then a total of 1,125 probation officer hours will be needed to complete all the short forms. The total number of hours required each month is about 2,421. Since each probation officer works 136.2 hours per month, there is a demand for 18 probation officers (2,421 divided by 136.2). Thus, from the workload and time use study, we can determine staffing allocations to the divisions.

By referring back to Table 2-17, we see the budget requirements for a division of 18 probation officers. The division has a director who has the same responsibilities as the manager of field services described earlier. Since one supervisor is required for every six probation officers (by de-

partment policy), we know that three supervisors will be needed. In addition, 10 support staff will be needed for the division. The total personnel costs are $394,404.

Table 2-19

Services to the Courts Division: Resource Requirements, FY 1981

Function	Cases per Month[a] (1)	Hours per Case[b] (2)	Hours per Month (3) = (1) x (2)
Short Form Presentence Investigation	250	4.5	1,125
Long Form Presentence Investigation	150	7.5	1,125
Regular Completion Processing	154	.25	38.5
Early Termination Processing	70	.40	28.0
Revocation Processing	16	6.5	140.0
TOTAL	NA	NA	2,420.5

a/ Projected from FY 1980 (see discussion in text)
b/ Time use study (see Table 2-18

Non-personnel costs are essentially distributed to each division's budget in the same proportion that they appear in the total probation budget (see Table 2-15). For example, communications cost about $22,000 or 1.6 percent of personnel costs. We can then apply this percentage to personnel costs in each of the division budgets to find the distribution of communication costs. The same procedure would be used for supplies, travel and all the other non-personnel costs. Actual costs may vary from these estimates because some divisions may incure more non-personnel costs than others. In the absence of data to indicate how divisions use non-personnel costs (e.g., travel) this procedure yields reasonable estimates.

The average cost for each of the functions can now be calculated. Each hour of probation officer time in this division costs $16.23. This is computed by dividing total operating costs ($477,456) by the number of probation officers (18) and then dividing the result by the number of hours (1,634.5) each probation officer works during the year. The hourly cost is then multiplied by the time it takes to complete each function to find the average cost per function. For example, it takes 4.5 hours to complete a short form presentence investigation and it costs $16.23 per hour; therefore, it costs $74.04 per short form presentence investigation. Using this method of calculation, we see that it costs:

- $121.73 per long form presentence investigation;
- $74.04 per short form presentence investigation;
- $4.06 per regular completion processing;
- $6.49 per early termination processing;
- $105.50 per revocation processing.

These cost estimates are considerably more accurate, detailed and useful than knowing that it costs an average of $99.14 for presentence investigations (as was derived earlier without the workload and time use analyses).

Table 2-20 presents the budget for the services to the probationers division. This budget was derived using the same method of calculation as was explained for the services to the courts division. Rather than go through the details again, we will summarize the procedure. The budget was developed using the following steps:

- Step 1 -- workloads for each function are estimated (e.g., 250 needs assessments per month; supervise and deliver services to 1,000 minimum risk cases, 1,200 medium risk cases with low service needs, and so on).
- Step 2 -- a time use study is conducted to determine how long it takes to complete each event (e.g., 4.5 hours per needs assessment, .75 hours per month per minimum risk case, and so on).
- Step 3 -- the demand for resources is calculated by multiplying the workload (e.g., 250 needs assessments per month) times the number of hours (4.5) it takes for each needs assessment.
- Step 4 -- the allocation of probation officers to the division is calculated by dividing the total number of probation officer hours per month required of the division by the number of hours (136.2) each probation officer works. We would find that the services to probationers division would need 60 probation officers to complete all its work.

Table 2-20

Services to Probationers Division Budget, FY 1981

Item	Budget	Percent of Total Operating Costs
Personnel		
Director	$ 18,570	1.4%
10 Supervisors	148,080	10.8
60 Probation Officers	713,220	52.1
28 Support Personnel	184,800	13.5
TOTAL Salaries	$1,064,670	77.8
Fringe Benefits (15%)	$ 159,701	11.6
TOTAL Personnel Costs	$1,224,371	89.4
Non-Personnel		
Rent, Utilities, Maintenance	54,782	4.0
Communications	21,913	1.6
Supplies	20,543	1.5
Travel	15,065	1.1
Training	8,217	.6
Purchased Services	15,065	1.1
Other	9,587	.7
TOTAL Non-personnel Costs	$ 145,172	10.6
TOTAL OPERATING COSTS	$1,369,543	100.0%

- Step 5 -- supervisory staff (1 director for the division and 1 supervisor for every six probation officers) and support staff are added to the resource requirements.

- Step 6 -- the budget for personnel is calculated by multiplying the number of personnel by their salaries and then adding fringe benefits.

- Step 7 -- non-personnel costs are added to the budget by finding the percent of total operating costs that each non-personnel cost (e.g., rent, supplies) represents in the total organizational budget and multiplying these percentages times the operating budget for each division.

- Step 8 -- probation officer working hour costs are calculated by dividing total operating costs ($1,489,765 from Table 2-20) by probation officer hours (60 probation officers x 1,634.5 annual probation officer hours).

- Step 9 -- the average cost for each function is calculated by multiplying the time it takes to complete a function (4.5 hours per needs assessment, for example) by the average operating cost per probation officer working hour ($15.19). The result in this case is that it costs an average of $68.36 for each needs assessment.

Conclusion. The model budgeting approach, as we have shown, is applicable to situations where there is little baseline data from which to estimate costs. In this example it was used to show the costs of a probation department after a reorganization. With this information, the chief of the department can allocate resources to the various divisions according to their workload. In the next example, we show how a budget can be prepared when there exists sufficient budgetary data to estimate costs.

2.2.5 Sample Budgeting

In the final application, we explain how to conduct a comparative cost analysis of two organizational schemes. The Commissioner of Correction is deciding whether to add a new halfway house to the department. Currently, there are a few houses providing basic in-house services. The basic in-house services include housing, food, group counseling and employment. These halfway houses are used exclusively by work releasees; therefore, the programmatic focus is primarily on employment. With the new halfway house, the commissioner would like to have rehabilitative services provided by community resources. The new halfway house will offer clients a wider variety of services by referring them to community agencies rather than providing the rehabilitative services in-house. The commissioner would like two

budgets prepared for halfway houses providing basic in-house services plus community resource referral (one utilizing volunteers and the other utilizing only departmental employees) so that a decision can be made as to which way to proceed.

Decision Focus. There is a dual focus to the commissioner's decision. First, the commissioner needs to know the costs of planned activities. In this regard, the economic information needed is much like in the two previous examples. Second, the commissioner wants to compare the costs of two different organizational schemes. In one scheme the halfway house will utilize volunteers; in the other it will not. The focus of this part of the decision is the relative costs of staffing the halfway house with volunteers or departmental employees. The dual focus, therefore, implies a comparative cost analysis of the two different halfway house organizations.

Background. As we mentioned, the department currently operates five halfway houses that provide basic in-house services. The average capacity of the halfway houses is 18. The personnel include an administrative director, an assistant director who serves in both an administrative and supervisory capacity, a full-time counselor who conducts both vocational and group counseling, a night-time counselor, a part-time counselor, a secretary, and a housekeeper. Total salaries and fringe benefits for all the halfway houses cost almost $400,000. Non-personnel costs account for about 40% of the budget. The total operating budget for the five halfway houses is about $661,000.

Analysis. The halfway house just described provides only basic in-house services. No community resource referrals are made and no volunteers are used. However, expenditure data from these halfway houses can serve as the basis for the comparative cost analysis. By analyzing cost data from existing operations and adding costs for new components (community resource referrals and volunteers), we can develop budgets for the two new proposed halfway houses. This is common practice in the public sector and is technically called "sample budgeting."

Sample budgeting is essentially the creation of a budget for a prototype program from existing programs. It is called sample budgeting because the prototype budget is developed from a sample of budgets for other similar programs. The sample can be selected on the basis of:

- randomness -- in which each case has an equal chance of being selected for the sample;
- deliberate selection -- in which cases are selected in accordance with special criteria (e.g., halfway houses that utilize volunteers);
- systematic selection -- in which each case is selected.

Any of these sampling procedures can be used depending on the particular circumstances. In this situation, we use systematic selection procedures, that is, expenditure data for all five halfway houses are collected. Budgets for each of the five halfway houses were acquired and the average cost of providing basic in-house services in these five halfway houses was computed. On the average, personnel costs are about $80,000, and non-personnel costs are nearly $53,000. Total expenditures are a little over $132,000 or an average of $20.15 per client per day. In summary, the first step in the sample budgeting approach is to draw a sample of halfway houses (in this case a systematic sample) and find the average cost for each budget item.

The next step is to develop budgets for halfway houses that also provide community resource referral (with and without volunteers). Table 2-21 presents the budgets for the two halfway houses providing basic in-house services plus community resources referral. The first column depicts the costs using salaried departmental employees. All positions and salaries are identical to the average halfway house except that a full-time community resource manager is added. The function of the community resource manager is to counsel clients and refer them to the appropriate community agencies. The salary is, therefore, estimated at the average counselor salary ($11,756). The only other costs that change are non-personnel costs that vary with respect to salary. Travel, transportation, communications, and supply costs are all increased to reflect the addition of the community resource manager. The total increase in operating costs resulting from the community resource referral function is $14,967. This increase adds $2.13 to the average daily cost per client, bringing the average cost up to $22.26 per day. These costs represent only costs to the department and do not include the value of community resources which clients will receive.

The second column in Table 2-21 shows the budget for a similar halfway house using volunteers. As with the halfway house utilizing salaried staff only, budget estimates are essentially derived from the sample budget. The director's salary, the assistant director's salary and so on are estimated at the average for the five sample halfway houses. The only changes reflect the use of volunteers.

Volunteers are used to complement halfway house staff in counseling clients and to replace non-administrative staff such as the housekeeper, the night counselor and the part-time (weekend) counselor. The community resource manager coordinates volunteer activities. Volunteers receive an $8.33 stipend (to cover transportation, meals and other expenses) if they supervise a shift. (On holidays they receive a $15.00 stipend each shift.) There are 16 supervisory shifts each week: two eight-hour shifts during the week and six eight-hour shifts on weekends. Thus, the total annual stipend comes to $7,214.

Table 2-21

Halfway House Budget, FY 1980[a/]

Item	Budget: Without Volunteers (1)	Budget: With Volunteers (2)	Difference With Volunteers (3)
Personnel			
Director	$ 15,970	$ 15,970	$ -0-
Assistant Director	12,737	12,737	-0-
Community Resource Manager	11,756	11,756	-0-
Counselor	11,756	11,756	-0-
Night Counselor	9,441	-0-	- 9,441
Part-time Counselor	4,576	-0-	- 4,576
Secretary	7,646	7,646	-0-
Housekeeper	6,990	-0-	- 6,990
TOTAL Salaries	$ 80,872	$ 59,865	$-21,007
Fringe Benefits (15%)	12,131	8,980	- 3,151
TOTAL Personnel Costs	$ 93,003	$ 68,845	$-24,158
Non-personnel Costs			
Volunteer Stipends	$ -0-	$ 7,214	$+ 7,214
Professional Fees	4,042	4,042	-0-
Travel and Transportation	3,741	3,469	- 272
Rent	12,292	12,292	-0-
Maintenance	2,461	2,461	-0-
Utilities	4,288	4,288	-0-
Communications	2,561	2,561	-0-
Supplies	3,770	3,770	-0-
Food	18,002	18,002	-0-
Other	2,057	2,057	-0-
TOTAL Non-personnel Costs	$ 53,214	$ 60,156	$+ 6,942
TOTAL OPERATING COSTS	$146,217	$129,001	$-17,216

a/ The halfway house provides basic in-house services plus community resource referral.

Table 2-21 shows that personnel costs (i.e., salaries and fringe benefits) are $68,845 if volunteers are used. This is $24,158 less than the halfway house budget for salaried departmental employees. However, non-personnel costs are almost $7,000 more if volunteers are used. There is a total savings of about $17,000 per year (or $2.63 per client per day) if volunteers are used.

Conclusion. We should note that several non-economic factors may affect the commissioner's final decision as to the use of volunteers. On the one hand, if there is a freeze on positions, the halfway house utilizing volunteers has certain obvious advantages. There are fewer salaried employees on the payroll with the non-personnel budget picking up the cost of volunteers. Furthermore, the commissioner may prefer to use volunteers believing they will serve as a stronger link between the department and community resources. On the other hand, the commissioner may finally decide that management and efficiency would be greater in the halfway house staffed with salaried professionals. A comparative analysis of the costs of the two halfway houses may, therefore, not be the deciding factor. Nonetheless, a comparative cost analysis of two or more budgets (such as those presented in Table 2-21) provides the decisionmaker with economic information he or she needs regardless of the non-economic factors which may influence the decision.

2.3 Points to Remember

From the preceding examples, it is clear that the specifics of an analysis (technique, data, etc.) depends on the focus of the decision. In this section we present some general guidelines which should be kept in mind regardless of the decision or cost analysis technique. The main point to remember is that the accuracy of any cost estimate depends on several factors: the variables used, their relationships, their measurement and the quality of the data. If any of these issues is overlooked or neglected, cost estimates become suspect. We, therefore, discuss each of these points in the following subsections.

2.3.1 Point 1: Determine the Cost Variables from the Decision Focus

Each of the decisions in the preceding examples was rather narrow in focus. The focus of the decisions was primarily on correctional budgets. In the first example we were concerned with a county's correctional budget; in the second example we were interested in a state prison system budget. In any event, the cost variables included in each analysis were selected on the basis of the focus on correctional budgets. Thus, in most of the examples we analyzed primarily correctional system costs.

The reader should be aware that other costs can enter into the analysis. In the House of Corrections analysis we included law enforcement costs (the sheriff's time spent managing the HOC) and the value of land. In the following paragraphs we present several types of costs, any or all of which might be included in the analysis depending on the focus of the decision.

Operating and Capital Costs. The two basic cost categories in economics are labor and capital. Labor costs are those costs incurred in employing a workforce. They represent the cost of operating a program or activity and can basically be increased or decreased (by hiring or laying off workers) on fairly short notice. The resources are "used up" as they are paid. In other words, workers are paid for work completed; if labor is to be utilized some more (for another 40 hour week), management will have to pay for the additional use of labor. This essentially applies to all operating costs including supplies, transportation, purchase of services, etc.

Capital costs are different in this respect. The costs of physical plant and equipment may be paid in one or more installments, but the life cycle of capital extends far beyond the initial investment. A clear example of this is prison construction. A prison may be built in 1980 and financed by issuing bonds. If the prison costs $30 million to build, the actual cost will be considerably higher once interest on the bonds is taken into account. Furthermore, even if capital improvements are made and financed in a single year, their lifetime will extend beyond the initial investment. If the investment is included as a one-time (lump-sum) expenditure, the costs for the year being analyzed will be inflated. Therefore, the cost of capital (i.e., investment and interest) would be depreciated over the useful life of the capital. We saw how this was done in the House of Corrections example.

Criminal Justice System Costs. A second categorization of costs relates to the various components of the criminal justice system. Criminal justice system costs include direct outlays for, or the imputed value of, services provided by:

- law enforcement agencies;
- courts;
- corrections;
- legal services agencies, bureaus or firms;
- other agencies, organizations or individuals whose stated mission could not be carried out if there were no crime;
- activities of organizations or individuals financed by any of the above.

When conducting a cost analysis, the analyst should think carefully about the decision focus. If the focus of the decision is strictly on correctional resources and budgets, then only correctional costs will be included. However, if the focus is on the true economic costs of a correctional program or activity, then all relevant criminal justice costs should be taken into account. These will include both public (governmental) and private (non-governmental) expenditures.

External Costs. Again, if the focus is on the true, or total economic cost of an activity, then external costs should be taken into account. As defined here, external costs are those costs occasioned by criminal justice system activities which are borne by agencies, organizations or individuals outside the system. Private police protection purchased by homeowners adjacent to a halfway house, or services provided to correctional clients by a state employment agency are examples of external costs which would not appear in criminal justice outlays. Nevertheless, they constitute part of the total, economic costs of an activity. External costs, also, may be further subdivided into:

- Public Expenditures -- direct outlays for, or the imputed value of, goods and services provided or financed by governmental agencies or units. (Examples would include: welfare, health and mental health departments or facilities; employment and training programs; public schools and departments of education).
- Private Expenditures -- direct outlays for, or the imputed value of, goods and services provided or financed by nongovernmental agencies or units (e.g., private mental health practitioners).

Generally speaking, the way to decide which costs to include in an analysis is to consider the unit of analysis. The unit of analysis, that is, the unit that the decisionmaker has responsibility for, determines the relevant cost components (internal and external) to the criminal justice system. For example, the director of a prison system might only be concerned about prison system costs; all other costs would be external costs. However, the legislator or governor might be concerned about law enforcement, court costs and certain costs external to the criminal justice system as well as correctional costs. The analyst should keep in mind the focus of the decision and the unit of analysis in selecting relevant cost variables. It is often advisable to point out the external costs to decisionmakers so that they are aware of the consequences (external costs) of their actions.

Direct and Indirect Costs. These costs apply to both criminal justice and external costs when a specific "cost objective" is sought, for example, the cost of an activity such as citation, arrest, diversion and so forth. A fairly simple way to view direct costs is to consider them as including personnel expenditures and other expenditures directly associated with the provision of a specific service to a specific client. For example, the salary of a patrol officer issuing citations to specific individuals would be considered a direct cost of the citation activity. Likewise, transport-

ation costs incurred in the provision of that service would be considered direct costs.

Indirect costs, according to standard federal government definitions, include those "(a) incurred for a common joint purpose benefiting more than one cost objective, and (b) not readily assignable to the cost objectives specifically benefited, without effort disproportionate to the results achieved."[12] In terms of this analysis, point (a) includes expenditures for items associated with more than one activity, where the specific proportion devoted to each is not readily identifiable, (e.g., administrative costs). Point (b) above refers to the expenditures that under the normal definition would be direct costs but that are more practically treated as indirect costs. For relatively self-contained activities such as correctional institutions, most halfway houses and diversion projects, indirect expenses do not play a large role. Most expenditures for these activities are readily assignable to the "cost objective," or activity, in question. It is important to emphasize that identifying direct costs of a particular activity and indirect costs allocable to that activity are simply means of arriving at an accurate picture of the activity's total cost, as measured in an accounting framework.

Opportunity Costs. The central concept of economic cost, opportunity cost, is a measure of the cost that results from undertaking one activity and thus foregoing another. Opportunity cost is used to measure the value of resources when no market prices exist. For example, the value of prison land or volunteers is estimated from its next best alternative use (e.g., taxes and private sector income, respectively). Opportunity cost may be viewed from many different levels of resource aggregation. That is, there is an opportunity cost associated with:

- a single resource which could be used in different ways (such as a person who can hold different jobs);
- a set of resources which could be used in alternative criminal justice activities (such as $10,000 for pretrial detention instead of release activities);
- a set of resources which could be used in alternative criminal justice program areas (such as educational programs for pretrial instead of post-adjudication inmates);
- a set of resources which could be used in alternative public activities (such as government doctors for criminal justice instead of public health programs);
- a set of resources which could be used in public or private activities (such as $10 million in loans to build a correctional institution instead of private homes).

From the perspective of a single resource which could be used in different ways, one measure of the opportunity cost of an inmate in pretrial detention is the productivity of his labor that is foregone; or, the opportunity cost of using a person to teach inmates is the teaching (or other tasks) he or she might have performed elsewhere. At the level of alternative pretrial activities, the opportunity cost of using a set of resources to perform one particular activity (for example, detaining accused persons) can be considered the result or product that could be obtained from using those same (or smaller) resources in other types of pretrial activities (such as diversion or supervised release). At other levels of resource use suggested in the list above, individual pretrial activities, or pretrial activities as a group, can be compared to other criminal justice activities or non-governmental activities.

In all of these comparisons, if the opportunity cost (that is, the product of the activity foregone) is greater than the product of the activity undertaken, there is a loss or "cost" to society above and beyond the types of costs described earlier. This loss to society is a social cost attributable to undertaking the activity whose productivity is lower. The question of how to define and measure productivity (or more important, relative productivity) becomes a major problem when the analysis moves from the level of individual resources to criminal justice activities whose "products" are differentially defined by policymakers and analysts as deterrence, rehabilitation and so forth.

2.3.2 Point 2: Include All Relevant Cost Variables in a Model

The cost of any decision or activity usually comprises several cost components or cost variables. As we saw in the House of Correction example, the average daily cost included numerous operating costs and annual capital costs. Similarly, the halfway house operating budget in the last example included several personnel and non-personnel costs. After considering the focus of the decision (point one above), the analyst should include all the relevant cost variables in a model.

The model may be thought of as a set of independent variables (cost components) which determines the value of the dependent (total cost) variable. In the example of the variable cost function, we developed three models (see Table 2-9). The total cost of each option was a function of a different set of independent variables. For example, option A (utilizing all existing beds) required only supply costs, whereas option C (convert a facility into a prison) required personnel, supply, equipment and capital costs. After determining the relevant cost variables from the decision focus, the analyst should develop model(s) that show explicitly which variables (e.g., correctional capital costs, law enforcement personnel costs, external costs) determine total cost.

2.3.3 Point 3: The Accuracy of Cost Estimates Depends on the Measurement of Variables

Ultimately, economists strive for accuracy more than anything else when conducting cost analyses. The accuracy of cost estimates depends more than anything else on the measurement of variables. A few points should be kept in mind when measuring variables.

First, it is usually preferable to measure actual costs from expenditure data rather than budget data. Budget data are requests for resource allocations. The requests may be granted in full or changed by the reviewing body (e.g., governor, legislature). Expenditure data represent actual allocations of resources to programs or activities. By using expenditure data the analyst reduces the amount of error in the data and consequently improves the measurement of the cost variables.

Second, the time period for cost data is an important consideration. If the time period is too short, certain program costs may be omitted. As a rule, cost data for a year should be used. Furthermore, variables should all be measured for the same time period. Measurement error could be introduced by measuring one set of variables from fiscal year expenditures and another set from calendar year expenditures. Some variables are measured from monthly data while others are taken from annual data; the former should be annualized by multiplying times twelve.

Third, workload measures can be used to develop cost estimates. We demonstrated this in the program budgeting example (when we estimated the cost of the prison system's educational program) and in the model budgeting example for the probation divisions. In general, the analyst first finds out how long it takes to complete an activity. This can be ascertained through interviews or through a more sophisticated technique such as a time use study. Then, the analyst determines what the workload is (e.g., number of clients to be served, number of students in a class). This information can be acquired by interviewing the program manager or by projecting workloads from historical data. Combined, the workload and the time factor gives an indication of the total resource (personnel) requirement (e.g., demand for resources). The analyst then multiplies the total hours by the hourly rate (salaries and fringe benefits) of the staff to find the total cost. Allocating resources on the basis of their workload is much better (i.e., more efficient) than caseload management because it takes into account the time it takes to complete an activity such as a presentence investigation.

Finally, each cost component (e.g., personnel, equipment, capital) should be measured by including all relevant costs in its measurement. We attempted to show by way of example how this is done in each of the applications.

For example, in the House of Correction application, transportation costs were measured in accordance with the time it takes to make trips not simply the number of trips made. Similarly, 50 percent of the sheriff's (law enforcement) time was included in the House of Correction costs. While there are no hard and fast rules, other than to say that the measurement of each cost variable is critical to the accuracy of the total cost estimate, some guidelines can be suggested.

These measurement procedures can technically be called cost allocation, that is, costs from one program are allocated or attributed to another. There are two forms of cost allocation. One deals with a cost pool. For example, some portion of administrative overhead in the treasurer's office (the cost pool) goes towards managing the correctional system. A part of the cost pool is allocated to the correctional budget. Another situation arises in pricing externalities. For example, an external cost of recreation is the security required to guard inmates. Therefore, when analyzing the cost of recreational activities, a certain proportion of security costs should be allocated to recreation.

Two guidelines should be kept in mind when allocating costs. They are causality and materiality. The analyst should identify the resources (staff, automobiles, etc.) that in theory are necessary causes of program outcomes. The share of the cost pool (e.g., overhead) allocated to corrections would include only those administrative resources devoted to overseeing the correctional system, auditing correctional records, issuing payments to corrections, etc. Similarly, security costs allocated to recreation might include correctional officers' wages but would exclude security equipment costs as these would be incurred regardless of the recreational program. Materiality implies that the costs allocated to a program should be of sufficient magnitude to make it worthwhile. One would not add $50 in correctional officers' salaries to a $100,000 recreational budget simply because a correctional officer spent one day guarding prisoners. To be material, the resources should be utilized on a fairly regular basis and should increase costs by a fairly sizeable degree.

2.3.4 Point 4: Utilize Multiple Data Sources

As we demonstrated in some of the examples, data for cost analyses comes from a multitude of sources. Insurance and real estate companies can provide data on rentals and the value of property. Architects and construction companies can provide design estimates and estimates for materials. Wage data can be taken from civil service salary schedules.

Interviews are often an important source of data for cost analyses. For example, in the House of Correction application estimates of fringe benefits

were made by interviewing officials in the county personnel office and converting the data they provided into reasonable approximations of fringe benefits. In formulating a program budget, for example, program managers should be interviewed to find out the program's objectives, workload, staffing patterns and resource requirements. Cost estimates can then be developed by collecting cost data (i.e., the unit price of resources such as personnel and supplies) from the personnel, budget, finance or accounting department. In conclusion, the important point is that cost analysis is a creative process from start to finish, and the analyst must use his or her skills to collect the best available data to support the analysis.

Footnotes

1. This example is taken from Gail S. Funke and Billy L. Wayson, Comparative Costs of State and Local Facilities (Correctional Economics Center of the American Bar Association, 1975). All tables in this section are derived from this report.

2. In addition to the straight-line depreciation method, there are the double-declining balance and sum-of-the-years digits methods. In selecting a depreciation method, the analyst can refer to the Internal Revenue Service. See, for example, Depreciation: Guidelines and Rules (Washington, DC: U.S. Government Printing Office, 1964).

3. The approach taken in the example is modeled after Douglas McDonald, The Price of Punishment: Public Spending for Corrections in New York (Boulder, CO: Westview Press, 1980).

4. Ibid., p. 39.

5. The variable cost methodology is based on Gregory P. Falkin, Gail S. Funke and Billy L. Wayson, Revising Connecticut's Sentencing Laws: An Impact Assessment (Institute for Economic and Policy Studies, Inc., 1981).

6. See Greogry P. Falkin, Billy L. Wayson and Gail S. Funke, Users' Manual for Estimating Standards Compliance Costs, Chapter 4 (Institute for Economic and Policy Studies, Inc., 1981) for the estimation procedure relevant to building a new prison in compliance with CAC standards.

7. In actuality, cost projections such as these should be inflated so that the budget for a future time period reflects the value of money. See Appendix B-1 for inflating cost estimates.

8. See Appendix B-2 for determining the life cycle value of capital.

9. This example is based on Donald J. Thalheimer, Cost Analysis of Correctional Standards: Community Supervision, Probation, Restitution, Community Service (U.S. Department of Justice: National Institute for Law Enforcement and Criminal Justice, May 1978).

10. See Thalheimer, p. A-12 for the calculation of probation officers' hours.

11. This example is based on Donald J. Thalheimer, Cost Analysis of Correctional Standards: Halfway Houses (U.S. Department of Justice: National Institute for Law Enforcement and Criminal Justice, October 1975).

12. General Services Administration, Office of Federal Management Policy, Federal Management Circular 74-4, Attachment A (Washington, DC, July 18, 1974), p. 4.

Chapter 3

COST-EFFECTIVENESS ANALYSIS

The purpose of cost-effectiveness analysis is to provide information for choosing which of two or more ways of accomplishing an objective is most efficient or most effective. If a comparative cost analysis shows that two programs cost about the same, which is preferable? This can only be answered by looking at outputs or outcomes.[1] If there is a need to place 1,000 releasees in jobs, what is the least costly way of accomplishing this objective? How many job placements can be made with $20,000? Again, this can only be answered by comparing anticipated costs with results for the alternatives that might be used. Faced with an objective, the decisionmaker must choose either to minimize cost, given a desired level of results or to maximize results given a desired level of cost. These choices are commonly referred to as "fixed effectiveness" and "fixed cost" respectively; both cannot be accomplished with the same alternative.

3.1 Assessing Effectiveness in Meeting Correctional Objectives

The essential difference between cost analysis, which evaluates only inputs, and cost-effectiveness is the introduction of some notion of what these inputs produce. Therefore, the theme of this chapter is analyzing program objectives, related effects and measures. It should be remembered, however, that all of the analytical considerations discussed in Chapter Two — cost definitions, cost allocation, external costs, etc. -- are equally relevant to cost-effectiveness analysis. Three examples will be used to demonstrate different ways of measuring results and to show, when appropriate, how specific cost problems were treated by the analyst. One example compares the cost-effectiveness of two types of institutions; another, compares the cost-effectiveness of probation, community centers and institutions; and a third compares the cost-effectiveness of residential and nonresidential programs.

3.1.1. Decisionmaker's Role

Cost-effectiveness analysis introduces an entirely new set of information into the decision by comparing alternatives on the basis of results (outputs or outcomes). This added complexity places the decisionmaker in a more active role during the analysis and increases her/his responsibilities in defining what will be analyzed.

The decisionmaker must be actively involved in specifying and prioritizing the goals or objectives of the programs to be studied. [2] There is an abundant literature on why goals and objectives are crucial to evaluation methodology which will not be repeated here; however, in cost-effectiveness analysis a statement of objectives acceptable to the decisionmaker is even more crucial, because it helps to identify those programs which are considered as alternative ways of accomplishing an objective. Just as a car is not an alternative to fuel oil heat, a guard tower is not an alternative to high school equivalency classes -- they have different objectives. Programs must be comparable to be subjected to cost-effectiveness analysis with comparability to be determined by objective(s). A second task related to objectives is prioritization. Various schemes for carrying out this responsibility are described in the technical section of this chapter. It is sufficient to note here that most public programs are intended for more than one purpose (i.e., they have multiple objectives) and the most important objective must be selected or the subjective weight assigned to each objective must be determined. This task can only be done by the person or persons who are faced with the choice between alternatives, namely, the decisionmaker(s).

A second area of responsibility is identifying general alternatives which will be examined. Parole supervision is obviously not an alternative to probation supervision because of the way in which the criminal justice system is organized. It may be an alternative to halfway houses and could be compared on cost-effectiveness grounds. The decisionmaker also must be comfortable with the cause and effect relationships implicitly assumed by cost-effectiveness analysis. Except to allocate certain costs (e.g., overhead), or exclude unrelated costs (e.g., research), this technique only compares inputs (costs) with outputs (results) and does not examine the technical linkages or processes by which the results are presumably obtained. Why an alternative produces certain results must be explained by criminology, psychology, sociology and other social sciences, but the user of cost-effectiveness information must be reasonably confident of the underlying theory. Identifying general alternatives does not mean the analysis is deprived of its creativity, but only that the choices being evaluated must be within the purview of those who are choosing and are reasonably expected to produce the stated results.

The final area of decisionmaker responsibility concerns the use of the technique itself. As suggested above, the user of cost-effectiveness analysis must decide whether alternatives will be evaluated on the basis of fixed cost or fixed effectiveness. In the first instance, a budget figure or range is given and the alternative which maximizes results is chosen; in the second, a level of performance is specified and the minimum cost alternative chosen. The most important responsibility, however, is deciding just how useful cost-effectiveness information will be and for whom. There are a host of justifications for government programs other than efficiency: they may be important

to a politically powerful constituency; they may be symbolic, such as a chainlink fence around a minimum security camp; or they may fulfill some socially useful purpose unrelated to a specific program such as citizen involvement. Cost-effectiveness may be highly valued by a legislative appropriations committee but considered a "green eye shade" mentality by advocacy groups who support the governor. Determining usefulness of cost-effectiveness information is obviously a matter of judgment, personal predisposition and political acumen; however, it is a necessary choice to avoid unnecessary resource expenditure and results which only gather dust on the shelf.

Cost-effectiveness analysis is a useful technique when a decisionmaker wants to compare the efficiency with which two or more operating or planned programs do or will accomplish a similar objective. This comparision most commonly is made between programs already in operation or an operating and a planned program. In either case, the choice must be between alternatives intended to accomplish a common objective; cost-effectiveness information must be relevant to the audience; and the objective must be quantifiable.

3.1.2 Analyzing Program Effects and Objectives

The literature on evaluation methods is replete with discussion on identifying and measuring program objectives and will not be repeated here. The purpose of this section is to discuss how certain management systems, evaluation studies and recent research on objectives and measures for corrections are sources for identifying potential effects of programs as the first step in cost-effectiveness analysis.

Evaluation Studies. What are the effects of correctional programs? The field historically has claimed to serve a variety of sometimes conflicting public purposes: punishment, penitence, reformation, rehabilitation and reintegration. The coexistence of two or more of these purposes has clouded the measurement of performance. Recidivism unfortunately has become the pitard of correctional effectiveness, even though its limitations are well-known. It assumes, correctly or incorrectly, that the goal is crime reduction. The definition of "recidivism" (e.g., rearrest, reconviction, reincarceration) is too frequently a function of data availability and subject to so much disagreement that one study used 18 measures of the concept.[3] It does not take into consideration subtleties such as the postponement [4] and seriousness of subsequent illegal behavior. [5] Nor, does the measure incorporate other equally desirable outcomes from correctional programs such as economic productivity, social adjustment in non-criminal spheres, etc. Finally, it is a measure of failure, not success.

Despite these limitations, some concept of recidivism has been the most commonly used measure of corrections output. However, recent refinements in the concept to incorporate the time distribution of failure,[6] to measure social adjustment,[7] to account for offense seriousness[8] and the general performance measurement research[9] have served to clarify both the effects expected of corrections and their measurement. For example, introducing the timing of failure (recidivism) implicitly assumes that a program effect is postponement as well as prevention of subsequent criminal behavior.

MBO. The concern with program effects or results allies cost-effectiveness closely with the management systems of performance measurement and management by objectives (MBO). The objectives which these systems produce can be viewed as statements of program effects; although there may be more to a program than is formally stated. The relevant aspect of MBO for our purposes is "its focus . . . on solving problems and obtaining results - not on the activities which lead to these results."[10] The activities (or "production function" in the economist's jargon) are important, of course, in estimating the cost or input side of the equation, and this feature distinguishes cost-effectiveness and cost-benefit analysis from MBO. By requiring quantifiable output measures, the MBO process greatly facilitates and is a natural antecedent to better economic analysis. McConkie, for example, illustrates acceptable and unacceptable goals within an MBO system:

> ORIGINAL GOAL: The major goal of the Division of Rehabilitation Services is the treatment and training of inmates to enable them to take their place in society as law abiding citizens upon release.[11]
>
> REVISED GOAL: Within the existing budget, to reduce by 20% the number of releasees who are returned to confinement during the prison year ending December 31, 1976.[12]

The original goal is too nebulous, uses undefined terms such as "law abiding citizens," and focuses on activities ("treatment and training"). While the revision may still be difficult to measure, it introduces a time and budget constraint and specifies the level of change anticipated.

Any economic analysis is greatly simplified when the organization or even an activity within the organization has a mutually agreed to set of

objectives. More typically, however, the analyst is confronted with a vague request to evaluate the costs and benefits of an activity as it approaches refunding consideration. In this case, an additional (and sometimes time consuming) effort is required to develop not only a clearer specification of ambiguous, manifest goals but also a statement of the unwritten, latent goals.[13] The potential for questioning the results of any cost-effectiveness or cost-benefit study will be reduced to the degree program managers and executives are involved in articulating and agreeing to the restated objectives.

Performance Measurement. Research by Reynolds, Blair, et al. and Grizzle, et al. have served to sharpen the articulation of objectives and to develop related measures of performance. However, performance measures cannot be accepted uncritically because they may be related to how things are done (process) rather than to results (outputs or outcomes). For example, counting the number of presentence investigations may be an important monitoring device in the period before end products are attained, but they have only a second order relation to an agency's ultimate goal and the effects it wants to occur.

Figure 3-1 summarizes objectives and related measures for probation, prisons, parole and halfway houses presented in the literature. (See Appendix C for more detail.) What is striking about Figure 3-1 is the high degree of similarity and that each column incorporates some concept of results which relate to the individual (e.g., changes in attitude), organizations (e.g., improve caseload management) and society (e.g., reduce criminal activity). This illustrates how prospective users of information, who may have different perceptions of a program's effects, can be accommodated. The individual-organization-society distinction is critical in cost-benefit analysis (described in Chapter Four) as well as in cost-effectiveness analysis.

Other Sources. Besides the evaluation literature, program objectives may be more readily available from official documents. Laws establishing a program may include a statement of legislative intent from which measurable objectives can be derived. Certain management systems - MBO, performance measurement and performance or program budgets -- incorporate objectives and measures, but caution must be exercised to avoid selecting process, rather than output or outcome, indexes. Finally, interviews or formal surveys of different potential user groups may be conducted to ascertain their expectations of a program. This approach, like a review of legislation, will produce fairly general statements of purpose(s) from which objectives must be derived.

Figure 3-1

CORRECTIONAL GOALS AND OBJECTIVES

PROBATION AND PAROLE (Reynolds)	PRISONS AND PAROLE (Blair)	HALFWAY HOUSES (Allen)
Reduce Criminal Activity • Rearrest • Reconvictions	Reduce Criminal Activity (Rehabilitate) • Rearrest • Reconviction • Revocation • Reincarceration	Provide Program & Treatment Services • Employment • Education • Financial assistance • Interpersonal relations • Family relations • Leisure activities • Self-image • Substance abuse • Community placement
Improve Social Productivity • Employment • Training	Increase Social Productivity (Rehabilitate) • Employment • Income • Self-support	Provide Security and Resident Well-Being • In-house security • Community security • Provide basic needs
Improve Successful Completion of Terms • Completions • Violations • Revocations	Change in Attitude (Rehabilitation) • Scoring on test scales • Number scales showing improvement	Provide Support for Operations • Funding • Administrative • Facility • Staffing • Community support • Community services • Evaluations
Improve Caseload Management • Cases • Contacts • PSI's • Referrals • Costs	Hold Humanely • Inmate days of overcrowding • Rating of conditions • Unmet health needs	
	Holds Securely • Escapes • Escapee crimes • Incidents	

Sources: Jack Reynolds, Performance Measurement in Probation and Parole (Washington, D.C., University Research Corporation, 1979); L. Blair, et al., Monitoring The Impact of Prison and Parole Services: An Initial Examination (Washington, D.C.; The Urban Institute, 1977); Allen, et al,. Halfway Houses (Washington, D.C.: NILECJ, 1978).

3.1.3 Relating Cause and Effect

Cost-effectiveness analysis assumes that inputs (staff, facilities, etc.) are in some way transformed into results or outputs (crime reduction, employment, etc.); what happens inside the "black box" to make this transformation is left to other social science disciplines. Regardless of whether objectives are derived from interviews, documents or evaluation literature, they should be relevant to those making a decision and related to the activities (processes) which create the results (output). This does not mean to imply that serendipitous or unintended results may not occur but only that the meaning of cost-effectiveness information will be vacuous if the input-process-output assumption is violated. Preferably, there should be some body of theory which, at a minimum, logically, (if not empirically), relates cause and effect. The theory may be based on principles of economics, sociology, psychology, biology, or some combination. For example, if a program is designed to overcome negative labeling because it contributes to criminally deviant behavior, some measures of changes in labeling must be devised and ultimately related to reduced criminality. Alternatively, if the program assumes individuals maximize net wealth or income, whether legally or illegally, then the objective may be to increase legitimate income-producing opportunities (e.g., with vocational training). As illustrated in Figure 3-2 adapted from Grizzle, et al., there is seldom a single rationale underpinning a correctional program. Improving interpersonal relations, self-esteem and family viability are assumed to positively affect one's attitude toward society and hence reduce illegal activity. At the same time, an individual's choice of productive activity will be enhanced by increased financial independence, work and educational mobility, which are consequences of program activities such as employment activities, and training in money management.

Although cost-effectiveness analysis rarely meddles in the "black box" linking input to output, an understanding of the underlying rationale is essential when carrying out the first analytical steps which are to develop objectives, identify program effects and select measures. Decisionmaker involvement is critical not only to this step, but also in deciding whether conditions are such that an analysis is feasible.

3.2 Applications of Cost-Effectiveness Analysis

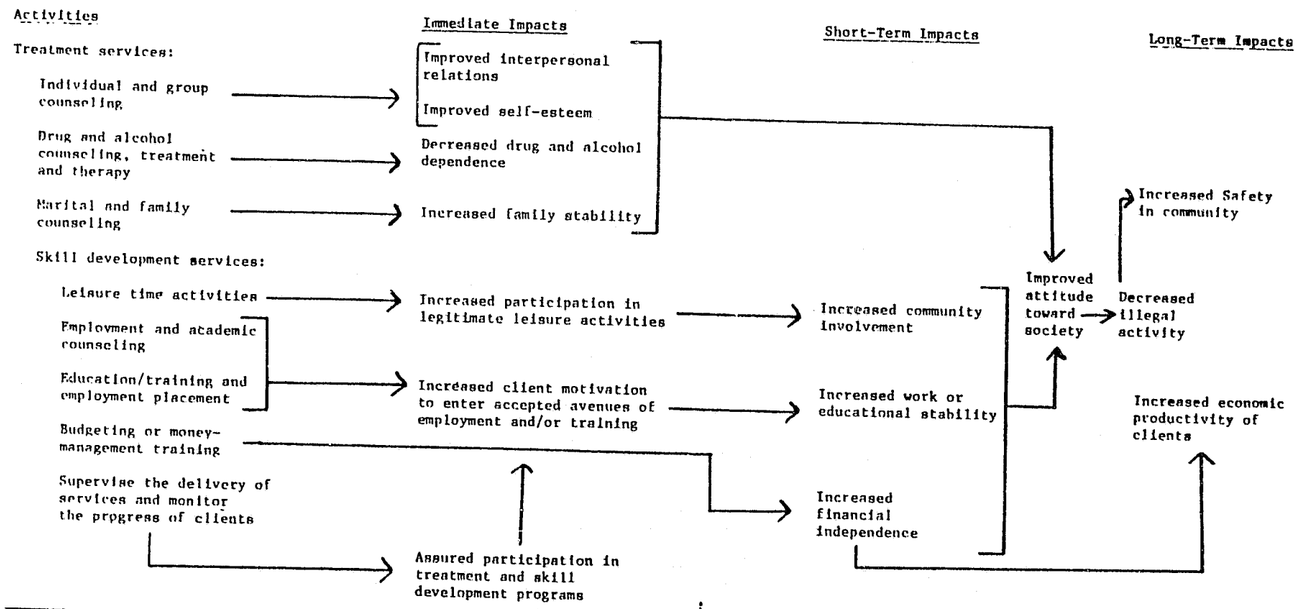
The above discussion suggests three conditions which must be met before cost-effectiveness analysis can be undertaken: [14]

1. alternatives must be possible;

2. alternatives must be directed toward comparable goals or objectives; and

Figure 3-2

EXPECTED IMPACT OF HALFWAY HOUSE TREATMENT AND SKILLS DEVELOPMENT ACTIVITIES



Source: Gloria A. Grizzle, et al., Measuring Corrections Performance: Final Report Submitted to the National Institute of Justice (Raleigh, N.C.: The Osprey Company, 1980), pp. 62-63.

CONTINUED

1 OF 3

3. time, effectiveness and/or cost constraints must be specified.

The need for the first condition is obvious: if there is only one way or no choice, comparisions cannot be made. The second requirement simply means that the intended results, such as reducing criminal behavior or improving social adjustment, must be the same for each alternative being considered. Thus, one would not compare the cost-effectiveness of police patrol to group counseling, even though they may be related at a high level of abstraction. Finally, some constraints need to be specified in advance to avoid casting the analytical net too broadly. For example, intensive psychiatric care costing $500,000 may be more cost-effective than guided group interaction, but these analytical results are meaningless if only $100,000 is available. Each of the examples described below evaluated alternative ways of accomplishing objectives, even though they define results or effects in different ways. The comparison of community centers, institutions and field services in the first example was made on seriousness of post-program crimes. Rearrest and time free before rearrest were measures selected in the third example to compare traditional and intensive treatment institutions. Data limitations noted in the second study required that residential and nonresidential programs be evaluated on the basis of service units provided.

3.2.1 Institutional and Community programs

A midwestern state operates, as part of its correctional system, a series of adult halfway houses, juvenile residences, state institutions and special probation projects. Although the study [15] described below was done independently, it addresses a recurring question asked by agency administrators, legislators and citizens: Are community residential and probation programs more cost-effective than institutions? It is clear that a mean daily cost for probation of $2-3 is less than the $20-30 sometimes cited for prisons, but prisons may produce ten times the results and, therefore, be equally cost-effective.

Decision Focus. The types of decisions which can be informed by a cost-effectiveness analysis of options which are directed at a similar objective include:

- where should additional funds be allocated, other things remaining the same?
- where should budget cuts be made?

- where should efforts to improve efficiency be directed?
- are there alternatives to the least cost-effective programs?
- can more be accomplished by reallocating resources?

Background. The community-based alternatives examined in this study were six adult halfway houses, six special probation projects (Probated Offenders Rehabilitation and Training) and six juvenile residences. Institutional alternatives operated by the state included three adult maximum/medium security facilities, one facility for adults which was medium/minimum security, and two juvenile institutions.

Since the study was not done in collaboration with or at the request of decisionmakers, the authors assumed (reasonably) these 24 projects were alternative ways of accomplishing a crime reduction objective for either juveniles or adults. The task then was to define measures of this objective and determine data availability.

Objectives and Measures. This study is notable for its use of several outcome indexes and refinement of a simple recidivism measure. Juvenile offenses filed and sustained were both used as outcome measures, but they also were modified to assess the seriousness and severity of offenses.

Forty-eight probation and parole officers and counselors were asked to rate 41 offenses as "high" (1), "medium" (2), or "low" (3) seriousness. Mean ratings were used to rank each offense from most to least severe; thus, rape was considered very serious by this group (1.08), escape less so (2.00) and curfew negligible (3.00). The resulting ranking or ordinal scale was converted into an interval scale of 0 to 100 using the following formula:

$$\text{Seriousness weight} = \frac{1}{(\text{seriousness rating})^3} \times 100$$

Table 3-1 illustrates some of the seriousness weights that were computed from the mean seriousness ratings.

Table 3-1

Illustrative Seriousness Weights

Offense	Mean Seriousness Rating	Seriousness Weights
Homicide	1.02	94.1
Simple Robbery	1.32	43.4
Larceny	1.84	16.0
Curfew	3.00	3.7

The weights should not be interpreted as suggesting that homicide was considered to be twice as serious as simple robbery by the 48 raters. However, this measure does convert simple, yes/no recidivism into one which recognizes that all crimes are not similar. It implies that an objective is not only to reduce crime but its seriousness as well. Therefore, the accomplishment of a program would be recognized if some clients switched, say, from simple robbery (weight = 43.4) to larceny (weight = 16.0).

Another method used to differentiate between crimes was to develop a severity scale based on statutory maximum sentences permitted for each offense. This was done by computing the proportion of average life expectancy in the United States (71.3 years) represented by a maximum sentence and multiplying by 100 to derive a weight. For example, if the maximum sentence for larceny is five years, this is seven percent of an expected life for a weight of 7.0. As with the seriousness scale, the type of act is taken into consideration which implicitly assumes that an objective is to reduce the severity of criminal behavior, to the extent that it cannot be eradicated.

Offenses filed and their seriousness and severity in the post-program period were compared with a predicted level based on behavior prior to an intervention, and the difference was attributed to the program. While this is not a totally valid comparison, it is sufficient for our purposes of illustrating the use of more refined and complex measures. Table 3-2 shows that, even though the same number of offenses was comitted pre and post, their seriousness declined, presumably as a result of the intervention.

Table 3-2

Computing Program Effects Using Composite Measures

Offense	Seriousness Weight (1)	Pre-Program Offenses (2)	Seriousness (3)=(1 X 2)	Post-Program Offenses (4)	Seriousness (5)=(1 X 4)
Simple Robbery	43.4	2	86.8	1	43.3
Larceny	16.0	3	48.0	4	64.0
Curfew	3.7	1	3.7	1	3.7
TOTAL		6	138.5	6	111.1

Difference between columns (3) - (5) = 27.4

Costs. There are several features of how the evaluators computed cost which warrant discussion. A distinction was made between input, output and outcome costs. The value of resources used by a program divided by 365 was defined as "input cost," since it essentially measures what it takes on average to run a program for one day and not what it produces. Since alternatives service clients for different lengths of time, an "output" or cost per case was estimated multiplying daily cost by time in program. Finally, the costs per reduced arrest, seriousness and severity were defined as "outcome cost." These distinctions are especially important in the corrections field, first, because cost per day is so commonly used inappropriately to compare alternatives and, second, because options vary so substantially in the length of time they serve clients.

Another important feature of this example is identifying those costs over which the decisionmaker has some control. Fixed costs are those which do not change with changes in client population; variable, those that do. However, whether a cost is fixed is contingent on the time period under consideration. In the very short run (e.g., weekly), only food, clothing and similar client maintenance expenditures can vary. Month-to-month, more kinds of expenditures can be changed such as salaries for counselors. All costs are variable in the long-run, since bed space can be added, all staff can be layed off, etc. These very short, short and long run perspectives are important in corrections.

The proportion of total cost represented by labor and capital varies widely by alternative; and, changing capital expenditures requires the longest time frame. As seen in the accompanying Table 3-3 extracted from Grey, et al., the very short run cost per reduced juvenile offense is less in a state institution than it is in probation or community residential centers; but it is reversed as the time period lengthens. This results, because a probation department does not have expenditures which can vary week-to-week. In essence, the evaluators varied what was included on the input or "total" cost figure to test the sensitivity of their findings to different assumptions regarding what were fixed and variable costs.

Rather than cost per client day or input costs, the study used cost per case which adjusts for different lengths of program participation. What is interesting is that a probation "case" did not refer to individual clients, but was based on a work unit concept used by the agency. A work unit approach recognizes that offenders or functions (e.g., investigations) require different amounts of staff time and assigns caseloads accordingly.[16] In this instance, one unit was defined as a "regular" probationer who was contacted once monthly; two units, as weekly contacts with an "intensive" case, etc. A caseload is some combination of these units which equals an established standard such as 50 work units per officer. Thus, both lapsed participation time and relative effort devoted to each type of client are incorporated into the measurement, cost per case. This approach, also, is used in the cost-effectiveness study of community programs described below.

A final characteristic which is very common in cost-effectiveness studies is the evaluators' creative use of diverse data sources. Indirect costs of probation were estimated using data from another probation study in one county. The value of services provided to community program participants by agencies external to criminal justice was derived from a survey of residential centers and, then, assumed to be the same for probationers and parolees. The seriousness scale for adjusting outcome measures was based on work done by another researcher for other purposes. These illustrate how a cost-effectiveness analysis can (and must) draw on a wide variety of data sources and use many data collection techniques.

Summary. Which program is most cost-effective? It depends on whether one means today, next month or next year. The study by Gray, et al, demonstrates the effect different cost definitions can have on information produced by a study (Table 3-3). In the very short run (weekly), it appears that institutions are most cost-effective; but, as a longer time period is considered, more costs are allowed to vary, and community-based programs appear more efficient. It also recognizes that how results are measured is a critical aspect of cost-effectiveness analysis.

A simple recidivism measure does not account for other possible outcomes, so it was refined to include indicators of seriousness and severity. The next example shows how output measures can be improved and combined into indexes of cost-effectiveness.

Table 3-3

Cost-Effectiveness of Juvenile Alternatives

	Very Short Run	Short Run	Long Run
Probation	$ 117	$ 117	$ 154
Residential:			
No Priors	176	199	869
Priors	183	207	902
Institution	99	412	2,006

Source: Charles M. Gray, et al., "Cost-Effectiveness of Residential Community Corrections: An Analytical Prototype." Evaluation Quarterly, August (1978), p. 394.

3.2.2 Community-based Programs

If, as suggested by the preceding example, residential and field services are more cost-effective than institutions, which of these community programs are more efficient? The scarcity of alternatives to incarceration heretofore has not required many choices regarding how resources or clients should be allocated among them. Rather, interest has been concentrated on simply creating enough programs to meet a seemingly insatiable demand for services. If there is only one halfway house in a city, there really is no choice. As the number of non-incarcerative alternatives grow and institutional costs skyrocket, this question will be asked with increasing frequency.

Decision Focus. A decisiommaker might be interested in this question if faced with budget cutbacks and the same number of clients; more clients and a constant budget; or a budget increase which must be allocated to the most efficient alternative. It should be noted that the choices are not between institutional and non-incarcerative alternatives but rather among community programs. The example described below shows how the question was answered for 28 residential and nonresidential programs operated by private agencies under contract with a state department of corrections. [17]

Background. Several years ago, a northeastern state adopted a policy of contracting with private agencies to provide parolees with job placement, counseling, financial, health care, legal and similar services. By fiscal year 1980, almost $300,000 of the department's $38.7 million budget was expended on contracts with 12 residential centers and 16 non-residential programs. Some private agencies accepted referrals from many sources and others served only criminal justice clients. They had contact with twelve hundred clients during the first six months of 1980, and this group was included in the cost-effectiveness study.

Objectives and Measures. There was no single statement of objectives for all 28 agencies as might be expected. However, a data system required by the department provided an implicit set of output objectives, because it collected information on both client needs, services delivered and the results obtained from the service. If an individual was diagnosed by department counselors as having a substance abuse problem, it was assumed that a client-specific (and by inference a general) objective was to reduce dependence on drugs or alcohol. This assumption becomes even more appropriate because service delivery was related directly to each type of problem on the reporting form. Thus, a particular process (service) was aimed at a specific output (objective). Discussions with agency and departmental personnel revealed an overall reintegration goal similar to that stated by Allen, et al. Since clients have multiple needs, the study had to devise a method for dealing with multiple, output objectives. Fortunately, the data system provided two convenient ways of aggregating multiple results -- one of which was used.

The severity of client need was rated by institutional counselors for ten items on a scale of zero to two: 0 = none; 1 = some; and 2 = significant. Secondly, units of service were standardized, so a counseling session of 15 minutes, one referral and one instance of all

other services, were equal to one work unit. Although only work units were used to measure outputs, it would have been possible to include problem severity so relatively more weight would have been assigned to difficult clients. Table 3-4 illustrates how this might have been done. The output is 11 when measured in terms of standardized service units, but increases to 13 when severity of the need is considered. Note, also, the service provider is penalized for dealing with a housing problem not considered important by the referring organization.

Table 3-4

Example of Weighted Service Units for One Client

Need	Need Severity (1)	Service Units Provided (2)	Service Unit Value (3)=(1 X 2)
Alcohol	1	5	5
Employment	2	3	6
Housing	0	2	0
Financial	2	1	2
TOTAL		11	13

Gray, et al., measured output by length of time to account for differences between programs. Standardized service units based on time for both residential and nonresidential options made it possible for Vilinsky, et al., to use these measures and, further aggregate them across objectives (e.g., employment, reduce drug abuse, etc.).

Consistent with the reintegration goal, the data system reported three types of "initial results" from a program which were similar to three client need areas: training/education secured, job secured, housing secured. Since an individual client can have more than one need, ratios rather than absolute figures were used in assessing intermediate results. For example, in one nonresidential agency fourteen clients had an employment need; eight of the fourteen secured a job. Four of the seven had a housing need and secured housing. None of their clients had an education/vocational need. The ratio measure of this agency's

successful initial output is (8 + 4 + 0) divided by (14 + 7 + 0) or 57 percent.

Another ratio measure of output was calculated using data on 283 clients "favorably" or "unfavorably" terminated from programs during the first six months of 1980. Clients whose problems were totally or partially resolved or who were referred to another agency (a requirement of contractors) were counted as favorably terminated and included in the numerator of the ratio.

Since the standardized service unit measure is close to being a process (rather than output) indicator, two ratios, also, were used to more closely approximate cost-effectiveness concepts. One measure related the number of employment, training and housing needs of clients to the number actually fulfilled by agencies; another, favorable and unfavorable terminations. (These indicators, rather than reduced criminal behavior were used in this study because agencies would not release information necessary to estimate longer term effects of their programs.)

Service unit and ratio measures were converted into separate indexes for residential and nonresidential programs. Mean service units per client in a particular program (A) were divided by the mean number per client for all programs (N) of that type and the result multiplied by 100 to derive an index.

$$\text{Service Index} = \frac{\text{Units per client}_A}{\text{Mean Units}_N} \times 100$$

This operation can be applied to any two numbers when one wants to compare a level of performance or cost to some standard, in this case, group means. A disadvantage of index number is that they cannot be interpreted straightforwardly and, therefore, may be more difficult to understand.

Table 3-5 shows raw numbers and indexes for service unit measures of residential programs. Program R1 and R2 produced slightly more service units (1.07) than the "typical" residential alternative; whereas, R12 showed results about one-third as high. Similar indexes were computed for initial outputs and terminations. All agencies delivered some service but only some reported any job placement, training or housing results (Initial Index) or "favorable" terminations; therefore, multiple output measures make more comparisons possible than when a single measure is used. For example, program R4 can be compared on terminations but not initial output.

Table 3-5

Output Indexes

Residential Program	Mean Units/ Client	Service Unit Index	Initial Output Index	Termination Index
1	73	1.07	1.14	0.00
2	73	1.07	NA	0.00
3	22	0.32	3.45	1.60
4	101	1.49	0.00	0.48
5	110	1.62	0.00	0.00
6	83	1.22	0.00	2.38
7	15	0.22	2.03	1.60
8	36	0.53	0.00	NA
9	75	1.10	0.00	0.00
10	117	1.72	0.00	0.00
11	88	1.29	2.31	2.38
12	22	0.32	1.14	1.67
Means	68		53%	68%

Source: Abbe Vilinsky, Gail Funke and Billy Wayson, Cost-Effectiveness Analysis of Community Corrections in Connecticut (Alexandria, VA: Institute for Economic and Policy Studies, Inc., 1981), p. 76.

Costs. Unlike the study by Gray, et al., programs were operated by a diversity of private agencies, so cost data were not available from grant applications or government documents. Therefore, a survey of all 28 agencies was performed using the instrument in Appendix C-4. When dealing with a diversity of programs, several cost estimating problems commonly arise: fiscal years may vary; only a proportion of total services are provided to the client group relevant to the study; and donated goods and services may be significantly large. If programs are to be compared accurately, their costs must be inclusive of all resources used, allocated among relevant client groups and encompass the same time period. The survey instrument included items specifically intended to help derive comparable input cost estimates. For example, total expenditures for two prior fiscal years and a budget for the current year were collected; then if a program's fiscal year was October-September rather than a more typical calendar year, prorated expenditures

for nine months of one fiscal year would be added to three months of another to derive a 12-month figure comparable to other programs. Agencies accepted more than just corrections' referrals, and it was necessary to have some basis for allocating total costs. Agencies seemingly did not differentiate the level or kinds of services for clients from different sources, so costs were allocated on the basis of percent correction clients. Finally, budgets or expenditures were adjusted upward to account for donated goods or services received from a parent agency or the community. An example is shown in Figure 3-3 in which 75 percent of the resources ($92,250) used in calendar year 1979, were allocated to department of corrections referrals. These types of adjustments are common in cost, cost-effectiveness and cost-benefit analysis, but care should be used to ensure expenditures do not vary significantly month-to-month.

Figure 3-3

Illustrative Budget Adjustments

	Program Expenditures
October-September, 1979:	$120,000
October-September, 1980:	132,000
.75 x $120,000:	90,000
.25 x $132,000	33,000
Estimated calendar, 1979:	$123,000
Corrections' share, 1979:	.75
	$ 92,250

	Clients Served
Total Clients, 1979:	120
Corrections' Referrals, 1979:	90
Percent Corrections	75%

Since one audience for this cost-effectiveness study was the Department of Corrections, cost-effectiveness ratios were also computed using only the dollar value contracted with private agencies. These contract costs

were always less than expenditures estimated using the above procedure. The discrepancy stemmed from the department's policy never to fund the "true" costs of servicing their referrals as an incentive for agencies to seek outside funding. (There, also, may have been an implicit belief that the marginal costs of adding a few corrections' clients to an established program were less than average costs. However, there was no evidence that the department attempted to identify and fund only those costs which varied with changes in their referrals.)

All program cost estimates were converted into indexes by dividing cost per service unit, initial output or termination by the mean value of these measures for residential programs as a whole. If it cost an average of $77 across all agencies for each service unit delivered and one agency's costs were $204 per unit, the index for that program would be 2.65 ($204/$77) or a cost over 2½ times the average.

Cost-effectiveness ratios incorporating various measures of cost and outputs were computed using cost and output indexes. For example, the average cost per client serviced by R2 was $5,480 compared to the mean of $4,090 for all programs which resulted in a cost index of 1.34. But, it also produced more service units per client (73) than others (68), so its service index was 1.07. Dividing cost (1.34) by output (1.07) yields a value of 1.25. Programs with lower indexes (cost per unit of output) in Table 3-6 can be judged more efficient. (If ratios were reversed the interpretation would be "number of service units per dollar expenditure.")

The advantage of using more than one measure of results can be seen by comparing agency R3 and R4. In column one, which uses a service unit measure, R4 appears more cost-effective, but this is reversed when they are compared on the basis of favorable terminations (column 3). This underscores the importance of obtaining agreement on objectives and measures from prospective users before undertaking a cost-effectiveness analysis.

Summary. Vilinsky, et al., were only able to measure two kinds of results (initial outputs and terminations) and one process indicator (service units delivered). Services delivered by 28 private agencies were reported in standardized work units with 15 minutes of counseling, one referral and one instance of any other service being equal to a "work unit." If an agency secured housing, a job or training for a client, they were credited with having accomplished an objective (created an output). Similarly, credit was given when someone was favorably terminated from the program.

Table 3-6

Cost-Effectiveness Indexes

	Index CC[a] / Index SU[b] (1)	Index CC / Index IO[c] (2)	Index CC / Index TO[d] (3)
R1	3.40	3.19	0.00
R2	1.25	NA	0.00
R3	1.22	0.11	0.24
R4	0.89	0.00	2.75
R5	0.57	0.00	0.00
R6	0.37	0.00	0.19
R7	2.32	0.25	0.32
R8	2.04	0.00	NA
R9	0.52	0.00	0.00
R10	0.26	0.51	0.43
R11	0.57	0.32	0.31
R12	1.94	0.54	0.37

a/ CC = Average client costs
b/ SU = Average service units/client
c/ IO = Proportion successful initial output
c/ TO = Proportion successful termination

These measures of output are obviously not as desirable as the reduced crime outcome indicator used by Gray, et al. However, it does add more information than simple cost analysis by making possible comparisons of agencies' efficiency.

Survey data were used to estimate expenditures for 28 programs over a common time period. The allocation for department of correction referrals was estimated using the proportion of DOC to total clients served by an agency. These and similar budget adjustments are always necessary when evaluating programs which are not part of a single organization. But, occassionally, they are necessary even when operated under the same auspices as were the two institutions in the next example.

3.2.3 Institutional Alternatives

Like community alternatives, secure institutions vary widely in their costs, intervention techniques and intended results. Some require an intensive regimen of counseling, training and education; others are

oriented toward holding offenders securely, minimizing idleness and providing so-called treatment opportunities almost as a leisure time activity. There is no definitive answer regarding which approach has the best results, but the costs of operating the first approach are usually higher in the short-run.

Decision Focus. Which type of institution has the best results? Once someone has discovered cost differences, this question logically follows. If costs are unequal, is effectiveness the same or different? Can the costs of one be reduced without sacrificing results? Can the effectiveness of one be increased by adding resources? These kinds of questions were asked in one state and the resulting cost-effectiveness is described below.[18]

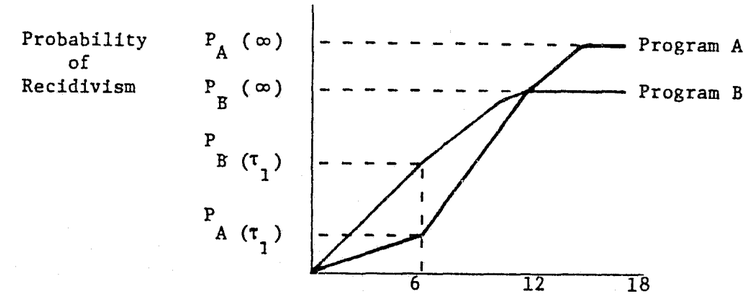
Background. Since 1955, a mid-Atlantic state has operated a high security, intensive treatment institution for persons convicted of crimes who also have "intellectual deficiencies" or emotional disorders." Offenders diagnosed as having these problems are committed for an indeterminate period with release contingent on individual performance in education, training, work and recreation programs and response to psychotherapy counseling, etc. If progress is made, the offender is awarded more privileges within the institution and is gradually released, first to a release center on grounds, then a halfway house, and, finally, outpatient status at a clinic. The alternative to this institution -- and one selected by the court for some diagnosed as "deficient" -- was a traditional maximum security prison whose costs were substantially less.

The study by Bloom and Singer was designed to determine which institution was more cost-effective. For our purposes, their evaluation included two features of particular interest: on the input side, they included an estimate for the value of inmate manpower (or opportunity cost of institutionalization); output was measured both in terms of crime free months and recidivism using a model to isolate program effects.

Objectives and Measures. The authors assumed the institutions had two objectives: to postpone crime and to prevent further crime. Therefore, accomplishment could be measured not only with simple recidivism or failure rates but also with the time between release and subsequent criminal acts. One program may have a higher recidivism rate in the first six months, but a lower one overall, so the results will be sensitive to when they are measured. This was overcome by using a model which incorporated both time at risk and probability of failure. Figure 3-4 shows how these impacts might be plotted for two programs.

Figure 3-4

Comparing Program Impact Over Time



Costs. A unique feature of this study's cost estimates was the inclusion of earnings foregone by inmates while they were incarcerated. As explained in earlier chapters, this is an opportunity cost of incarceration since some of the incarcerees would have been employed and contributing to the national economy. Regression estimates of these costs were made using data from the 1974 National Prisoners Survey for income, education, marital status, race, age and drug abuse. Values of the same variables for inmates included in the cost-effectiveness study were substituted into the regression equation and resulted in a potential annual earnings of $8,900 or $35,600 over the four years most were incarcerated.

Summary. The model used to compare the traditional institution with an intensive treatment one showed that 84 percent of the releasees from the former and 76 percent from the latter were ultimately rearrested. (Unfortunately, data and time limitations did not permit measurement of reconvictions and recommitments.) In addition, the mean time to rearrest was, also, better for the intensive (2.3 years) than the traditional (1.3 years) alternative. Just as programs cannot be compared fully on the basis of costs alone, they, also, cannot be compared only on results. The cost of one additional year to rearrest and 6 percent less recidivism was an additional $38,000 per offender.

If the sole objective was to prevent crime by incapacitation, the traditional prison is clearly more cost-effective. The postponement and

post-release prevention objectives do not make this single criterion of successes sufficient; however, the scope of the cost-effectiveness analysis over an entire institution does not provide information on which components account for the differential results. In this case, the legislative decisionmakers chose to reduce the maximum period of imprisonment in the intensive alternative and made it voluntary -- two actions thought to reduce costs.

3.3 Points to Rembember

What are we getting for $100,000? Which contractors should be drop? How will we allocate the additional $50,000 for community corrections? Each of these questions is implicitly asking what the results are from alternative approaches to accomplishing some goal. Cost or comparative cost analysis cannot provide information for answering this type of question; cost-effectiveness analysis can.

3.3.1 Point 1: Determine Feasibility of Doing Cost-effectiveness Analysis

Before a cost-effectiveness analysis is undertaken, several other questions must be answered to decisionmakers' and analysts' satisfaction:

Are there alternatives? Without different ways of accomplishing something, there is no choice and, hence, cost-effectiveness analysis is impossible.

Are there comparable goals and objectives? If two programs are directed at widely differing ends or their common purpose is too general (e.g., improve society), they cannot be compared using cost-effectiveness analysis. The objective must be comparable and measurable.

Is efficiency an important decision criterion? Public programs are undertaken for many social and political reasons other than economic efficiency. Once operating, they are continued and legitimately justified on many grounds other than how well they use scarce resources. Typically, cost-effectiveness is only one of several measures of a program's worth, and its importance must be reassessed within each decisionmaking context.

Once these preliminary questions have been answered to the satisfaction of both decisionmakers and those who will perform the analysis, the first step is to identify relevant objectives.

3.3.2 Point 2: Clarify Objectives with Key Decisionmakers

The evaluation literature contains a great deal of information describing where to find objectives, how they should be stated and techniques for translating them into measurable terms. In an ideal situation, a program's objectives would be found in the documents which created it and would be accompanied by a set of assumptions regarding why this particular endeavor was thought to lead to a clearly stated result. More commonly, the underlying rationale is a combination of subjective beliefs, agency tradition and implicit theoretical concepts which are unwritten, unverified or unintelligible to an evaluator. Since the essence of cost-effectiveness is relating results to resources, measurable objectives are the critical variables.

Types of Objectives. To be useful in cost-effectiveness analysis, objectives and their measures should relate to results (outputs or outcomes) and not to processes by which these results are obtained. In part, these distinctions are arbitrary and a function of the perspective from which one views the activity being evaluated. For example, if an organization's principal function is vocational testing then an objective such as "complete skills inventories for 200 clients" is an acceptable output objective. However, if this function is one of several performed by a halfway house, to produce an outcome of "improved social productivity," it is more properly treated as a process objective; an output objective for this organization might be "to place 100 clients in jobs paying $3 per hour for at least six months." Sometimes outcomes are associated with goals and outputs with objectives, but these distinctions are generally not made here to avoid further complicating the writing.

Performance measurement research and other evaluation studies are fruitful sources for extracting a preliminary set of candidates for review by key decisionmakers and program managers. (See Appendix C) However, these objectives should be considered no more than tentative and supplemented with agency documents, budget narratives, enabling legislation and interviews. These various sources may solve one analytical problem and create another -- too many objectives.

Multiple Objectives. Sometimes there are more objectives than can be analyzed within the time and resources available or, prospective users differ over which objective is most important. In these situations the

basic solution is to establish priorities, using one of several techniques. [19] Sometimes objectives can be organized by level of specificity by creating a goals hierarchy which relates day-to-day activities to intermediate results (outputs) which, in turn, are related to longer run effects (outcomes). [20] For example, activities like job readiness and skills training may be intended to result in a placement (output) which will enable the individual to become socially productive (outcome).

An example of a goal hierarchy drawn from Allen, et al., is shown in Figure 3-5. It shows the relationship between lower level, process objectives (e.g., testing) and higher order goals which focus on outputs (e.g., employment) and outcomes (e.g., reduce reliance on criminal behavior). Not only does it rank the importance of various results, but it also implicitly describes the rationale on which the program is based (although not as clearly as Figure 3-2). If only one or a few objectives can be evaluated, selection is made from the highest level consistent with data and/or resources available to perform the analysis

Another method of assigning priorities among objectives is to develop weights on the basis of ratings or rankings done by prospective users of cost-effectiveness information. [21] For example, preventing an additional serious crime against persons may be rated as more important than preventing a property crime; in which case a priority has been established among these two objectives.

Finally, objectives may be considered of equal or undetermined priority and multiple measures are used to address the concerns of different user groups. For example, the report may include cost per reduced arrest, conviction, and incarceration; cost per reduced crime and reduced seriousness; or cost per month of undetected crime and cost per reduced crime. The advantage of using multiple measures is that the information will be useful to a wider audience.

Whether single or multiple, the objective(s) chosen must be relevant to the cause-effect relationship implicitly or explicitly underlying the programs being compared. Cost-effectiveness analysis does not meddle in the "black box" linking inputs and outputs, but the effects it measures will be questionable if this connection is unclear or unconvincing.

3.3.3 Point 3: Select Measures

Level of specificity, data availability or limited resources may make some objectives unmeasurable; those that are, however, must be carefully selected.

Figure 3-5

Goals Hierarchy for a Halfway House

BROAD GOAL	To assist in the reintegration of ex-offenders by increasing their ability to function in a socially-acceptable manner and reducing their reliance on criminal behavior								
SUBGOALS	To provide clients with programs and treatment services directed toward reducing the disadvantages and problems of returning to the community after a period of incarceration.			To provide sufficiently secure environment for clients designed both to safeguard the community by reducing the opportunity for unobserved deviant behavior, and insure clients' health and well being.			To provide the necessary support for operations of the house, and to allocate resources among house functions in the most efficient manner.		
BASIC OBJECTIVES	EMPLOYMENT	EDUCATION	FINANCIAL ASSISTANCE	IN-HOUSE SECURITY	COMMUNITY SECURTIY	PROVIDE BASIC NEEDS	FUNDING	COMMUNITY SUPPORT	STAFFING
ACTIVITY OBJECTIVES	1. Job Placement	1. Testing	1. Require savings	1. House rules	1. Curfews	1. Shelter	1. Budgeting	1. Volunteer programs	1. Recruitment
	2. Vocational testing	2. Basic skills training	2. Consumer education	2. Crisis intervention	2. Activities log	2. Food	2. Accounting	2. Advisory Board	2. Training
	3. Job finding skills	3. Education counseling	3. Money management	3. Night supervision	3. Use of volunteers	3. Transportation	3. Grants	3. Meetings with community groups	3. Assessment
	• • • etc.	• • • etc.		• • • etc.	• • • etc.	• • • etc.	• • • etc.	• • • etc.	• • • etc.

Source: Harry Allen, et al., Halfway Houses (Washington, D.C.: NILECJ, 1978), p. 6-8.

Types of Measures. Blair, et al. and Reynolds provide guidance on how to select measures for performance systems which is also applicable for cost-effectiveness. Some criteria for assessing measures include: [22]

- importance — the phenomenon being measured contributes to a stated objective;
- uniqueness — the measure provides information unlike any other measure;
- validity — changes in the measure accurately reflects achievement;
- influenceable — the agency can affect the measure (i.e., results);
- precision/reliability — values can be assigned accurately and repetitively;
- timeliness — feedback can occur at a point when decisions must be made;
- reasonable cost — data collection can be accomplished within resources available to the agency.

In essence these criteria require that an agency be capable of routinely collecting data which accurately measures a particular phenomenon under its control so information will be available when decisions are made. Measures which meet these criteria may take a variety of forms from the simple to the complex. [23]

- Counts are simply numbers such as number of cases;
- Rates include items like terminations per month which measure the frequency of some event;
- Ratios relate two numbers such as number of arrests per releasee. Percentages and proportions are simply variants of ratio measures;
- Indexes are combinations of numbers which represent a complex phenomena. For example, units of various types of service (counseling, job placement, etc.) may be summed to yield a composite measure. Items comprising the index such as counseling may be weighted by the mean time to deliver each unit of service, subjective values assigned by program managers or some other method which differentiates items within the index; and
- Models use multivariant statistics to relate some measure of result (e.g., recidivism) to a set of variables and compare predicted with actual results.

Since indexes have been used rarely in correctional evaluations, this type of measure requires special mention here. The problem of multiple objectives discussed above can be solved by combining measures of each into a composite measure or index. For example, service units in a probation department may be defined as the sum of the following items: number of needs assessments, counseling contacts, referrals, referral follow-ups, revocations, completions. [24] If each of these items are of unequal importance, they can be weighted by time required to complete each event or some other indicator of relative importance such as ratings by program managers. Table 3-7, adapted from Grizzle, et al., shows how this weighting can be done. The minutes for each activity can be estimated by persons performing them or workload sampling. The number of events with a revocation is multiplied by the weight (390 minutes) to derive a value for that item of the index. These results are less cumbersome if weights are converted into smaller numbers such as units of 15 minutes so referral follow-up = 1, needs assessment = 12, completion = 2, etc.

Table 3-7

Calculating a Weighted Service Unit Index

Index Item	Minutes Required (1)	Number Performed (2)	Item Value (3)=(1 X 2)
Needs Assessment	180	8	1,440
Counseling Services	50	300	6,000
Referred	20	15	300
Referral Follow-up	15	12	180
Revocation	390	3	1,170
Completion	30	5	150
		Service Unit Index	9,240

No single type of measure is appropriate for all evaluations; indeed, the cost-effectiveness examples described above each make use of several types. One, for example, uses both the number of subsequent crimes (counts) and their severity and seriousness (indexes); another uses agency-defined, service units per client (ratio) to construct an index based on mean service units per client in all alternatives being evaluated.

3.3.4 Point 4: Adjust Cost Estimates

Chapter Two explained in detail the many points to remember when analyzing the cost or inputs of a program. It is important in cost-effectiveness analysis that one ensures that expenditures are for a similar time period; exclude activities within a program unrelated to producing the specified results; and include all economic costs, especially donated goods and services. It is unacceptable to include rental expenditures for one alternative, because it is a budgeted item, and exclude them for another, because space is provided "free" by a parent agency.

3.3.5 Summary

Cost-effectiveness is a form of comparative analysis which relates both the inputs and outputs of two or more alternative ways of achieving an objective. However, it is not a technique for comparing programs with dissimilar objectives such as crime prevention/reduction and public works projects. For this evaluation, a type of analysis is required which can evaluate results obtained from these very different activities in terms other than counts, ratios, indexes, etc. Cost-benefit analysis is such a technique which compares alternatives in terms of their return on investment and is the subject of Chapter Four.

Footnotes

1. "Outputs" is sometimes used to refer to immediate or short-run results (e.g., job placements) and "outcome" to long-run results (e.g., social productivity). They will be used here interchangeably, unless otherwise specified in the text, to mean the tangible and intangible effects of some activity.

2. "Goal" and "objective" are treated as synonymous unless otherwise specified in the text.

3. Gordon P. Waldo and Theodore G. Chiricos, "Work Release and Recidivism: An Empirical Evaluation of a Social Policy," Evaluation Quarterly, 1977, Vol. 1, No. 1, p. 106-107.

4. M. D. Maltz and R. McCleary, "The Mathematics of Behavior Changes: Recidivism and Construct Validity," Evaluation Quarterly, 1977, Vol. 1, No. 3, pp. 431-438.

5. Charles M. Gray, C. Johnston Conover and Timothy M. Hennessey, "Cost Effectiveness of Residential Community Programs: An Analytical Prototype," Evaluation Quarterly, 1978, Vol. 2, No. 3, pp. 375-400.

6. See Stephen Stollmack and C. M. Harris, "Failure Rate Analysis Applied to Recidivism Data," Operations Research 22, pp. 1192-1205; and Maltz and McCleary, op. cit.

7. Harry P. Allen, Eric W. Carlson, Evalyn C. Parks and Richard P. Seiter, Halfway Houses (Washington, DC: National Institute of Law Enforcement and Criminal Justice, 1978), p. 72 ff.

8. Gray, et al., op. cit., pp. 384-389.

9. See Jack Reynolds, Performance Measurement in Probation and Parole (Washington, DC: University Research Corporation, 1979); Louis Blair, Harry P. Hatry, Karan Bunn, Leslie Stevens and Kenneth Parker, Monitoring the Impacts of Prison and Parole Services: An Initial Examination (Washington, DC: The Urban Institute, 1977); Gloria Grizzle, et al., Measuring Corrections Performance: Final Report Submitted to the National Institute of Justice (Raleigh, NC: The Osprey Company, 1980).

10. Mark McConkie, Management by Objectives: A Corrections Perspective (Washington, DC.: NILECJ, 1975), p. 1.

11. Ibid., p. 15.

12. Ibid., p. 16.

13. See Daniel Glaser, Routinizing Evaluation (Washington, DC: U.S. Government Printing Office, 1977).

14. A. D. Kazanowski, "A Standardized Approach to Cost-Effectiveness Evaluations." In Cost Effectiveness: The Economic Evaluation of Engineered Systems, J. Morley English, ed. (New York: John Wiley and Sons, Inc., 1968), p. 114.

15. Gray, et al., op. cit.

16. S. Christopher Baird, Richard C. Heinze and Brian J. Beume, The Wisconsin Case Classification/Staff Deployment Project: A Two Year Follow-Up Report (Madison, WI: Department of Health and Social Services, Division of Corrections, 1979), p. 30 ff.

17. Abbe Vilinsky, Gail S. Funke and Billy L. Wayson, Cost-Effectiveness Analysis of Community Corrections in Connecticut (Alexandria, VA: Institute for Economic and Policy Studies, Inc., 1981).

18. Howard S. Bloom and Neil M. Singer, "Determining the Cost-Effectiveness of Correctional Programs: The Case of the Patuxent Institution," Evaluation Quarterly, 1979, vol. 3, No. 4, pp. 602-628.

19. Michael Quinn Patton, Utilization-Focused Evaluation (Beverly Hills, CA: Sage Publications, 1978), p. 136.

20. Lynn Lyons Morris and Carol Taylor Fitz-Gibbon, How to Deal with Goals and Objectives (Beverly Hills, CA: Sage Publications), p. 69-75.

21. Ibid., pp. 62-29.

22. Blair, et al., op. cit., p.12.

23. Reynolds, op. cit., pp. 57-59; Grizzle, et al., op. cit., pp. 82-91; Peter Schmidt and Ann D. Witte, "Evaluating Correctional Programs: Models of Criminal Recidivism and an Illustration of Their Use," Evaluation Review, 1980, Vol. 4, No. 5, pp. 585-600.

Chapter 4

COST-BENEFIT ANALYSIS

Cost-benefit, or benefit-cost analysis is the process by which the expected (or observed) benefits of an undertaking are compared with their expected (or observed) costs. It is a method by which it can be determined whether these benefits warrant the allocation of society's scarce resources to produce them. Since resources are scarce, that is, not unlimited, cost-benefit analysis yields information on whether the labor, capital and other resources used in a particular activity might be better allocated to another use. Cost-benefit analysis can answer such questions as: Is the positive change in client behavior in an intensive treatment program worth the extra program costs? Will improving prison industries' operations result in a "payoff" to released inmates? Which will be a better investment for a community: a library, a park or a prison?

This chapter will present information on the uses of cost-benefit analysis and its relationship to cost and cost-effectiveness analysis. A case study illustrates the application of the concepts and techniques. Included is information on benefits determination, estimating costs, distribution of costs and benefits, calculations of present value, discounting and interpretation of results. We demonstrate the technique with a cost-benefit analysis of a juvenile diversion project.

4.1 Assessing the Return on Investment in Corrections

Cost-benefit analysis differs from the other forms of economic analysis discussed earlier in this Program Model. Because the benefit or outcome side is distinguished from the cost or input side, the technique enables analysis of a single project, multiple projects of differing scale, and projects with non-comparable objectives. In using cost-benefit analysis we are concerned with questions about the most efficient use of society's resources. As such, the analysis is less concerned with whether a project is "humane," or whether halfway houses are "better" than prisons, except as this translates into benefits which can be assessed against costs. Thus, a social service agency seeking to efficiently allocate its scarce resources might be interested in a comparison between an enriched community services program and a drug treatment center, even though these projects have non-comparable objectives. In cost-effectiveness analysis we are ordinarily

searching for the most efficient way to accomplish a particular objective (i.e., minimize the costs, or if costs are fixed, maximize the output). In cost and comparative cost analysis the output side is assumed constant or ignored. But in cost-benefit analysis we are concerned with optimum resource allocation. Therefore, if the social benefits of a park are greater than those of a streetcleaning program or a halfway house, the park represents the most efficient investment. Because of this distinction, cost-benefit analysis should only be undertaken when the issue in fact is the efficient allocation of resources, either when contemplating alternative investments, or estimating the payoff of a particular project.

In cost-benefit analysis, the benefits are derived and estimated separately and apart from the inputs used to produce them. This is unlike certain forms of cost-effectiveness analysis where output measures such as "clean" days or case costs may be expressed in terms of the inputs used to produce them. Cost-benefit analysis independently values the outcomes and permits their subsequent comparison with costs.

Cost-benefit analysis unites the concepts and techniques of cost and cost-effectiveness analysis discussed in previous chapters and introduces some new considerations of its own. The techniques of cost analysis are useful not only for analyzing resources on the input side but for valuing benefits. The concepts of cost-effectiveness analysis are critical to understanding the relationship between program objectives and activities and the benefits which flow from these activities.

Cost-benefit or benefit-cost analysis is the most informative type of economic/cost analysis. Because it is time-consuming and costly to undertake, however, it is also the most infrequently used technique. The decision focus of cost-benefit analysis is return on investment: the return, or program benefits, compared to the cost, or investment, necessary to produce them. As such, cost-benefit analysis focuses on program efficiency, although other goals may certainly be present in the decision context. Ideally, when employing cost-benefit analysis, the decisionmaker is interested in whether a program represents an efficient use of society's resources. In the case of multiple programs this would mean the selection of the program which exhibited the greatest net benefit or whose benefit-cost ratio was the largest. In the case of a single program, interest would focus on the degree to which (if any) benefits exceed cost.

Cost-benefit analysis is of recent vintage (1960's) in public project evaluation and has been more widely used for government projects and programs other than corrections. However, as corrections is faced with burgeoning numbers of persons under supervision and the fiscal realities of budget constraints, such analysis should enjoy more widespread application. The reasons for this include the capability of cost-benefit analysis to indeed suggest the most efficient use of scarce resources, as well as the range of decisions which the technique can inform. In using cost-benefit analysis

we have more latitude than with less sophisticated techniques. We may analyze a single project or a series of projects with different objectives. In addition, it is also possible to perform an "inventory" type of cost-benefit analysis in which dollar valuations are not derived. In this case, costs and benefits are enumerated, or inventoried, and the result provides less than a net benefit figure but still represents a non-quantitative evaluation of a program's costs and benefits. Because of the possibility of unintended consequences, this modified application is still capable of providing useful information.

The types of decisions that can be informed by cost-benefit analysis are indeed quite numerous. They differ from those informed by cost-effectiveness because of the focus on net benefits i.e., the valuation of the output of a project). The technique may be used to evaluate an existing single project in order to inform decisions about its continuation. Or, a contemplated project may be assessed as to whether it constitutes a "good" investment. A series of existing projects may be evaluated to select a smaller set for continued funding; a series of contemplated projects may be analyzed to determine which, if any, warrant funding. When several projects have similar costs and there is a budget constraint, cost-benefit analysis will help select the best investment. Projects with non-common objectives, outcomes or technologies may be evaluated and compared using cost-benefit analysis. Thus, the technique permits evaluation of a single project, multiple projects and projects with differing objectives; in addition, analysis may be conducted for ongoing or contemplated projects.

In addition to its applicability to a wide range of project scenarios or decisions, cost-benefit analysis provides detailed information about the program(s) being evaluated. Besides providing specific information about program inputs, outputs and outcomes, some additional features of this technique differentiate it from the other economic techniques discussed in prior chapters. Cost-benefit analysis incorporates both planned and unplanned consequences or effects of the project under evaluation. These latter effects are characterized as externalities, or spillover effects, and range from a diversion program's utilization of other, non-criminal justice agency (e.g., employment) resources to greater public understanding about correctional activities. Because cost-benefit analysis includes program outcomes or effects, the analysis must be broad enough to include both planned and unplanned (unplanned in the sense that they are not directly related to project objectives and activities) effects. For example, a drug treatment program designed to reduce addiction may provide information on new technologies (treatment modalities) which can be used by other programs; or, there may be an increase in crime because persons who would normally be committed have more freedom. Whenever possible, consequences such as these should be identified and included in the analysis.

Other related features include future costs and benefits of the program as well as the distribution of costs and benefits generally. Because the

effects of activities are not limited to program duration, anticipated future consequences must be incorporated into the analysis. These range from reduced recidivism to increased lifetime earnings as a result of program participation. In addition, costs and benefits do not accrue equally to each individual or group. The benefits (or costs) of the individual program client are not the same as those of the criminal justice system or society generally. Knowledge of both future effects and the distribution of costs and benefits provides additional information to the decisionmaker.

In sum, then, the decision focus of cost-benefit analysis involves the efficient allocation of resources. Decisionmakers seeking to maximize the return (benefits) for a particular investment (costs) may use this technique to compare different programs. Those with a finite budget for alternative projects will select that subset of projects which maximizes the total benefits for a given outlay. Administrators contemplating beginning or continuing a particular program will be interested in the relationship between costs and benefits -- is the program "worth it"?

4.2 Application: A Cost-Benefit Analysis of a Juvenile Diversion Program

The commissioners of a county are faced with a decision about whether or not to assume funding for a model juvenile diversion program located in their county whose federal grant is expiring. The Juvenile Services Program began operations two years ago with federal seed money. At the end of the current calendar year its initial grant will be exhausted. The program is managed by a private firm based several hundred miles away. Those involved in the funding decision believe that a study should be performed to determine the program's value to the local community. A cost-benefit analysis has been suggested as a means for ascertaining program costs and the benefits accruing from them. Hopefully, the study product will help the commissioners decide the relative merits of the program and the level of operations at which it should be refunded.[1]

4.2.1 Decision Focus

In this example the focus of the decision is on whether to continue the program at all, and if so, at what level of operations. The decision criteria include program efficiency (i.e., do the program benefits warrant the expenditure of scarce county resources)? A decision not to continue the program in the face of a favorable cost-benefit ratio would suggest that the county had other ways in which to spend its funds which would provide a greater return on investment (e.g., a six percent vs. a four percent return).

4.2.2 Background

The Juvenile Services Program is non-residential and serves 80 clients at any given time. Involvement is approximately three months, during which time participants are offered intensive counseling, as well as educational tutoring and job training and placement. The program provides an alternative to "traditional" juvenile case processing. Referrals to the program occur in one of two ways: "formally," through the county Youth Services Department, or "informally," through suggestions by parents or schools that a child might benefit by program attendance. "Formal" program referrals occur when decisions are made about whether or not complaints should be disposed by filing them for appearance before a juvenile court judge. Of all program participants, 80% are formally referred, the balance being informal referrals. The program offers a payoff to successful participants which has positive consequences for the county juvenile justice system. Upon entering the program, a report is sent to the Youth Services Department and the State Attorney's Office recommending a "no file" decision on the charge for which the child was referred to the program (for formally referred participants). During the period of program involvement, the State Attorney's Office holds the child's case in abeyance pending successful program completion. Approximately 75% of the participants are successfully terminated, and charges are dropped for virtually all these cases which were formally referred. This impacts favorably upon the juvenile justice system by reducing the number of cases which must be processed and appear in court. Appendix D-1 presents a flow chart of the system.

Organizational Description. The Juvenile Services Program's model status resulted in several characteristics not usually attributable to a community program. For example, it is operated by a private, non-local management consulting firm that was awarded the federal contract for planning, implementation and managerial support functions. To fulfill grant requirements, an ongoing evaluation was built into operations. An independent third party evaluator was hired to perform comprehensive pre- and post-participation testing of clients to ascertain exactly what kinds of improvements result from program involvement. For comparative purposes, intake, testing and follow-up are performed for a matched sample control group. This group of children (approximately 120 for the first year of operations) is significantly correlated with participants with respect to age, sex, race, reason for program referral (intake charges), prior record, grade level, and reading, mathematical and intelligence test scores. Program staff also must assist in evaluation measurement and testing, particularly the Intake Officer (who performs pre- and post-testing). This evaluation is intended to document educational improvements, as well as changes in attitudinal and motivational factors. In addition, data were collected on subsequent criminal behavior for both groups. Since cost-benefit analysis focuses on net benefits i.e., the change in outcomes attributable to program operations, capturing outcomes of traditional program is critical as well.

Figure 4-1

Goals, Objectives and Activities for a Diversion Project

Goals	Minimize System Involvement (short-run)	Reduce Recidivism (long-run)	Develop Community Assistance & Support	Facilitate Program Re lication
Objectives	• Produce positive and measurable attitudinal change • Secure employment for clients		• Increase involvement of community with juvenile offenders	• . sure administrative a.countability
Activities	• Counseling • Contract programming • Volunteer services	• Academic training • Job placement	• Work awareness sessions • Job placements, work experience • Agreements with local organizations for education, health, training, etc.	• Intensive management supervision • Program evaluation • Benefit-cost analysis

Program Activities. Assistance and activities provided by the program include counseling, job placement, education services and so forth. The program provides counseling and support services in-house but relies on community resources for education, training and job placement.

4.2.3 Analysis

Understanding the background, or setting, in which a program operates is a necessary precursor to actually engaging in cost-benefit analysis. The analytical steps include specifying the program's objectives, enumerating, measuring and analyzing the cost and benefits of the program, and then presenting and interpreting the results for decisionmakers. These analytical steps are described below for the diversion program.

Program Objectives. The first step in cost-benefit analysis is the specification of program goals and objectives. It is from these goals and objectives that program activities flow and to which benefits relate. A program goal may be broad (e.g., reduce crime), but must then have specific measurable objectives. The objectives themselves must have discrete activities directly related to the attainment of such objectives. Without this rigor, it is impossible to assign benefits and costs, or to determine if a program produced its intended effect. In addition, since many programs have multiple goals, specificity is necessary if their attainment is to be separately measured. A well-prepared program design will address these concerns, but occasionally the analyst may find himself or herself ferreting out unclear objectives and vague activities. The requirement of measurability is necessary if costs and benefits are to be evaluated at the margin (i.e., their net change attributable to the program) and subsequently expressed in dollar terms. Figure 4-1 provides an example from the case study of goals, objectives and program activities. Each activity relates to its objectives (one activity may fulfill more than one objective) and the objectives in turn relate to the goals.

Enumerating Costs and Benefits. The next step is to consider the costs and benefits associated with the various program objectives and activities. At this stage it is not necessary to be limited to only those costs and benefits which may be quantifiable and susceptible to dollar valuation. We may be able to perform more quantification than initially appears evident, and there is a place in cost-benefit analysis for unquantifiables. The initial listing may be quite broad; the purpose here is to identify as many costs and benefits attributable to the program under evaluation as possible. In order to proceed with this step, additional information about the program may be necessary, such as budgets, client information, criminal justice system involvement, and outside resources. Following is the sort of information from which the analyst might glean this first listing of costs and benefits.

Figure 4-2

Juvenile Assistance Program Budget (annual)
(First Year of Operation)

Salaries and Fringe Benefits[a/]	$272,184
Consultants and Temporary Help[b/]	3,030
Travel and Auto[c/]	21,855
Supplies (consumables and xerox)[d/]	9,251
Telephone and Postage	8,377
Office Operations:	
Supportive Funds (includes utilities)[e/]	21,285
Equipment, Furnishing and Leaseholder Improvements[f/]	7,341
Evaluation Contractor[g/]	13,200
Overhead and Fee (private management)	116,903
TOTAL ANNUAL EXPENDITURES	$473,436

a/ Includes salaries for the following program staff: Director, Assistant Director, Vocational Coordinator, Intake Officer, Screener/Receptionist, Contracts Coordinator, Staff Assistant, 5 Counselors, 3 Tutors and 2 Secretaries. Fringe benefits are approximately 17%.

b/ Includes assistance hired to complete planning and devise evaluation methodology.

c/ Includes total purchase price of the automobile, insurance, auto operation and travel and per diem for management.

d/ Includes all consumable paper supplies, educational materials, and xeroxing. Approximately 25% of the xeroxing is for evaluation forms.

e/ Includes utilities and client-related emergency expenses (meals, transportation, clothing as needed). Rent is excluded because it is provided gratis although logically it would be included within office operations.

f/ Includes purchases of all equipment (typewriters, desks, file cabinets, etc.) and leaseholder improvements (installation of carpeting and paneling).

g/ Salary and fringes paid to the evaluation consultant.

The program budget for this first year of operations is in Figure 4-2. It includes salaries for 17 staff, and all other expenditures required for program operation. Because of the program's model status, several costs for staff and reproduction of forms related to the evaluator are included. In addition, Figure 4-3 displays community resource utilization by program clients.

Figure 4-3

Community Service Utilization

Service	Average Daily Attendance by Program Participants
Vocational Rehabilitation Education Center	2
Center for Adult Learning: Adult General and Vocational-Technical Training	7 (Adult General Programs) 16 (Vocational-Technical Training Courses)
Neighborhood Youth Corps Program (job placement)	4

Information available for benefits determination relates to employment, education, reduced dispositions and rearrests. Approximately 30% of the participants have part-time jobs when they enter the program. They are encouraged to maintain their employment -- program staff are flexible with regard to other commitments -- whereas this flexibility may very well not be possible if they were being "traditionally" processed. Additionally, the Vocational Coordinator succeeds in placing another 25% of the participants in jobs. The average earnings for employed participants are $250 for a duration of 30 days. Most of these children (over 85%) maintain their jobs at program completion, working an average of 20 hours per week at $2.45 per hour.

The program evaluator documented educational improvements resulting from program involvement. Of all children who have completed the program, 75 improved an average of .70 grade level in reading skills; 70 had increases of .80 grade level, on on average, in math skills. (Total

program participants number 400.) Two participants had received their Graduate Equivalent Degrees (GED) because of arrangements made by program staff, and an additional 15 are enrolled in GED preparatory courses. Counselors or tutors made arrangements with the public school system for participants to receive credits for comparable work performed while in the program. As a result, 14 children were promoted to a higher grade level by earning credits through the program's educational component.

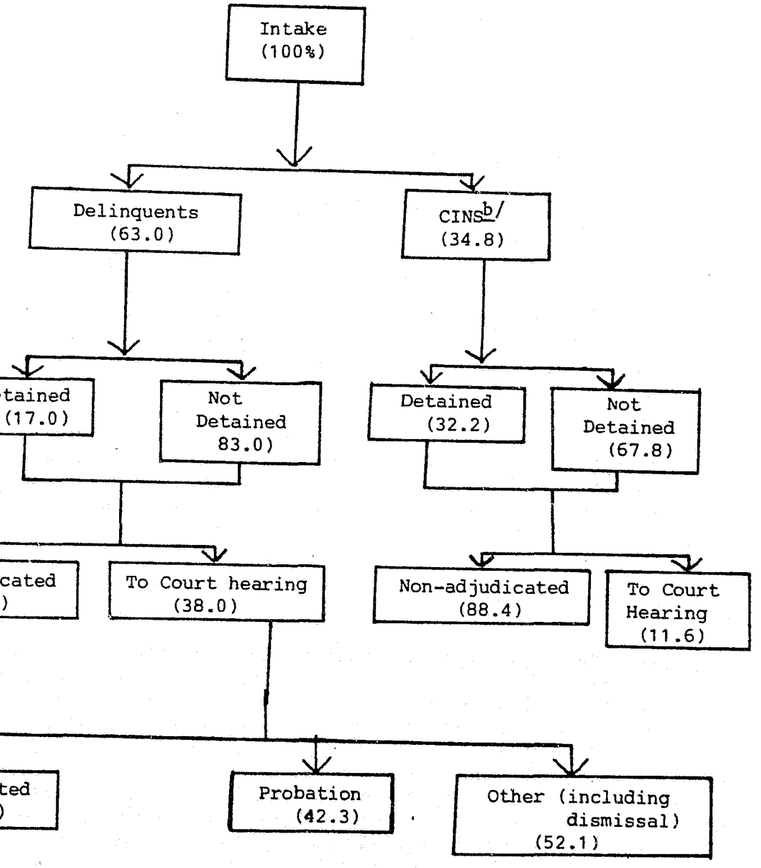
As discussed earlier, 75% of all participants are successfully terminated, resulting in dropped charges for those referred from the Youth Services Department. Those children who were unsuccessfully terminated received dispositions similar to those received by children "traditionally" processed. The costs incurred by court appearances, etc. required for these unsuccessfully terminated participants may be thought of as the cost of the program's "failure rate."

The control group's dispositions were more severe than their counterparts in the program and than the representative outcomes indicated in Figure 4-4. This may be because the program Intake Officer selected the most difficult cases for the participant and control groups, or it may have been a random (sampling) effect. The control group's dispositions are indicated in Figure 4-5.

At this time it may be useful to consider the various persons or groups to whom the benefits and costs accrue. While such division will not affect the final aggregated cost-benefit calculations, distribution of costs and benefits may constitute an important decision criterion. For example, if most of the benefits accrue to the offender-client or to another jurisdiction, a locality may not wish to fund such a program even in the face of highly favorable benefit-cost ratio. In addition, benefits or costs may be incurred for segments of the population heretofore ignored in program planning. Figure 4-6 presents a detailed example of the benefits and costs of the program example, arrayed by objectives and to whom they accrue: the individual, the criminal justice system, and society as a whole. Reference to the figure shows both the inclusion of some costs and benefits which may be unmeasurable (at least within the confines of the study) and also begins to address the issue of externalities (e.g., "cost of education and vocational services provided by outside agencies"). All these costs and benefits were derived from the narrative information provided for the program and a little thinking about the impact a neighborhood program might have on its community, its clients and on the criminal justice system.

Figure 4-4

Arrested Juvenile Flow for County X[a/]



a/ Percentage in parentheses indicate proportion of total number of arrested children who are processed through each outcome from each proceeding outcome.

b/ CINS = Children in Need of Supervision

Figure 4-5

Control Group Dispositions
(Formal Referrals Only)

Non-Adjudicated (no court appearance necessary):	35%
Adjudicated:	
As CINS	10%
As Delinquents	14%
Probation/Court Warnings	35%
Commitments (to training schools):	6%
	100%

Follow-up was performed for both controls and participants after their termination from the program at three-month intervals. Rearrest data could be documented for 98% of the children who had completed the program (the remaining 2% had moved from the county or information was otherwise unavailable). Thirty-two percent and 44% had been re-arrested, respectively, for the participant and control groups. The rearrest offenses for controls were somewhat more serious than those for their counterparts in the participant group.

Measuring Costs and Benefits. Once the initial listing of costs and benefits is developed, it then becomes necessary to consider which of these may be measurable and then, which will be measured, given the study time and resource constraints. Questions such as the following are considered at this time: What kinds of data are needed to attach dollar signs to costs and benefits? If benefits cannot be measured directly, are there any proxies for documenting them? What other statistics are necessary to perform the analysis? Where or to whom might you go to get data? What kinds of manipulation would be necessary to get data into usable form? The reader is reminded of the caveats of Chapter Three: each analyst must decide which costs (and in this case benefits) are so critical to the analysis that the time and effort devoted to their estimation is worthwhile. In our example, the potential future "harm" to private security companies as their services are less necessary in a "safer" society represents a cost which probably would be time-consuming to calculate, fraught with assumption, probably of little interest to the decisionmaker and not terribly useful to the analysis. On the other hand, averted criminal justice system costs are critical

to the program and its objectives and must be included even if their measurement is difficult. Essentially, there are three broad categories of costs and benefits: those which are measurable and capable of expression in dollar terms; those which are measurable, but not presently capable of expression in dollar terms; and those which are unmeasurable but perceived to exist. The cost of an arrest is measurable (e.g., police officer's time, court time, detention, etc.) and can be expressed in dollar terms by using resource prices. A benefit such as improved self-esteem of program clients may be measured through before/after testing, but would be difficult to "price." A reduction in feelings of fear in the local community may indeed be considered to have occurred by all relevant parties but is problematical to measure because of its subjectivity.

Another distinguishing feature is the nature of the costs and benefits accruing to the program under evaluation. Economists refer to real vs. pecuniary changes; only real changes, not relative changes are included in cost-benefit analysis. Real benefits reflect real changes in community welfare which are subsequently balanced against the real cost of the resources required to produce them (i.e., the withdrawal of resources from other uses). Benefits which are relative (i.e., offset by changes elsewhere), are not properly included in the analysis. An example of a real benefit would be the increased contribution to national product or output made by newly-employed program clients (which would also constitute a benefit to them because of increased earnings). However, if these individuals displace others, there is no change in national product and hence no societal benefit and the change is regarded as pecuniary. Similarly, an increase or reduction in welfare payments is regarded as a transfer payment (not a change in output) and is not included in standard cost-benefit analysis. In performing cost-benefit analysis in corrections, however, we ordinarily will not face these problems and for this reason the subsequent analysis excludes these considerations.

Another distinction which is of somewhat more use in corrections' cost-benefit analysis is that between direct and indirect effects, sometimes referred to as primary and secondary. Direct benefits and costs are immediately attributable to the project objectives. Indirect effects are those that are definitely a result of the program's activities but were not specified in the project objectives. For example, a diversion program may create more cooperation within the criminal justice system or more community understanding, but unless these are directly related to project objectives (i.e., with activities designed to foster their achievement) then they are secondary consequences of the project. Just the same efforts must be made to measure and evaluate these indirect costs and benefits.

A common question in cost-benefit analysis is how benefits and costs can be measured and valued when they appear so nebulous and have no "price."

Figure 4-6

Goal Hierarchy and Benefit-Cost Model

BROAD GOAL: Reduce Juvenile Crime

	Minimize Penetration (short-run)		Reduce Recidivism (long-run)	
Objectives:	• Produce Positive and Measurable Attitudinal Change • Secure Employment for Clients			
	Benefits	Costs	Benefits	Costs
INDIVIDUAL	1. Greater job finding capacity. 2. Avoid stigma. 3. Avoid lost work time. 4. Higher self-esteem. 5. Improved motivation. 6. Vocational skills. 7. Vocational tutoring. 8. Employment during program participation.	1. Costs to the individual associated with time spent in Program.	1. Reduce contact with juvenile system 2. Increased life time earnings from improved education and skills.	
SYSTEM	9. Reduced cost to "traditional" system. • Court • Probation • Institution	3. Program costs. 4. Cost of education and vocational services provided by outside agencies.	3. Reduce case backlogs. 4. More efficient judicial processes. 5. Less long-run costs to juvenile and adult system.	1. Short-run increases in average costs as system adjusts to lower output.
SOCIETY	10. Increase in contribution to social welfare. • Increased taxes from employment and higher incomes.	5. Increased risk of victimization.	6. Reduction in adult crime. 7. Less fear. 8. Greater productivity as fewer require correctional services.	2. Social costs of insurance companies, security manufacturers, guard services as demand declines. 3. Increased competition for available jobs.

Figure 4-6 (cont'd.)

	Develop Community Assistance and Support for Juvenile Offenders		Facilitate Program Replication	
Objective:	To Increase Involvement of Community with Juvenile Offenders		Objective: To Assure Administrative Accountability	
Activities:	• Work Awareness Sessions • Job Placement, Work Experiences • Agreements with Local Organizations for Education, Health, Training, etc.		Activities: • Intensive Management Supervision • Program Evaluation • Benefit-Cost Analysis	
	Benefits	Costs	Benefits	Costs
INDIVIDUAL	1. Increase juveniles' employment opportunities as perceptions improve.	1. Marginal cost of adding Program's referrals to existing services.		
SYSTEM	2. Avoid replication of services.	1. Marginal cost of adding Program's referrals to existing services.	1. More efficient recordkeeping techniques. 2. Documentation of program outcome for monitoring contract.	1. Cost of additional documentation efforts for evaluation.
SOCIETY	3. Interaction with community will facilitate reintegration.	2. Inputed value of volunteer labor. 3. Unemployment of non-participants who are crowded out of the job market.	3. More efficient allocation of society's resources as correctional technology is improved.	2. Costs of testing innovative programs and transferring to other jurisdictions.

For example, in a community-based program, one might expect some crimes to be committed by participants. We have seen that arrest and other criminal justice system costs can be calculated, but what about costs to the victim? The answer often is to use indicators, or proxy measures for such costs and benefits. In our example, the analyst might use medical bills of victims involved in incidents attributable to program participants. Or, in another example, if a program uses volunteers, the cost may be imputed by estimating what the salary and related costs would be if such persons were hired. An indicator of changes in the safety of the community might be complaints received by the project or a public opinion survey or additional purchases of security devices by residents in proximity to the program. Appendix D provides some indicators of costs and benefits. The analyst will probably develop additional indicators, depending on the project under evaluation and the objectives. Information on performance measures which have been developed for correctional activities promise to greatly simplify the life of the cost-benefit analyst of the Eighties.

Recapitulating the sequence of events in this section, then, the initial set of potential costs and benefits is assessed to determine:

- materiality to the analysis;
- measurability;
- whether valuation measures exist, or must be developed;
- what indicators or proxy measures will be necessary;
- potential data sources (budgets, records, interviews, etc.) and methods for data collection.

In our example, the goal hierarchy and benefit-cost model (Figure 4-6) presented an exhaustive list of short-term and long-term benefits and costs attributable to the Juvenile Services Program. Note that benefits and costs were "matched" (i.e., not randomly listed), and presented in terms of the costs attributable to producing a specific benefit. The actual costs and benefits selected for measurement and valuation are indicated in Figure 4-7. This subset appropriately relates to the project objectives of minimizing clients' involvement with the criminal justice system, reducing recidivism, and providing employment. The major costs necessary to achieve these objectives are costs of the program itself, related system costs and costs of outside community agencies whose services were furnished to the clients. If the program had not had an objective, but rather only focused on diversion and recidivism, then participant earnings would not have been an appropriate benefit measure; similarly, if employment had been the sole objective, then averted criminal justice system costs would not have been included. This set of costs and benefits is the most typical set evaluated for diversion and other community programs.

Figure 4-7

Benefits and Costs Selected for Measurement

Benefits

Type	Measure
Diversion (short-run)	Averted present system costs due to program participation • Court • Probation • Institution
Recidivism (long-run)	Averted future system costs due to lower future crime • Police • Court • Probation • Institution
Earnings (short-term)	Individual earnings during program time
Earnings (long-term)	Expected future earnings productivity increases

Costs

Type	Measure
Direct criminal justice system costs	Program costs Direct criminal justice system costs
Indirect costs	Additional community services by outside agencies

Before moving to actual calculation of costs and benefits, a final reminder is in order, obvious as it may seem. We are interested in net benefits and costs (i.e., the changes attributable to the program intervention). This is where a control group, or some measure of events in the hypothetical absence of the program, becomes critical. Thus, in estimating recidivism benefits, for example, we are interested in the difference in long-run performance for clients and controls. In estimating earnings benefits, we may only include the difference in earnings between clients and controls, not total client earnings. In a similar vein, in calculating averted systems costs, we must estimate the probabilities that an individual will move to another stage of the system (i.e., consume additional resources). Not everyone who is arrested subsequently is incarcerated; yet early cost-benefit analyses were performed using such assumptions and produced inflated benefit figures.[3]

Cost Analysis. In this step the costs and measures selected in the prior step are transformed into dollar figures. This step is not straightforward and the reader should refer to Chapter Two for the cost estimation procedures, cost allocation, proxies, and so forth. Our goal, as always, is to identify only those resources associated with the program and correctly value them. The following analysis is typical of the procedures to be undertaken in assessing the cost side of a cost-benefit analysis.

We have identified three major costs for our analysis: direct program costs, direct (non-program) criminal justice system costs and indirect costs of other community programs. We begin with an analysis of the program's budget. This task is complicated for several reasons: the initial, grant budget was for an eighteen-month, rather than one-year period; program start-up costs were included; resources for the evaluator were reflected as well. Since the county is interested in the ongoing costs of the program, many of the outlays of the initial budget need to be expected annual outlays. In order to do this it is necessary to analyze the budget with respect to components that should be deleted totally as well as those for which a portion should be eliminated.

The technique follows the cost analysis and location of extra-agency costs which were determined in the house of correction case study in Chapter Two and the comparison of 28 community programs in Chapter Three. In the present case, however, we are excluding certain costs unrelated to steady-state operation -- in effect, a reversal of the techniques discussed earlier. We exclude resource costs related to the evaluation function, the cost of capital purchases and improvements, and a portion of management costs. However, certain costs, such as some related criminal justice costs and costs incurred by community agencies should be included in program costs. Following is an explanation of these components and the subsequent adjustment.

Table 4-1

Actual and Adjusted Budgets
Juvenile Services Program

	Actual First Year Operations	Adjustment	Steady-State Budget
Salaries and Fringe Benefits	$272,184	- $13,048	$259,136
Consultants - Temporary Help	3,030	- 3,030	-0-
Travel and Automobile	21,855	- 2,975	18,880
Supplies	9,251	- 539	8,712
Telephone and Postage	8,377	-0-	8,377
Office Operations			
Rent & Supportive Funds	21,285	-0-	21,285
Equipment, Furnishings and Improvements	7,351	- 5,695	1,656
Evaluation Contractor	13,200	- 13,200	-0-
Overhead/Fee	116,903	- 5,282	111,621
TOTAL	$473,436		$429,667

The first cost that is excluded (evaluator resources) includes: the contractor's fee, consultants and temporary help hired exclusively for his use, copying services, and staff time required for coordination. In a steady-state operation, these resources would not be required, since they are attributable solely to the program's model status. The fee, consultant, and temporary services are straightforward items and capable of immediate deletion. Copying services (for forms, reproduction and newsletter publication) and staff resources are more difficult to determine. Estimates were derived from staff as to the proportion of total copies produced for the evaluation. (One could not simply delete the lease and copy costs because the capital equipment was required for the project, regardless of the evaluator's presence.) It was estimated that about one-fourth of the reproduction services were evaluator-related. However, much of this deduction was offset by the creation of an allowance for educational materials which had been omitted from the original budget. To determine adjustments to salaries and fringe benefits staff were interviewed. Staff were interviewed to determine how much time they spent providing services to the evaluation contractor. These interviews revealed that the equivalent (i.e., 10 percent from the project director, 15 percent from the assistant director, etc.) of nearly two full-time positions were devoted to services to the evaluator. As a conservative gesture, one full-time position was deleted from the adjusted budget.

Next we exclude certain capital costs. As the discussion in Chapter Two indicated, it is inappropriate to "charge" the entire cost of capital items in a single year of operation. Therefore, such expenses need to be allocated over time according to their expected life. The automobile purchases of $4850 was divided by three, based on information from the National Automobile Dealers' Association. (It is assumed that if the car were sold, its value would have diminished by this amount over one year.) Hence, a figure of $1617 represents the cost for one year's usage. All first-year (i.e., 15-month) expenditures for furniture, equipment and lease-holder improvements were amortized over ten years. (The standard asset guideline period for depreciation for furniture and office equipment is the IRS Guide "Tax Information on Depreciation"). Typewriters and office equipment have an asset life of six years; to this figure was added a charge of $500/year for maintenance and repair.

The outside management firm responsible for designing and maintaining the program incurred annual costs of $117,000. One argument made by the county for local control is that it would "save" the entire amount of mangement overhead and fees. Clearly, deletion of this cost would have produced highly favorable cost-benefit ratios. However, effective mangement is critical to a program such as this and it is unclear as to what outlays would be necessary to replicate the original management. In the absence of clear information from the county as to their management plans, it was decided that this cost should remain (less some costs for coordinating with the evaluator). This may have the effect of overstating the costs, but theoretically, it is the only information available

on managerial costs (i.e., it is a proxy of itself). This example underscores the importance of an unbiased approach to analysis. It would have been relatively simple to "take the county's word," eliminate any management costs and produce most favorable cost-benefit results. Only later when the effects of lack of management became apparent would the analysis be called into question.

Table 4-1 shows the program budget adjusted as previously discussed. As the data in Table 4-1 indicates, the actual operating-year budget exceeds the adjusted, or steady-state budget by ten percent; as in Chapter Two, the analyst must always verify existing budgets for accuracy, inclusiveness, and perhaps assumptions, before proceding.

Related criminal justice system costs refer to any additional costs incurred by program participants. The intake costs (i.e., the procedures that occur prior to program acceptance) are the same for <u>all</u> program referrals, both those who become clients and those who are sent back to traditional processing (i.e, become controls). Therefore, these costs are not included in the analysis. However, since all program participants are not successfully terminated, some additional dispositional costs are incurred which are attributable to the program ("failure costs"). One-fifth of the clients do not complete the program, but 89 percent of these receive non-judicial or informal adjustments which require no outlays Data on the distribution of disposition was collected from program records. Cost data were derived from the Division of Youth Services and by estimating the probabilities of going to trial and the average resource costs of each step in the court process. (See Appendix D for a detailed example.) For the eleven percent (37 clients) for whom court appearances and other actions were necessary, the costs are summarized in Table 4-2.

In addition, as noted in the background material and preceding discussion, many program participants utilize the services of other community agencies. Since these services relate directly to program objectives and consequently to benefits, they must be included in the analysis. These include diagnostic services, vocational-rehabilitation and employment services.

The program refers clients solely for counseling, both at intake, and during program participation. The clinic estimated their patient/visit cost at $26/hour for the types of services received by program clients. Twelve visits are standard for the children receiving counseling; the child's parents attend the first visit, raising the cost of diagnostic services to $78 ($26/hour x 3 persons).

Existing research on the cost of vocational adult programs in the state provided average costs for full-time student equivalents at two centers. Since program participants did not attend full-time (most took one or two

Table 4-2

Cost of Disposition
Unsuccessful Participants

No. of Participants	Event	Cost of Event	Total Cost
37	Preparation of Pre-dispositional reports	$90	$3,330
37	Judicial Trial	177	6,549
12	Probation	460	5,520
		TOTAL	$15,399

courses), and individual course costs were not available, costs were derived as if clients attended on a one-half time equivalency. This will tend to overstate costs, but in keeping with the conservative nature of the analysis and is an appropriate decision when information is limited.

Employment services were provided through a federally subsidized Youth Corps Program. No specific county information was available but statewide, client/day costs were $17.48 and the average program time was 62 days.

Table 4-3 summarizes these external system costs for program clients.

Table 4-4 summarizes the total costs of the program.

It is appropriate in this type of analysis to discuss costs omitted and the reasons for their exclusion. This helps to round out the analysis and increase its credibility. For the program, such exclusions include: costs of volunteers (i.e., the loss of their services to other community activities); rent (because the building was donated and it was apparent that such an arrangement would continue under county auspices); costs borne by individuals ir foregoing their right to a speedy trial (this was considered minimal because of the flexibility of the program); offense costs (many juvenile offenses, because of their nature, do not have obvious cost implications and time constraints on the analysis prohibited such data collection).

Table 4-3

Community Resource Utilization

Services	Cost/Client	No. Clients	Total Service Cost
Diagnostic	$ 364	11	$ 4,004
Vocational/Rehabilitive	1,764	4	7,056
Vocational/Education			
• general programs	510	19	9,698
• voc-ed programs	900	49	44,100
Employment Services	1,084	16	17,344
TOTAL			$82,202

Table 4-4

Program Costs

Direct Program Costs	$429,667
Criminal Justice System Costs	15,399
Community Resource Costs	82,202
TOTAL	$527,268

Benefit Analysis. The next step is to develop dollar statements for the benefits which were measured. There are two major types of benefits, diversion and earnings, further separable by when they occur: in the short-term (program time) or in the long-term (post-program). In all cases the differ-

ences between the control and client groups are used as the measure of benefits attributable to the program.

The benefit analysis begins with an assessment of the short-term diversion benefits, which are measured as criminal justice cost savings. For purposes of the analysis, it is assumed that clients would have received the same dispositions as the control group had the program not existed. Therefore, we must calculate the probabilities and costs associated with the various dispositions of the control group. The probability that a particular sanction would be imposed was calculated for the control group based on actual experiences of that group (i.e., case file review). These probabilities were then extrapolated to the clients, on the assumption that because of the selection process, these procedures would have just as easily occurred for the clients without the program. Table 4-5 presents the various dispositions, their probabilities, and the relevant proportions of the client groups, and Table 4-6 illustrated the costs of these dispositions. The cost figures were derived from existing research, documents search, and interviews. Court appearance information was (and is) the most difficult to derive, requiring many interviews with different court and juvenile justice personnel. Interviewees found it difficult to think in terms of a typical case and estimates were used (see Appendix D). Just generating the single information component can be very time-consuming. In the case of our example, data collection, interviewing, consulting other jurisdictions (for proxies), data compilation and analysis required 10 person-days. Training School and Center costs were derived by multiplying the average daily cost ($24.97 and $10.64 respectively), by the average length of stay (165 and 150 days). However, the reader/analyst is cautioned that average cost figures may overstate the true increase in costs attributable to adding another client to an existing operation. (This is true because many costs -- security officers, general equipment, counselors, kitchen and hospital equipment, etc. -- do not vary for small increments in the inmate population.) Without, again, more detailed analysis, it is not possible to determine the differences, if any, between marginal and average costs. In his benefit-cost analysis of Project Crossroads, Holohan used regression analysis to derive marginal costs for various criminal justice system dispositions.[4] Ordinarily, such analysis may be beyond the time and resource constraints of a research department, but the reader is herewith cautioned of the pitfalls of average costs. When they are used in the analysis, appropriate notation should be made.

Thus, the short-term averted criminal justice system costs (diversion benefit) are estimated at $111,974. Were we here calculating net benefits, the dispositional costs of unsuccessful clients would be subtracted (i.e., netted out). Since this figure will appear on the cost side of our ultimate benefit-cost calculations, we leave the averted cost figure intact.

Table 4-5

Estimation of Averted Dispositions,
Program Participants

Disposition	Percent of Cases	Number of Clients
Non-judicial	34.1	115
Adjudicated CINS	9.8	33
Adjudicated Delinquents	13.2	44
Court Warning	26.4	89
Probation	12.1	41
Training School	1.1	4
Centers	3.3	11
TOTAL	100.0	337

Table 4-6

Costs of Dispositions

Event	Cost	No. of Cases	Total Cost
Preparation of Pre-disposition reports	$ 90	222	$ 19,980
Judicial Trial	177	222	39,294
Probation	460	41	18,860
Training Schools	4,071	4	16,284
Centers	1,596	11	17,556
TOTAL			$111,974

Next, we measure long-term recidivism benefits. Since one of the program objectives is to reduce subsequent criminal activity, we are interested in the performance of the experimentals and controls during a post-program phase. Thirty-three percent of the experimental (client) groups were re-arrested, compared with 44 percent of the controls. Control group offenses tended to be more serious than those of the former program clients; this latter phenomenon was not included in the analysis. Rearrest costs were calculated for the difference between the rearrest rates (21 clients). As an aside, we are aware of the problem of rearrest data as an indicator of criminal activity. However, if as in this case, we are estimating averted criminal justice system costs (as opposed, e.g., to victim costs), then rearrest is an appropriate measure since it originates at the point where system resources begin to be expended.

In order to calculate averted costs, we must first gather data on the various criminal justice events which follow arrest and the probability that an arrested person will be exposed to a particular procedure. Figure 4-4 presented the case flow for the county. From the numbers of persons exposed to each procedure we can calculate the probabilities. For example, if 1,500 persons are arrested annually and 750 of them are designated delinquents, we assign that event a probability of .5 and perform a similar exercise for all events. Armed with these derived probabilities, we can then apply them to our known pool of rearrestees, estimate the numbers exposed to the various procedures, and calculate the costs. Table 4-7 indicates the procedures to which 21 juveniles would be exposed, as well as the associated costs for each procedure and the total costs (clients X lower case procedures X lower case cost). Police intake costs were derived by dividing the annual costs of all personnel involved in juvenile arrest procedures (plus a percentage for overhead and support costs) by the number of annual juvenile arrests. Additional costs, such as time spent in station-houses, transportation and costs associated with counseling and release were excluded because of data problems and time limitations.[5] Division of Youth Services (DYS) costs were estimated from available documents and represent statewide averages. Table 4-8 presents more detailed estimates for detention, intake and probation which were incorporated into the information of Table 4-7.

Other excluded items were State Attorney costs for case review of clients who do not go to court, psychological evaluations at intake, and costs of CINS case outcomes. The State Attorney's costs were unknown and the other costs could not be derived because it was not possible to ascertain the branching ratios and calculate probabilities. These other omitted costs provide an offset to the average cost figures used elsewhere, in the sense that they tend to balance the potential overstatement of average costs.

Table 4-7

Direct Criminal Justice System Costs of Processing 21 Cases through the County Juvenile Justice System

Event or Stage in Process (Flow Diagram II)	No. Children Processed	Associated Cost: Cost Per Case or Client	Total Cost Per Event
Delinquents:			
Police Intake	13	Cost of police intake (arrests) & transferring child to Juvenile Detention Center @ $29	$ 377
Detention	2	Secure detention at Juvenile Detention Center @ 195	390
Division of Youth Services Intake (not indicated on flow chart -- follows the detained-not detained events)	13	DYS intake @ $49	637
Judicial Event Preparation	5	Preparation of pre-disposition reports @ $90	450
Court Hearings	5	Court Costs @ $177	885
Outcome of Hearings (Dispositions)	2	Probation costs @ $460	920
CINS:			
Police Intake	8	Police intake & Transportation @ $29	232
Detention	3	Non-secure detention: group or attention houses @ $171	513
Division of Youth Services Intake	8	DYS intake @ $49	392
Judicial Event Preparation	1	Preparation of pre-disposition reports @ $90	90
Court Hearings	1	Court Costs @ $177	177
Outcome of Hearings (Dispositions)	(Representative outcomes are unknown for CINS in the county)		
			$5,063

Table 4-8

Detention, Intake and Probation Costs

Event	Unit Cost	Average Length of Stay	Total Costs/Client
Secure Detention	$24.63/day	7.9 days	$195
Non-Secure Detention	11.63/day	14.7 days	171
Intake (Counseling & Report Prep.)	10.88/hour	4.5 hours	49
Probation	1.23/day	374 days	460

The next short-term benefit is participant earnings. Because one program objective is to provide employment experiences for clients, the earnings of clients while in the program constitutes a benefit. Since the available information indicated that the members of the control group either were unemployed or lost their jobs while going through "traditional" case processing, it is not necessary to net out control group earnings. In addition, since program participation permitted clients who were previously employed to maintain their jobs, these earnings constitute a benefit to the program.

Eighty-five participants were employed during their participation in the program; 70 percent of these had not been working prior to program enrollment. The average period of employment was 30 days and the average earnings for the period were $239. It was assumed that one-half of those working would continue their jobs for at least one month after program completion and these salaries were included in the benefit estimates. (Follow-up data would have been useful here, both in terms of numbers employed and job duration; however, as is often the case in policy research, results are needed well before long-term data are available.) Another sixteen clients were employed by the Neighborhood Youth Corps for a period of two months. The subsidized salaries appear as an other-community-agency cost, but here represent a benefit to participants. The total short-term earnings benefit is presentd in Table 4-9.

Table 4-9

Short-Term Earnings Benefit

	Number of Participants	Average Salary	Total Earnings
Program	85	$239	$20,315
Post-Program	43	239	10,277
Youth Corps	16	691	11,056
TOTAL			$41,648

In the following paragraphs, long-term earnings are assessed. Another program objective was the provision of academic enrichment. Since there is a relationship between higher academic achievement and increased lifetime earnings, this measure was used to estimate the long-term benefits attributable to the academic program component. The evaluation made possible the documentation of improvements in grade levels for participating clients. Long-term earnings benefits are calculated only for the group whose academic achievements were documented through the public school system (i.e., by receipt of a GED or grade-level promotion). (Other participants made noteworthy improvements -- 78 clients improved their reading skills by an average of .68 grade level, while 77 improved their math skills by .71 grade level -- but in accordance with the conservative nature of the analysis, this is noted but not valued. Such data could of course, be useful in conducting a cost-effectiveness analysis. It was assumed that there were no deleterious effects of the educational program, and that no negative benefits need to be netted out. Further, the control group was not systematically monitored but was believed to have achieved no documented promotions.

Nine clients were promoted one grade level (from eighth to ninth grade) and two received GED certificates (high school equivalency). We are interested in the difference in lifetime earnings attributable to these changes in education. The U.S. Bureau of the Census (Social and Economic Statistic Administration) compiles data on expected lifetime earnings associated with educational variation. Because they are predictions (albeit based on historical experience) and are national averages, they are used cautiously in the analysis.

In order to estimate the change in lifetime earnings attributable to the educational achievement of program clients, two concepts must be introduced: productivity and discount rates. Productivity rates ordinarily will be used in any cost-benefit analysis where lifetime earnings constitute a program benefit. They incorporate assumptions about increases in worker productivity over time, as measured by changes in wage rates. This is a separate phenomenon from the influence on earnings occasioned by changes in educational level. For example, if a worker increases his/her annual salary by $1,000 due to a change in grade level, this increase must be inflated over time by the expected trend in productivity (reflected in wage rates). Therefore, if productivity was rising at, say, 5 percent annually, after one year that $1,000 differential would increase to $1,050, after two years to $1,103, etc. This is a normal and expected trend in our economy and we incorporate it into our estimates of future benefits to avoid understatement. The problem, as we shall see shortly, is that there exists no "given" rate, yet the selection of some rate affects the results of the analysis. Discount rates are used not only in connection with lifetime earnings but for any benefit (or cost) stream occurring over time. While some of the program benefits occur in the present (i.e., during program time), others (such as lifetime earnings) occur in the future. Proper evaluation (i.e., comparison with present costs) of such benefits requires that they be converted into present values to account for the fact that future benefits are of less value than those of the present. Stated another way, a dollar next year is not equal to a dollar today, in the sense that we are not indifferent about having a dollar today or a dollar a year from now. Why? Because a future dollar purchases less than a present dollar; or conversely, I can take a dollar today, invest or save it, and have, say, $1.10 a year from now. If the annual rate of interest is 10 percent, then a dollar one year from now is worth about $.91 today. If the rate of interest is 5 percent, a future dollar is worth about $.96 today. When interest rates are very low, the difference between future and present dollars -- or benefits -- narrows; when rates are high, the difference is larger.

Since decisions are made in the present, it is necessary to express all future streams in present dollars. The necessity of this procedure is obvious in cost-benefit analysis. If a project "costs" $100,000 today, but its expected future benefits only yield a present value of $50,000, then a decisionmaker may wish to seek alternative ways to "invest" that $100,000 -- alternatives which will yield a greater return. Conversely, if the project is funded anyway, then the decision criteria were other than return on investment. Table 4-10 provides an illustration of the effects of various discount rates on a benefit stream of $100/year for 5 years. In all cases the present value of benefits is less than the "future value" (i.e., $500). The choice of the discount rate for this conversion has a substantial impact on the magnitude of present value.

Table 4-10

Present Value Calculations

Year	Benefits	Present Value When The Discount Rate Is			
		3%	4%	5%	8%
1	$100	$97	$96	$95	$93
2	100	94	92	91	88
3	100	92	89	86	79
4	100	89	85	82	74
5	100	86	82	78	68
	$500	$458	$444	$432	$402

When the discount rate is 3 percent, then $100 at the end of 5 years is worth $86 in today's money (since $86 invested at 3 percent will yield $100 in 5 years). If the rate is 8 percent, that same $100 is worth only $68 in today's money. Thus, the present value of the sum of a benefit stream occuring over 5 years ranges between $402 and $458, depending on the discount rate. The formula for calculating the present value of a sum (R) due in n years is:

$$PV = \frac{R}{(1+i)^n}$$

where

PV = present value

R = sum of benefits

i = rate of interest (discount rate)

n = years

If, in the example in Table 4-10, the benefits all occurred at the end of the fifth year, then the present value of $500, at a discount rate of 5 percent, would be:

$$PV = \frac{\$500}{(1+.05)^5} = \frac{\$500}{1.28} = \$391$$

If the discount rate were 8 percent then the result is:

$$PV = \frac{\$500}{(1+.08)^5} = \frac{\$500}{1.47} = \$340$$

So, when the benefits occur, as well as the choice of a discount rate, will affect the analysis (i.e., the comparison of costs and benefits).

As with productivity rates, the analysis is complicated by the fact that there is no single, agreed-upon discount rate to be used in public project evaluation, nor agreement on whether this rate should vary over the life of the expected benefit stream. The first choice addresses the fact that there are several rates which may be considered and justified for use in cost-benefit analysis of public projects.

One is the private rate, or the rate prevailing in consumer markets; another is the prevailing interest rate on government bonds and a third is an adjusted rate which compensates for the myopia of consumers who overestimate the value of current consumption. In the last case an individual might so value a dollar now that it would require a very high interest rate to induce postponement of the use of that dollar. It is argued that this understates the importance of the future and that a lower discount rate should be substituted.)[6] Absent consensus, the analyst performing a cost-benefit analysis of corrections need not debate the rate, but rather, use several rates in presenting results. This neatly and legitimately avoids the issue of choice and has the additional and critical feature of providing a form of sensitivity analysis to project findings. While we shall address this concept more fully in our analysis of project results, sensitivity analysis examines the robustness of project findings by subjecting them to a series of variations in the assumptions -- in effect testing how well the findings "hold up."

The standard format for analyzing lifetime earnings incorporates different productivity rates and discount rates simultaneously. Table 4-11 displays expected lifetime earnings by education level for different productivity and discount rates. Each dollar figure reflects the present value of various lifetime income streams. For example, if an individual has completed elementary school, the present value expected lifetime income, when productivity is 0 percent and the discount rate is 3 percent, is $153,000. If we maintain productivity at zero, but raise the discount rate to 5 percent, the present value of lifetime earnings is $105,000. At a discount rate of 7 percent, the present value is $76,000. Increasing the productivity rate raises the present value of lifetime earnings for each given discount rate.

Table 4-11

Expected Lifetime Income By Years Of School Completed
Selected Discount Rates, And Selected Annual Productivity Increase

Expected Lifetime Income (In Thousands of Dollars)

Years of School Completed	Discount Rate of 3% Annual Productivity Increase of . . .				Discount Rate of 5% Annual Productivity Increase of . . .				Discount Rate of 7% Annual Productivity Increase of . . .			
	0%	2%	3%	4%	0%	2%	3%	4%	0%	2%	3%	4%
Elementary: 8	153	235	297	379	105	153	188	234	76	106	127	153
High School: 1 - 3	169	263	333	427	115	170	209	261	83	116	140	170
High School: 4	210	324	410	524	144	210	259	322	104	145	173	210

To measure the difference in lifetime earnings associated with grade level achievements we look at the three categories of schooling. If an individual completes the ninth year of education (high school: 1-3), the present value of expected lifetime earnings at zero percent productivity and a 3 percent discount rate is $169,000. Thus, the difference in lifetime earnings (the "benefit" attributable to the project) is $169,000 - $153,000, or $16,000. If an individual who was in high school subsequently completed high school (using the same productivity and discount rates), then the increase in lifetime earnings in present value would be $210,000 - $169,000 = $41,000. Table 4-12 presents these results for the program participants as extrapolated from Table 4-11. We see that the range of benefits is between $105,000 (7 percent discount rate, zero percent productivity increase) and $626,000 (3 percent discount rate and 4 percent productivity increase). For the reasons discussed above, we will not select a single discount or productivity rate, but rather present an array of results which illustrates the sensitivity of the project findings to varying assumptions about inflation and productivity.

Presentation of Results. For those seeking "the" discount or production rate, or a single benefit-cost ratio, this section may come as a surprise. Indeed, there are numerous examples in the literature which declare programs successful using a single ratio or "standard" cost-benefit analysis. Such assertions underestimate the public decisionmaking process and belie the complexities of cost-benefit analysis. The techniques and procedures we have outlined here are standard, but they are not without ambiguity. Because of the pyramid-like nature of the process, cost-benefit analysis can be quite frail. For example, the increases in lifetime earnings were derived from nationwide averages yet applied to the program's unique subset of individuals. To then assert a single productivity or discount rate elevates these approximations to an undeserved and inappropriate exactness. The cost against which they are to be measured are similarly inexact, albeit a good representation. In policy analysis, presumably we are trying to learn, to gain information for choices, rather than searching for assumptions which will justify a position. In fact, policy analysis can only assist in articulating the choice; attempts to develop a single cost-benefit measure which will dictate that choice are misguided.

The appropriate technique and a recommendation of this Program Model is the presentation of an array of cost-benefit results which illustrate the behavior (sensitivity) of analytical findings to variations in assumptions. It is not inappropriate for the analyst to indicate the results which he or she is most "comfortable" with, but the range of results should be made available to the decisionmaker. The results of the analysis of the juvenile services program make this point far more clearly than a narrative. Five benefit-cost comparisons are presented in Table 4-13. Although many variations are possible, these adequately represent the potential range and illustrate how results may vary, depending on the assumptions. Estimates are derived using steady-state

Table 4-12

Increased Lifetime Income
As A Result of Grade Level Changes

Participant Group	3% Discount Rate Annual Productivity Increase of . . .		5% Discount Rate Annual Productivity Increase of . . .		7% Discount Rate Annual Productivity Increase of . . .	
	2%	4%	0%	3%	0%	2%
GED Recipients (2 Participants)						
Individual	$ 61,000	$ 97,000	$ 29,000	$ 50,000	$ 21,000	$ 29,000
Total	$122,000	$194,000	$ 58,000	$100,000	$ 42,000	$ 58,000
Promotions From 8th - 9th Grade (9 Participants)						
Individual	$ 28,000	$ 48,000	$ [illegible],000	$ 21,000	$ 7,000	$ 10,000
Total	$252,000	$432,000	$ [illegible],000	$189,000	$ 63,000	$ 90,000
GRAND TOTAL	$374,000	$626,000	$148,000	$289,000	$105,000	$148,000

Table 4-13

Benefit-Cost Comparisons

	Most Conservative Estimate [a]	Long-term Earnings Benefit [b]	Moderate Estimate	Least Conservative Estimate	Actual Program Operating Costs
Benefits					
Diversion					
Short-term	$111,974	$111,974	$111,974	$111,974	$111,974
Longer-term	5,047	5,047	5,047	5,047	5,047
Earnings					
Short-term	41,648	41,648	41,648	41,648	41,648
Long-term		105,000	289,000	626,000	626,000
TOTAL	$158,669	$263,669	$447,669	$784,669	$784,669
Costs					
Program Operating	$429,667	$429,667	$429,667	$429,667	$460,236
External System					
Additional Community Services	82,202	82,202	82,202	82,202	82,202
Juvenile Justice System Costs	15,399	15,399	15,399	15,399	15,399
TOTAL	$527,268	$527,268	$527,268	$527,268	$557,837
Net Benefits	$368,599	$263,599	$ 79,599	$257,401	$225,832
Benefit/Cost Ratio	.30	.50	.85	1.5	1.4

a/ Long-term earnings benefit excluded.
b/ 70% discount rate; 0% productivity increase.

and actual program costs, elimination or inclusion of long-term benefits, and variations in productivity and discount rates. Conservative estimates are derived by excluding long term benefits. Other results vary productivity and discount rates and the least conservative estimate uses a three percent discount rate and a four percent productivity rate. Net benefits are positive for two scenarios and negative (in parentheses) for three.

Interpretation of Results. As indicated, there is no "single" result which will inform the policy decision. However, a few guidelines are appropriate. It is usual to derive a net benefit figure (benefits minus costs) or construct a ratio of benefits to costs and interpret its proximity to one (benefits/costs). A ratio greater than one indicates the projects' expected benefits are greater than its costs; a ratio less than one indicates costs greater than benefits. However it also may be desirable to inspect the magnitudes of benefits and costs (ratios have no dimension). For example, two projects may have benefit-cost ratios of 1.1 and 2.0, but the former represents benefits of $1,100,000 and costs of $1,000,000; while the latter represents benefits of $20,000 and costs of $10,000. If we only look at ratios, the second project appears the "better" investment; but the benefit-minus-cost figure is $100,000 for the first and $10,000 for the second. A decision made on the basis of the magnitude of the difference in benefits would ignore the fact that the resultant resource commitment is $1 million. Thus, a $100,000 project with a low benefit-cost ratio may have more appeal than a $10 million project with a slightly higher ratio. Again, no single decision rule prevails, but it is advisable to inspect analytical results from a variety of perspectives.

Another aid to interpretation is the sensitivity analysis discussed earlier. If a project only performs well under very extreme assumptions (lowest costs, highest productivity rate and lowest discount rate), then some other, non-economic grounds are necessary to justify its undertaking or continuation. If cost-benefit findings are positive over a wide range of assumptions, then it is more likely the project represents a worthwhile social investment.

The distribution of costs and benefits provides yet another method for interpreting results. In our example, most of the costs were incurred by criminal justice and community agencies, yet most of the benefits accrued to program participants. Thus, while the program may be a worthwhile social investment, from a taxpayer's perspective it may be less desirable. Although our focus in cost-benefit analysis is ordinarily the broader social perspective, the realities of the policy arena suggest that these other concerns may be important.

Table 4-14 presents the results of an analysis of a supported work project in which four different perspectives are addressed — social, taxpayer, welfare and participant. This table illustrates the variation in, or distribution of costs and benefits, according to the various groups affected by the analysis. For example, the taxpayer ratio, while positive, was the smallest, while the social benefits and costs which include participant earnings, exhibit a higher ratio. We also see that the definition of costs and benefits will vary, depending on the perspective chosen. Reduced welfare payments are a benefit to the taxpayer but are counted as a cost to the participant in calculating the latter's ratio. This sort of presentation is also highly useful in decisionmaking. In this case, all the results were positive and the decisionmaker's job was easier than it might be for the diversion project.

Another consideration involves those benefits and costs which cannot be measured or valued. Some analyses are able to reduce this set to a bare minimum so the analytical results represent the majority of associated costs and benefits. Others are able to quantify and value very few of the identified costs and benefits.[7] In the latter case, the ratios or net benefits are more suspect because uncertainty is higher when less information is available. Finally, correctional programs may generate costs and benefits which are difficult to measure and have no "price," yet are integral to the analysis. In such cases, proxy or surrogate measures must be employed. For example, expenditures on private police protection or burglar alarms might serve as a measure for "feelings of fear" in a neighborhood.[8]

A related issue is the interpretation of the ratio or net benefit figure itself. At least two concerns are relevant: the first is that projects may have multiple objectives and a single ratio obscures the relative costs and benefits attendant to achieving these objectives. To the degree that an objective may be relatively more important in the decision, it may be useful to apportion or weight the analytical results. This is true especially if two projects with different emphasis on multiple objectives are under evaluation. In addition, a (low) ratio or net benefit figure may obscure the fact that a program may "work."[9] In other words, a program may achieve its objectives yet the benefits may be insufficient to offset the costs. This may occur because of the intangibles discussed above, or may occur even when all benefits may be measured and valued. Its inclusion here is intended as a reminder that even though cost-benefit analysis is an economic indicator of program performance, such an indicator may be inadequate in some decisions and should not constitute the only decision criterion.

This section presented a detailed example of cost-benefit analysis, from decision setting through analytical techniques to presentation and interpretation of analytical results. The next section will recapitulate the steps in the process and provide information on additional considerations and points to remember.

Table 4-14

Benefits and Costs of Supported Work[a/]

Social Benefits and Costs	
Benefits	
Value added to goods and services	$4,519
Post-program earnings	1,154
Averted criminal justice costs	293
Health	(285)
TOTAL	$5,681
Costs	
Participant opportunity costs	$1,112
Staff and non-personnel expenses	2,362
TOTAL	$3,474
Benefit/Cost Ratio	1.64
Taxpayer Benefits and Costs	
Benefits	
Public goods and services	$4,519
Welfare reduction	1,797
Income taxes	311
Averted criminal justice costs	293
TOTAL	$6,920
Costs	
Support work costs	$6,131
Benefit/Cost Ratio	1.13
Welfare Benefits and Costs	
Benefits	$2,639
Costs (cash and other welfare)	2.079
Benefit/Cost Ratio	1.27
Participant Benefits and Costs	
Benefits	
Program wages and fringe	$3,769
Extra-program earnings	1,154
TOTAL	$4,923
Costs	
Foregone welfare	$1,797
Taxes	311
Foregone earnings	1,112
TOTAL	$3,220
Benefit/Cost Ratio	1.53

a/ Source: Lee S. Friedman, "An Interim Evaluation of the Supported Work Experiment," Policy Analysis, Vol. 3, No. 2, Spring 1977, pp. 165-168.

4.3 Points to Remember

Having examined a fairly standard, yet detailed cost-benefit analysis of a diversion project, we turn to a summary of the analytical steps, re-emphasis of critical concepts and additional considerations.

4.3.1 Point 1: Select Variables for the Analysis

Cost-benefit analysis is more encompassing than the other forms of economic analysis presented in the Program Model. While it is possible to limit the analysis to a very narrow application, its utility lies in its social perspective. The critical question which cost-benefit analysis best informs is whether a project represents an efficient use of society's resources. In order to answer, we must consider a wide-ranging set of costs and benefits and expand our analysis beyond persons or groups directly affected by a project, to include those indirectly affected as well. In corrections' projects we are interested not only in the immediate effect on clients and criminal justice resources but in future consequences and non-criminal justice efforts.

Project Environment. Because of these effects, a cost-benefit analysis must begin with an examination of the environment in which the project operates. Characteristics of this environment may range from the citizenry immediately adjacent to a community program to the non-correctional resources which will be utilized by the program, to the actual program and system operations. Such knowledge is also useful in developing the initial list of costs and benefits expected to emanate from the project. In our example the evaluation and outside management were unusual features which required subsequent adjustment of costs to derive a steady-state operating budget.

Project Objectives. As stressed in the example, the first formal step in conducting a cost-benefit analysis is the specification and examination of project goals and objectives. Objectives must be stated in measurable terms and should have specific activities designed to achieve them. It is from these activities that the cost side is developed, e.g., an objective directed at raising the client employment level might necessitate job placement, counseling and training services which themselves require resources. If clients engage in criminal activity while seeking work, the attendant law enforcement outlays would constitute an additional, if unintended, cost of the program. It is because of the potential for significant "unintended" consequences that we must think in terms of overall program effect. These effects may not be capable of measurement but the fact that they are likely to occur must not be overlooked.

The concept of measurable objectives is critical to proper benefits specification. An objective such as reduced criminal justice system involvement (of clients) may be expressed in benefit terms as the short- and long-term savings to the system of fewer clients. An objective of increased employment translates into benefits associated with client earnings, taxes paid, reduced welfare outlays and so forth.

Enumerating Costs and Benefits. As the text and the above discussion suggest, a fairly detailed list of costs and benefits constitutes the next step. It is important here to concentrate on costs and benefits attributable to program operations and to be exhaustive in this first round. Unanticipated costs and benefits (in the sense that they do not flow obviously from project activities) must be included. In our example, a long-term benefit of reduced criminal activity was potential unemployment in the private security industry as a "safer" society made these services less necessary. These costs were not measured nor valued but at this preliminary stage it is useful to include them because:

- generally, we are trying not to "miss" any costs or benefits;
- such a cost, even if unmeasurable, may relate to a project activity (in our case the relationship was remote enough to exclude it from analysis);
- different interest groups may have views about the benefits or costs of a particular project;
- the analysis gains credence when the array of potential costs and benefits, as well as the reasons for their non-measurement or non-valuation, are apparent to the reviewer.

Cost-benefit analysis rests upon a series of assumptions. Because of this, the results always have the potential of criticism. Although the analytical steps themselves are straightforward, by now it should be apparent to the reader that there are a great many choices made at each step of the analysis. Each of these choices has the potential of introducing researcher bias. Ultimately, the analytical findings are only as good as the objective judgment employed at each step. This is why the enumeration of costs and benefits is so important. This initial listing forms the set from which a more limited number of costs and benefits will be selected for analysis.

Measuring Costs and Benefits. This is the step in which the preliminary costs and benefits are assessed for their susceptibility to measurement. There are two general rules of thumb which were introduced in the chapter on cost analysis which are relevant here as well: materiability and causality. If a program activity "causes" a particular cost to occur and that

cost is expected to be significant, then it must be included in the analysis. If a benefit is central to the project's objectives, then measurement of the benefit itself, as well as its attendant costs, is critical. It is at this point that the analyst begins to consider data sources for the various costs and benefits of the project. Many cannot be measured directly and proxies will have to be developed.

Because we are often dealing with costs and benefits which are not readily measurable, both the selection of costs and benefits for the analysis and their subsequent measurement are critical. Again, researcher bias and assumptions come into play. If a particular benefit is selected as a representation of the project's objectives, then every effort must be made to identify the costs associated with "producing" that benefit. If more stable families are an important program benefit, then the attendant costs -- counseling, family time spent away from income-producing activities, other community resources utilized -- must be included.

The measurement of the costs and benefits finally selected is an important step. Since many will be measured through proxies or "shadow" prices (the approximation of a value for a good or service which has no market price), selection of measures may itself be an arbitrary or incomplete process. In an example in the chapter of of cost analysis, it was shown that while there appeared several adequate measures for transportation cost allocation, only one yielded enough information to be trustworthy in the analysis. The measure may be too far "downstream" to yield sufficient information. For example, use of reconviction data when the project objective is to reduce crime will probably overstate benefits (or understate costs).

Only net benefits and costs are to be included in the analysis. We are interested in the difference occasioned by the project -- in criminal justice system costs -- otherwise costs and benefits will be overstated. To properly ascertain this, control groups are common for human-services projects. One may also use modeling to predict outcomes in the absence of a project intervention. But we must be able to state how the situation would be in the absence of our project in order to assess the project's impact.

Measures, then, should be clear, as closely related as possible to the benefit or cost under consideration, and be reasonable, in the sense that they can be understood and accepted by others. If measures were considered but not used, the reasons for this should be made clear in the analysis. For example, in determining trial costs, it might be suggested that all the related resources (time of judges, prosecutors, public defenders, witnesses, support, etc.) should ideally be included. If it is subsequently determined that it will not be possible to collect all this information within the confines of the study, then what sub-measures can be used? Interviews and other procedures may be required to determine whether, for example, weighted judges' salaries constitute a good proxy measure. A proxy, or surrogate

measure implies that it bears a close relationship to whatever it is we would actually like to measure. Therefore, the analyst must be convinced (and be able to convince others) that the use of such a measure will yield information close to that which could be obtained from more detailed analysis.

4.3.2 Point 2: Analyze all Relevant Costs

At this stage of the analysis, a dollar value is assigned to the various cost measures developed above. Some costs are straightforward; others are not, depending on the measure. A simple-sounding term such as criminal justice system costs (e.g., as a measure associated with increased criminal behavior of clients in a community setting) is itself a composite of arrest, judicial and corrections costs, and probabilities of movement through the system. The step involving selection of measures will determine the information needed for cost components such as this but assignment of "prices" is itself a complex task. Chapter Two outlined the steps necessary to perform cost analysis and they are applicable here.

In effect, the steps for determining measures and the subsequent cost analysis may be iterative. A measure may be selected (e.g., cost of a jury trial), but it develops that deriving all the costs will be too time-consuming for the study. In this case, other measures are examined to see whether they can serve as reliable proxies. This substitution may take place until there exists a reliable subset of measures amenable to "pricing" within the time and resource constraints of the analysis.

The project budget itself may not accurately represent ongoing costs. All the lessons of budget analysis are equally applicable here: capital purchases may be included, as may be start-up costs or other one-time expenditures; other costs may be carried by other agencies or the project may be supporting an effort unrelated to project objectives. The project costs should always be examined to see whether they accurately reflect program operations.

A frequently asked question in cost-benefit analysis is how to determine whether collecting a particular cost (or benefit) data element is worth the time and effort? The answer is itself a kind of instant cost-benefit analysis: if the effort required to derive the information exceeds the benefit it will lend to the study, then some other solution must be found. If deriving a particular cost will take considerable time (e.g., in the example, it took ten person days to estimate cost of "traditional" processing through the system), then it must be determined how critical this is to the study (in the example, this was the principal short-term benefit, directly related to project objectives). The importance of a particular

cost component is often a judgment of the analyst. Ordinarily, if it is a critical cost of benefit of the project, it must be measured and valued in as accurate a fashion as possible. If the information is more interesting than critical, it probably can be safely omitted.

Another issue which also was addressed in Chapter Two is mentioned here as a reminder: it concerns the distinction between average and marginal costs. Remember that we are concerned with differences in benefits and costs which have been "caused" by the project. Similarly, when actually valuing benefits and costs, we must be concerned with the incremental changes which occur as a result of the project. In determining "savings" or averted costs to the criminal justice system because of reduced future crime, care must be taken that only those outlays which reasonably would be expected to vary with a change in population are included. Early removal from probation, for example, may not "save" the system any money as these costs are simply spread over a smaller population. Or, the costs associated with an additional arrest may approach zero as no new resources are used. It is now accepted knowledge that removing one individual from prison does not result in a savings equal to the average cost of confinement because so many prison costs are "fixed" (i.e., they do not vary with small changes in population). Any study using average cost data will only tend to overstate the cost or benefit thus represented. It is ordinarily impossible to derive a complete cost or benefit component so some of the overstatement will be corrected by exclusion. Furthermore, it may be argued that there exists some incremental units of diverted prisoners, for example, which would occassion a cost saving closer to the average (as resources are diverted to other activities).

4.3.3 Point 3: Analyze all Relevant Benefits

As on the cost side, we seek to price benefits according to the measures developed. In our example, the education component of the program was measured by the increases in lifetime earnings associated with grade-level changes. Benefits are often more difficult to price than costs yet their accuracy is no less critical as they represent the "return" to the project for the real costs it incurs.

Because many benefits accrue over time, it is important to determine when they accrue as well as their expected magnitude. If it is known, for example, that on average ex-offenders tend to have higher-than-average unemployment rates, it may be necessary to assume less than 100 percent future employment when calculating lifetime earnings. This is yet another place in which the assumptions of the researcher can affect analytical results.

Assumptions about productivity rates can affect the analysis. It was demonstrated in the example that different rates produced dramatic differences in lifetime earnings. Unless the analyst has some strong reason for justifying a particular rate, it is more appropriate to use a range.

4.3.4 Point 4: Evaluate Sensitivity of Findings and Assumptions

Sensitivity analysis tests the analytical results by varying assumptions. The use of a range of discount rates is the most common form of sensitivity analysis since it tests how well the net benefits perform when present value is varied. However, such a procedure may be employed for any part of the analysis where the assumptions seem tenuous. For example, if the analysis hinges on averted prison costs, or recidivism rates, it may be appropriate to introduce some variation and recalculate the results. If inflation is expected to increase future program costs but benefits will remain largely unchanged, it may be appropriate to incorporate this.

Because we cannot predict either costs or benefits of correctional programs with total accuracy, sensitivity analysis is useful in testing the "robustness" or tolerance of the findings. A project which exhibits positive results over a range of variation in its assumptions is more likely to maintain its net benefit position than one whose success hinges on one discount rate, or one productivity rate, or a single measure of averted costs.

4.3.5 Point 5: Provide an Interpretation of Results

While not strictly "steps" in the analysis, it is nevertheless the responsibility of the analyst to interpret and present results in a manner which will inform the decisionmaking process. We have argued that it is generally inappropriate to present a single ratio (benefits ÷ costs) or net benefits (benefits minus costs) figure. This is in keeping with the sensitivity analysis discussed above. If the analytical findings are robust, this needs to be indicated to the decisionmaker (as does the fact that they are not robust).

It is not always necessary to present the entire analysis in the main report. Ordinarily it is best to summarize the information but include or have available technical appendix material supporting the analysis. The decisionmaker needs information but should not have to become familiar with the entire research effort. Verbal briefings are also useful in presenting analyses of this type.

This is also the point at which the non-measureable, non-pricable benefits and costs are explained, with a brief rationale for their exclusion. They may also have appeared earlier in the study when the initial list of costs and benefits was developed.

In summary, cost-benefit analysis is a powerful tool for correctional decisionmaking. It permits comparison of projects with different objectives, different sizes and different benefit structures. A single, existing project may be evaluated, as in the example, or a proposed project may be assessed through modeling. A project may be examined for how it will meet a series of objectives, with the decision focus on retaining a subset of objectives. It enables determination of the distribution of costs and benefits and intergenerational effects.

Its utility, however, is highly dependent on the rigor with which the analysis is undertaken. Because it relies on a ladder of assumptions, cost-benefit analysis can be quite frail. The steps outlined above are designed to introduce accountability at every stage of the analysis, from selecting the costs and benefits to be included in the analysis, to the use of discount rates in determining present value. However, as discussed earlier, the use of a cost-benefit approach (i.e., enumerating the costs and benefits in non-quantative terms), may be very helpful when time and resources do not permit more rigorous analysis. This approach has the utility of setting out the intended and unintended program consequences and, as such, provides more information than if no analysis had been done at all.

The resources required to conduct usable cost-benefit analyses may be substantial. For this reason, such analysis should be undertaken only when it is reasonably clear that the decision focus is on efficiency or return on investment. If non-economic reasons for project initiation or continuance are the most important, it may be the wiser course of action to forego a cost-benefit analysis. But when the decision is on the "best investment," the best return for a given set of expenditures, there is indeed no better technique than cost-benefit analysis.

Footnotes

1. This case study was developed from an actual research effort: Sally F. Familton, A Benefit-Cost Analysis of the Juvenile Services Program for Pinellas County, Florida (American Bar Association, 1975) and Billy L. Wayson, Gail S. Funke and Thomas A. Henderson, A Model for Policy Analysis Training (Washington, DC: Law Enforcement Assistance Administration, 1978).

2. There are numerous sources to which the interested reader may turn for detailed treatment of these and related concepts. See, for example, Richard A. Musgrave and Peggy B. Musgrave, Public Finance in Theory and Practice (New York: McGraw Hill, 1980).

3. For example, in an analysis of financial assistance to parolees, one study used average costs for estimating "saved" prison expenditures, assumed a probability of 1.0 that arrest would lead to a 19-month incarceration, excluded program administration costs. The "conclusion" was that the program "would fall among the top money-returners in the field." Scientific Analysis Corporation, Direct Financial Assistance to Parolees Project, Research Evaluation Review (San Francisco, CA: Scientific Analysis Corporation, 1973). A later analysis of the same concept referred to the use of "standard cost-benefit analysis" to justify a program. Charles D. Mallar and Craig V.D. Thornton, A Comparative Evaluation of the Benefits and Costs from the Life Program (Washington, DC: American Bar Association, 1978). In this latter case, the cost-benefit analysis was used to justify a major federal intervention in two states -- which subsequently failed.

4. John F. Holohan, A Benefit-Cost Analysis of Project Crossroads (Washington, DC: National Committee for Children and Youth, 1971).

5. For an excellent analysis of arrest, transportation and detention costs, see Susan Weisberg, Cost Analysis of Correctional Standards: Alternatives to Arrest (Washington, DC: U.S. Government Printing Office, 1976).

6. For extensive and illuminating discussion on the basis for and selection of discount rates, see especially Arnold C. Harberger, Project Evaluation (Chicago: Markham Publishing Company, 1971) and Musgrave and Musgrave, op. cit.

7. David L. Weimer and Lee S. Friedman, "Efficiency, Considerations in Criminal Rehabilitation Research: Costs and Consequences," in The Rehabilitation of Criminal Offenders: Problems and Prospects, edited by Lee Sechrest, Susan O. White and Elizabeth D. Brown (Washington, DC: National Academy of Sciences, 1980). This paper provides good treatment of the limitations of the use of cost-benefit analysis in corrections.

8. Ibid., p. 260.

9. Burton A. Weisbrod, "Preventing High School Dropouts," in Measuring Benefits of Government Investments (Washington, D.C.: The Brookings Institution, 1971), p. 23

Chapter 5

CONCLUSION

5.1 Worldviews

There are many ways of viewing the world, each of which affords a slightly different slant on what is happening. A psychologist might explain a person's behavior in terms of their needs and motivations. Group norms, status, and roles might be the object of a sociologist's investigations. A biochemist's interests are inclined toward understanding the composition of human bodies and how they are sustained. An economist, also, has a particular way of looking at the world: she examines how people distribute their time between work and leisure; what they receive in return for their labor; how they use their income, etc. The subject of the economist's study is resources -- human, physical, intellectual -- and especially how they are parceled out for different uses. These interests can be captured in a formal definition: economics is the study of how scarce resources are allocated to competing alternatives.

5.2 Correctional Decisions and Economic Analysis

As we have stressed throughout the Program Model, the application of economics to corrections requires a dual focus. The focus has been on both the needs of decisionmakers and analysts. The major purpose of applying economic analysis to corrections should be to provide decisionmakers with information sufficient to enable them to allocate resources rationally. We have, therefore, attempted to describe the following:

- which analytical technique should be used in accordance with the focus of the decision; and
- how to apply the techniques.

This dual focus -- on both uses and techniques of economics -- is intended to explicitly clarify the roles and concerns of a dual audience -- decisionmakers and analysts. It is our contention that both decisionmakers and analysts need to know which technique to apply depending on the decision focus.

We have identified four decision focuses and four related techniques. If the decisionmaker wants to know:

- how much to allocate to a single program, a cost analysis should be used;
- whether to allocate to one program or another, a comparative cost analysis should be conducted;
- how effectively the objectives of a program will be achieved, a cost-effectiveness analysis should be conducted;
- what the return on an investment is, a cost-benefit analysis should be conducted.

The following section summarized each of these techniques by showing how they can respond to the concerns of correctional decisionmakers. However, many decisions are made on the basis of non-economic criteria. Our purpose has not been to argue the use of economic criteria to the exclusion of other considerations. Rather, we have tried to illustrate the range of decisions which can be elucidated through the use of economic analysis. Often, information provided by other disciplines will be used in conjunction with economic data. This is the nature of much public decisionmaking. However, the purpose of the Program Model has been to identify those decisions which involve resource allocation and hence require the use of economic analysis to inform choice. Many decisions which could have been improved through the use of economic analysis are presently made without benefit of this technique. As such, they may not be optimal in the sense that all (or most) resource implications of the decisions are not known.

Economic techniques are appropriate to use when decisions involve allocating resources to competing uses or alternatives. Corrections faces resource or budget constraints like all public and private sector activities. There is a limit to what corrections can accomplish given these resource constraints. In short economic techniques are useful primarily when decisions involve resource constraints. Economic analysis is relevant, therefore, to all budgetary decisions, legislation having fiscal impacts, program evaluations, reorganizations, investment decisions, alternative organizational arrangements (such as staffing, contracting) and so on.

There are, however, numerous correctional decisions for which economic analysis may not be relevant or may not be a critical factor in making the decisions. Economics is not relevant to decisions involving individuals. For example, it would not be advisable to conduct an economic analysis to determine the classification or release date of a prisoner. (It would be useful, however, to determine the costs of alternative classification and release policies.) Furthermore, economics is not particularly relevant

to decisions involving financial arrangements and the control of funds. These monetary issues are better addressed with cost accounting studies.

Economic analysis often has not been a critical factor in decisions when political considerations have been important. The cost of increasing security in prisons, for example, may not be an important issue if there is a public hue and cry against prison riots or escapes. Similarly, it may be expedient to build prisons to increase employment and income in a legislator's district. We recognize that economic analysis may be meaningless when political considerations are paramount. However, the hope of this Program Model is that it will increase the degree of rationality in the highly political process of allocating resources to corrections.

5.3 Summary of the Economic Techniques

In this section, we present a summary of each of the techniques and compare their advantages and limitations. The summaries define the techniques, explain when they should be used (i.e., the decision focus), and how they are to be applied (i.e., the analytical focus). In addition, examples drawn from the Program Model show how they have actually been applied successfully in the past. The section that follows the summary suggests areas where it may be useful to apply the techniques in the future.

5.3.1 Cost Analysis

Cost analysis is the simplist economic technique and has the widest applicability to corrections. Cost analysis may be defined as an assessment of the value of resources (inputs) used in a process, program or activity. Cost analyses are used to inform decisions that are concerned with either of the following:

- how much does an existing program or activity cost?
- how much should be allocated to a new program?

In the first decision focus, we are concerned with the price of resources. By "price of resources" we refer to the value of the inputs (e.g., labor, capital) used in corrections. For example, a decisionmaker may want to know the cost of prison security or probation services to the court. In the second decision focus, we are concerned with the cost of planned activities: the cost of building a prison, of converting a hotel into

a halfway house, of setting up a drug treatment program, and so on. All these applications have obvious implications for correctional budgeting.

It is difficult to describe the analytical process involved in conducting a cost analysis. The process is often complex and time consuming and was explained in detail in Chapter Two. For the purpose of summarizing the analytical process, we will focus on a few key elements.

First, cost analyses can involve several different techniques. In cost allocation, costs from one program (or budget) are allocated to another program. For example, a proportion of the sheriff's budget (for personnel and transportation) was allocated to House of Correction costs to find the true cost of the latter. Program budgeting involves estimating the cost of programs usually from workload measures. The demand for resources for a prison education program, for example, was estimated from the workload (i.e., hours of instruction), and the total cost of instruction personnel was then calculated. Variable cost analysis focuses on the marginal cost of adding to a stock (e.g., prison population). Several options may be available for expanding capacity, and in the example in Chapter Two we were concerned with the additional costs they would impose. Finally, model budgeting and sample budgeting can be used to develop line item budgets for new programs and for programs that are similar to existing programs for which budgets exist.

With a second technique, the economic cost of programs can be divided into operating (annual) costs and capital costs (where the useful life of the resource extends beyond the year). Total operating or capital costs include several kinds of cost variables. They include criminal justice system costs and external costs (i.e., cost incurred outside the agency or criminal justice system being analyzed). In addition, opportunity costs, that is, the value of resources in alternative uses, serves as estimates of cost when there are no market prices available for the present use of resources (e.g., prison land, inmate labor, volunteers).

Finally, data for estimating costs may come from several sources. These include budgets, expenditure reports, audits, payroll records, equipment inventories and so forth. Time use studies can be used to measure the value of time (in relation to workload). In addition, interviews are a means of collecting data on expenditures, workload, staffing and resource requirements.

In assessing the cost of a halfway house one would begin by determining the cost variables from the decision focus. If the focus is for a budget request, then only halfway house operating and capital costs would be included. Otherwise, external costs and opportunity costs might also be included. The analysts would then formulate a model. In this case, the

total operating cost for a halfway house would include personnel (salaries and fringe costs) and non-personnel costs (e.g., travel, supplies, training). Data for the various cost components would be collected and finally the cost of the halfway house would be estimated.

5.3.2 Comparative Cost Analysis

Comparative cost analysis compares the costs of inputs (i.e., the value of resources) used in two or more programs or activities. The focus of the decision is whether resources should be allocated to one program or another. All the programs being compared must have the same outputs or program effects. However, the production processes may vary. For example, one halfway house, as we demonstrated in Chapter Two, may be staffed with correctional employees while another may utilize volunteers. The focus of the analysis is on the relative costs of these two staffing arrangements.

The analytical process in conducting a comparative cost analysis is identical to that described above for cost analysis. However, the conclusions that one would draw in a comparative cost analysis of two halfway houses, for example, are likely to be somewhat different. Analysts should explain the difference in the production processes (e.g., that one halfway house is staffed soley with correctional employees and that the other utilizes volunteers) and then point out the difference in the total cost. In addition, the salient differences in the cost components should be highlighted. Personnel costs in one halfway house may be less than the other, but non-personnel may be greater perhaps because volunteers are paid a stipend. This sort of information may be useful to decisionmakers. Furthermore, whenever one production process or organizational arrangement uses fewer salaried positions than another (even if the total cost is greater) this should be highlighted for decisionmakers. Comparative cost analysis entails everything that a cost analysis of one program would but the cost estimates for two or more programs are compared.

5.3.3 Cost-effectiveness Analysis

With cost-effectiveness analysis, the focus shifts from the input side to the output side. Cost-effectiveness may be defined as the amount of output (effect) produced for an outlay of dollars (cost). It can be used to inform the following decisions:

- how can program results be maximized, given a fixed budget?

- how can costs be minimized, given a desired level of results?

In the first decision focus, cost-effectiveness is used to determine which one of several programs maximizes results given a fixed level of cost. The choice here is among two or more programs each with the same budget constraint and may be referred to as "fixed cost." In the second decision focus, the analyst is concerned with finding the least costly program that will produce a desired outcome. This may be referred to as "fixed effectiveness," that is, the analysis shows which one of several programs minimizes cost for an equal degree of effectiveness.

In Chapter Three, we described the use of cost-effectiveness analysis primarily as it pertains to evaluating the performance of correctional programs. In other words, we showed how the effects of programs could be measured in terms of the degree to which they achieve their objectives.

Thus, the first and most important step in applying cost-effectiveness analysis to program performance is to identify the relevant objectives. For example, the goals of a halfway house are to help clients readjust to community life and to protect society. These goals can be translated into a set of clearly articulated, measurable objectives. For example, two objectives might be to increase the number of clients that find jobs by 10 percent and to reduce the rearrest rate among clients by 25 percent. The effectiveness of the halfway house in meeting these objectives can then be measured from data on client outcomes.

Finally, the effect variables can be related to cost. A one percent increase in employment might cost $5,000 in one halfway house but would cost $7,500 in another. Obviously, the first halfway house would be more cost-effective as far as the objective of job placement is concerned. It is plausible, however, that it may be less cost-effective as far as reducing recidivism. Therefore, the analyst should always make explicit the various cost-effective estimates when multiple objectives are involved.

5.3.4 Cost-benefit Analysis

Cost-benefit analysis is the most sophisticated of the economic techniques presented in the Program Model. Cost-benefit analysis may be defined as an assessment of the efficiency of resource allocations. As such it is generally used to inform decisions that focus on the return on investments. For example, decisionmakers may be concerned about the profitability of prison industries, the benefits of a diversion project or a major investment such as jail or prison construction.

Characteristic of all cost-benefit analyses is that benefits are quantified in dollar terms. Total benefits comprise direct program benefits and the social benefits that result from an investment in corrections. In halfway houses, for example, the immediate benefits would include client income from working and the social benefits would include any reduction in the social cost of crimes averted as a result of the clients' participation in the program.

After the benefits are measured, they are related to the program's cost. The program's cost is estimated by conducting a cost analysis such as the one of the House of Correction presented in Chapter Two. Since benefits will accrue and costs will be incurred over the lifetime of the halfway house, the stream of benefits and costs should be discounted to present value. For example, an investment in a halfway house may produce benefits for 25 years. The value of $150,000 in benefits in the year 2000 is considerably less when inflation is taken into account. Therefore, future benefits and costs are discounted to real (1980) dollars.

Since it is virtually impossible to predict the inflation rate a sensitivity analysis can be conducted to see how real (1980 dollar) benefits and costs are affected by various assumptions about the discount rate. For example, a halfway house may have benefits greater than costs at a 5% discount rate but costs may exceed benefits at a 10% discount rate. The analyst would then present the results (benefit-cost ratios and net benefits) for the various discount rates to the decisionmaker.

5.3.5 Comparison of the Techniques

Figure 5-1 presents a comparison of the four analytical methods. It highlights the differences in the decision focus and analytical focus summarized above. In this section, we compare the advantages and limitations of the various techniques.

The major benefit of each technique is that it provides decisionmakers with information they need to allocate resources rationally. Each technique provides progressively more information than the preceding one. Since applying each technique also requires a progressively greater degree of analytical expertise, data and time, it is adviseable to use the technique that responds most directly to the concerns of decisionmakers. One would not conduct a cost-benefit analysis of a prison if all a decisionmaker wanted to know was how much it would cost to build one. The major advantage of each technique (i.e., to answer specific questions about the allocation of resources) derives from the choice of the appropriate analytical technique.

Figure 5-1

Comparison of Economic Analysis Techniques

Technique	Decision Focus	Analytical Focus	Data Requirements	Limitations
Cost Analysis	How much does an existing program or activity cost? How much should be allocated to a new program?	Assesses the cost of inputs (i.e., the value of resources) used in a process, program or activity.	Expenditures on - salaries & fringe benefits - supplies - equipment - capital - other nonpersonal cost Value of time	Does not consider noneconomic factors relevant to decisions. Does not evaluate the performance and quality of programs.
Comparative Cost Analysis	Whether to allocate resources to one program or to another?	Compares the cost of inputs used in two or more programs or activities.	Same as above.	Same as above. Requires that outputs or program effects be identical.
Cost-effectiveness Analysis	How can program results be maximized, given a budget? How can costs be minimized, given a desired level of results?	Measures the effects of two or more programs and relates them to inputs (i.e., cost).	List of goals & objectives Indicators of effects - counts - rates - ratios - indexes - models Cost estimates of program	Achieving consensus on programs' goals and objectives. Measuring output may be difficult.
Cost-benefit Analysis	How efficient is an expenditure? Is an investment economically sound?	Measures the dollar value of program benefits and relates them to cost (return on investment)	List of benefits - income increases - employment increases - education increases - productivity increases - reduction in criminal costs - reduction in criminal justice costs Cost estimates - criminal justice system costs (e.g., program costs) - external & social costs	Most difficult technique to apply. Highly dependent on assumptions utilized in analysis. Results are sensitive to discount rate.

Each technique, however, does have certain limitations. None of the techniques are used to analyze non-economic factors (e.g., political considerations) relevant to decisions involving resource allocations. Neither cost analysis nor comparative cost considers the quality or performance of programs. They totally ignore the issue of whether a resource allocation is worthwhile. Furthermore, comparative cost analysis is limited by the fact that it should only be applied to programs that have the same outputs or effects.

Cost-effectiveness analysis (as applied to program performance) requires that a consensus on the programs' goals and objectives be reached. This is not always feasible. Once the objectives and other output variables are defined, they must be measured. This is the most difficult obstacle to overcome in conducting a cost-effectiveness analysis. How does one measure educational achievement? Is it meaningful to measure it as the number of prisoners who receive a high school equivelancy diploma?

Cost-benefit analysis has had the most limited use thus far, primarily because it is the most difficult technique to apply. Cost-benefit results are highly dependent on the assumptions made in the analysis and are very sensitive to the discount rate selected. The implication of these limitations is that cost-benefit analysis requires correctional officials to make decisions on the basis of faith. They must trust that the analyst has made reasonable assumptions, has developed a complete model (of benefits and costs), has measured the variables accurately and has selected a reasonable discount rate. Perhaps much the same could be said about each of the other techniques.

5.4 The Future of Economics in Corrections

Notwithstanding certain limitations of the techniques, economics can play a significant role in informing correctional resource decisions. In this conclusion to the Program Model, we suggest some areas where economics may have an impact on correctional decisionmaking in the 1980's. In particular, we focus on the potential uses of the various techniques. Finally, we address what may be the most fundamental issue in the utilization of economic analysis, namely, the implementation of economic analysis in correctional agencies.

5.4.1 Decision Issues Amenable to Economic Analysis

In the preceding chapters, we have attempted to demonstrate how economics have thus far been applied in corrections. The question this section

addresses is, where do we go from here? One is not likely to answer a question such as this by looking into the crystal ball of the 1980's; for few of us have such insight. However, we can suggest a few areas where economics can and indeed should play a role. Whether it comes to pass is another matter entirely.

First, cost analysis as we demonstrated in Chapter Two can inform budgetary decisions. In an era of fiscal restraint cost analysis can serve a dual purpose: it can be used to justify budgets and to acquire evermore scarce resources. If corrections is to command the resources it will need to fulfill the obligations the public expects of it, then adequate resources will be needed. Herein lies the major role of economics in the future. If legislators expect a prison industries program to employ a certain number of prisoners or a halfway house to serve a certain number of clients, then adequate resources will be needed. Unless costs are estimated and budget requests are justified accordingly, it is likely that corrections will be expected to do more with less. Thus, the first and foremost use of economics may very well be in the acquisition of resources for corrections.

Second, cost-effectiveness analysis and cost-benefit analysis as we explained in Chapters Three and Four can be used in evaluating the efficiency of correctional expenditures. In an era when the efficacy of corrections comes under evermore critical inspection, evaluative studies could play an essential role. The purpose of doing cost-effectiveness analyses and cost-benefit analyses should not be for vested interests to justify on-going programs. Rather, its purpose should be to determine what works better or what is most efficient. Is centralization of probation services or halfway houses more efficient than decentralization? Is contracting with private halfway houses or contracting for counseling and psychiatric care more economical than providing in-house services? Are community programs more effective in dealing with certain kinds of offenders than institutions?

Unless we attempt to find answers to these and a host of other issues, corrections may very well come under increasingly severe criticism. Thus, there is a built-in incentive to improve the allocation of resources to correctional programs. If correctional agencies wish to receive both financial and public support, open and sound analysis can play a role in persuading others about the needs, requirements and limitations of correctional agencies. In short, if used effectively, analysis can play a role in achieving a more rational allocation of resources to corrections in the future.

5.4.2 Implementing Economic Analysis in Correctional Agencies

As we have tried to show, economic analysis can be applied in a wide variety of situations. The question is, who is going to conduct the analysis? We can suggest several measures to increase the utilization of economic analysis in managing correctional resources.

Every agency should have an analytical staff that can conduct economic analyses. Generally speaking, most agencies already have budget and research staffs to meet this requirement. We have tried to show that economics is largely a matter of common sense; we, therefore, believe that personnel are already in place to perform analytical tasks. What may be missing, however, are directives from correctional officials. Thus, we suggest that correctional decisionmakers who have not already begun to do so begin to request economic analyses pertinent to their decisions.

We recognize that some analyses may require a greater degree of expertise on the part of the analyst than may be available in correctional agencies. In such situations consultants can be brought in to provide technical assistance or the research and academic communities be given a major role in the analysis. Indeed, both of these approaches may lend credibility to the analytical findings.

As a rule, it may be worthwhile to begin conducting economic analyses on an on-going basis. For example, the director of an agency can require the budget staff to conduct a cost analysis of two or three programs to be included in the budget submission. Furthermore, the research staff can be required to perform one evaluative analysis biannually. Cost analyses can be conducted for all legislation significantly impacting on correctional resources. A research agenda or policy such as this may be a good habit to form.

As we have stressed throughout the Program Model, the dual focus of decisionmakers and analysts is critical to understanding the use of economics in corrections. Thus, in implementing economic analysis in correctional agencies, nothing is more important than communication between decisionmakers and analysts. If corrections is to take advantage of the strengths of economic analysis, then decisionmakers and analysts must begin to work together toward improving the allocation of correctional resources. Such a coordinated effort will ultimately enhance the position of corrections in American society.

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List of Appendixes

Appendix A-1

SYNOPSIS OF TELEPHONE SURVEY OF CORRECTIONAL AGENCIES

The purpose of the telephone interview was twofold: (1) to gain insights into the nature and functions of correctional research in departments of corrections throughout the nation, and (2) specifically to assess the "state of the art" in the application of economic techniques to substantive research in corrections. The telephone survey instrument was designed to elicit this information (see attachment). A survey sponsored by the NIJ was helpful in ascertaining the kinds of research conducted by correctional departments and establishing a list of contacts. The report, "Strategies for the Utilization of Correctional Research and Evaluation," by Jay W. Worrall (American Correctional Association) lists 29 states and the District of Columbia as conducting applied correctional research. Only three were listed as conducting cost analyses; the remainder conducted research in the areas of program evaluations, descriptive statistics and classification studies. IEPS contacted all 30 to learn more specifically the nature of their research, particularly in the area of cost analysis. The following describes the salient findings from the telephone survey.

The 30 divisions were diverse in their functions and staffing. Most of the divisions had responsibilities for program evaluations and/or descriptive statistics (including population projections) for management and agency reports. However, some divisions engaged in more specialized research, e.g., developing risk assessment models for parole, tracking inmate movement, and developing master plans. (In contrast to Worrall's survey, we did find quite a number of divisions conducting economic analyses, but these were primarily done within the context of program evaluations or other, more general, research efforts.)

The size and background of the research staffs tended to follow a similar pattern in most of the agencies. The staffs tended to have between 2 to 6 professionals including the director. A few staffs had only one individual and a couple had about 10. The backgrounds of the professionals were fairly diverse. Their backgrounds were in research, planning, evaluation, social work, education, statistics, social sciences (psychology, sociology) as well as criminal justice and corrections -- and there was a sprinkling of economists (including the Chief of Bureau of Planning, Research and Statistics in Florida).

Approximately half the states contacted have used economic techniques in their research. The other half used economic techniques primarily in program evaluations, budgeting, fiscal impact statements. Only in rare instances does economics seem to be applied as an analytical tool in and of itself. For example, New York State is in the process of developing a cost-benefit analysis of its satellite mental health program and Florida has conducted cost-benefit analyses of its probation and parole services. The primary reasons cited for the lack of economic applications were: (1) insufficient personnel, and (2) inadequate skills.

Although many states do not use economics, most of them are interested in doing so. The areas of greatest concern are in (1) cost-benefit analyses of programs (e.g., agri-industry, social rehabilitation units, work release centers, treatment programs), (2) cost analyses (of community facilities and community resources, for example), (3) cost-effectiveness analyses (of inmate treatment progr and finding an optimal officer/inmate ratio), and (4) fiscal impact statements. In this regard, one clear pattern emerged: virtually all of the respondents are interested in applying economic techniques. The degree of enthusiasm for the subject seemed to rank from low (in only a few cases) to quite high (in about a half dozen states). In conclusion, the impression one gets from such

a survey is that there are many states that would like to increase the economic techniques, but they need some assistance (hopefully in the form of this Program Model) to allow them to do so.

Appendix A-2

PROGRAM MODEL
ECONOMIC ANALYSIS TECHNIQUES FOR CORRECTIONS

Telephone Survey

DRAFT

Hello, my name is _____. Our organization, the Institute for Economic and Policy Studies, Inc., has been funded by the National Institute of Justice, a research office of the U.S. Department of Justice, to develop a Program Model document on economic analysis techniques in corrections. This Program Model is being prepared to help correctional practitioners and administrators utilize various analytic techniques more effectively in their program planning and policy development activities. In order to be relevant to the issues and concerns faced in corrections, we are contacting a number of agencies to determine their needs in the area of economic analysis. This includes cost and cost-benefit analyses as well as other techniques. I have several questions I would like to ask now that will help us focus on the most important areas in this field.

PART I: ORGANIZATION OVERVIEW

Name of Respondent _____ Title _____

Division _____ Agency _____

Address _____ Phone _____

Date of Interview _____

	Insts.	Probation	Parole	Comm.
1. What functions does your agency have?				
2. About how many clients were under supervision during FY 1980?				
3. What was your FY 1980 budget?				
4. About how many full-time equivalent employees did you have during FY 1980? total [ ]				

	Research	Planning	Comb.	Other
5. What are the functions of your research division? (Give budget allocations, if possible.)				
6. How many professionals are involved?				

7. What academic background or training training does your professional staff have? (Note Director's background.)

_____ # criminologists
_____ # sociologists
_____ # psychologists
_____ # economists
_____ # other (specify)

PART II: RESEARCH ACTIVITIES AND ECONOMIC ANALYSIS

8. What kinds of reports are produced? _____

Statistical _____

Short issue papers _____

Long-term studies _____

Other _____

9. Have you done or are you currently engaged in any economic analysis?

Yes _____ No _____ (If Yes, complete 9a-9f.)

a. What kinds of techniques have been used?

_____ cost analysis _____ comparative cost analysis _____ cost-effectiveness analysis _____ cost-benefit analysis _____ other.

b. What are the titles and what problems or issues did the analyses address: (Interviewer, request copies?)

_____

_____

_____

_____

_____

_____

c. What kinds of data were available? _____

d. How were the studies initiated? (Researcher interest, decision-maker need, legislative request)

e. How were the studies used (budget process, planning, other decisionmaking)?

f. Did you conduct the studies in-house or were outside resources used?

10. What kind of economic and cost analyses could be useful to your agency?

11. What constraints do you face in carrying out economic analysis? (lack of personnel, staff capabilities, money, adequate data, etc.)

12. What data bases do you have? List.

13. What sort of information on economic analysis would be useful to you and what should we include in the Program Model to help you increase and/or improve your use of economic analysis?

14. Do you have any comments or questions?

15. Do you know of any other organizations within the agency that conduct economic analyses? If yes, list.) _____

16. Thank you. May I contact you again should the need arise.

Interviewer Comments

_____

_____

_____

_____

_____

Appendix B-1

INFLATING COST ESTIMATES

Since prices are affected by inflation, analysts should be careful in comparing prices from two different time periods. For example, $1000 in 1974 would be equivalent to $1464 in 1978. If one is analyzing 1978 costs, for example, then early costs should be inflated so that they are comparable. This can be done by using a price index, which standardizes prices in accordance with the inflation rate. Price indexes can be acquired from government documents or can be created by the analyst from a survey of data. * Using the Implicit Gross National Product Price Deflator for Purchases by State and Local Governments, $15,000 in 1974 would be converted to its 1978 value as follows:

$$\$15{,}000 \times \frac{\text{1978 Index: } 160.4}{\text{1974 Index: } 118.4} = \$20{,}321$$

Thus, on the basis of a national average covering all types of government purchases, a program costing $15,000 in 1974 would cost approximately $20,321 in 1978.

Since this approach does not differentiate between rates of price change by specific budget components (e.g., food, fuel, personnel, etc.), a series of published and specially created Item Indexes can be used. The published series of indexes included:

Housing
Food
Maintenance and Repairs
Transportation
Utilities
Communications
Non-durables
Government Purchases of Industrial, Educational, Hospital and Other Structures
Medical
Commodities, less Food

*See U.S. Department of Commerce, Survey of Current Business, for price indexes.

Government programs, generally, are labor intensive, so the largest impact on costs over time should come from increases in salaries and wages. A set of indexes for specific job titles can be created from the State Salary Survey published by the U.S. Civil Service Commission. The indexes should be applied to the position that most closely approximates job descriptions included in that survey. Where no comparable data exist, a composite should be constructed by using the mean value of all other salary indexes as an approximation.

Appendix B2

LIFE CYCLE COSTING

In economics, the value of building material, prisons, and the like depends not only on the amount of money invested but also on the time value of money. * Every dollar invested in prisons could have alternatively been placed in a bank to accumulate interest. This, in essence, represents the opportunity cost of money. That is, the value of investments in corrections includes both the actual outlay and the return or interest on the money that is foregone. Investment decisions should consider all the costs over the life of the facility (e.g., maintenance, replacement, repairs) and choose the alternative that minimizes costs. Life cycle costing addresses the two investment concepts of cost minimization and the time value of money.

The basic formulas are derived by assuming that either a sum of money, P, is invested initially at an annual interest rate, i, or that a sum of money, A, is invested at the end of the first year and at the end of each subsequent year. The formulas for life cycle costing are as follows:

(1) $F = P\ (1+i)^N$

(2) $P = F\left[\frac{1}{(1+i)^N}\right]$

(3) $A = F\left[\frac{(1+i)^N-1}{1}\right]$

(4) $A = F\left[\frac{i}{(1+i)^N-1}\right]$

(5) $A = P\left[\frac{i(1+i)^N}{(1+i)^N-1}\right]$

(6) $P = A\left[\frac{(1+i)^N-1}{i(1+i)^N}\right]$

*This appendix is based on Robert J. Kapsel, "Life Cycle Costing Techniques Applicable to Law Enforcement Facilities," (Washington, D.C.: U.S. Government Printing Office, 1974). The reader should refer to this excellent document for elaboration of the concept and formulas and for tables that will help minimize calculation of life cycle costs.

Where:

P = Present sum of money.

F = Future sum of money that is equivalent to P at the end of N periods of time at an interest of i.

i = Interest rate.

N = Number of interest periods.

A = End-of-period payment (or receipt) in a uniform series of payments (or receipts) over N periods at i interest rate.

An example will illustrate how these formuals can be used. A Commissioner of Corrections has the option of leasing or building a halfway house. The department could lease the building for $9,600 per year for five years. Alternatively, it could build the halfway house for $120,000 and maintain it for $900 per year. If the program is discontinued after 5 years, it is expected that the building would sell for $140,000. The issue is, which option costs less (at a 10 percent discount rate).

The present value of the lease is:

$$P_1 = \$9600 \left[\frac{(1+i)^5-1}{i(1+i)^5}\right] \quad \text{Where: } i = 10\%, \; P_1 = \text{Total Cost of Lease}$$

$$P_1 = \$9600 \left[\frac{0.61051}{0.61051}\right] = \$9600 \; (3.791) = \$36,394$$

$$P_1 = \$36,394$$

The cost of buying the necessary building can be reduced to present value by the following formula:

P_B = Initial Cost + Present Value of Operations Cost - Present Value of Selvage Revenue

This can be written:

$$P_B = \$120,000 + \$900 \left[\frac{(1+i)^5-1}{i(1+i)^5}\right] - \$140,000 \left[\frac{1}{(1+i)^5}\right]$$

Where i is 10 percent and P_B is the total cost of buying the facility.

$$P_B = \$120,000 + \$900 \; (3.791) - \$140,000 \; (0.6209)$$

$$P_B = \$120,000 + \$3412 - \$86,926$$

$$P_B = \$36,486$$

In this particular example, the decision between leasing and buying must depend upon other factors when the total cost figures are this close. An analysis such as this clarifies the relative life cycle costs of two or more options, one of which may seem less costly on the surface (e.g., leasing in the preceding example).

SUGGESTED OBJECTIVES AND MEASURES FOR MONITORING PRISON AND PAROLE SERVICES

OBJECTIVES: Incarcerate offenders securely so that they cannot inflict harm on the public, while also providing for the safety, humane treatment, and health of inmates
Rehabilitate offenders so that they do not commit criminal offenses when released to the community and assist them in becoming socially productive and integrated into the community.

Objective Characteristic	Measures	Principal Data Breakouts	Data Collection Means/Source
To hold securely	1. Annual number of *escapes* divided by annual Average Daily Population (ADP)	Level of security, facility	Analysis of existing escape and prison population records
	2. Number of *crimes committed against the public* ascribed to escapees and to inmates on authorized absence (e.g., work release)	Type of offense, security level	Escape and recapture records and inmate files
	3. Number of incidents of *failure of internal* security, by type of incident, total divided by ADP	Level of security, facility	Special report
	a. Incidents involving *contraband*	Type of contraband	
	b. Incidents of *unrest* by groups of inmates	Type of unrest	
	c. Physical *assaults on prison officials*		
	d. Physical *assaults on inmates* requiring medical treatment		
To hold humanely	4. Number of inmate-days of *overcrowding*	Facility	Analysis of existing records
	5. Rating of *sanitation conditions* in facilities	Facility	Trained observer inspections
	6. Percentage of inmates with unmet health needs	Major facility	Physical examination of a sample of inmates
To rehabilitate (changes in attitude)	7. Percentages of inmates with substantial improvement-degradation in attitude associated with criminal or social behavior based on psychological test scales administered at intake and at release; numbers of scales showing significant improvement-degradation	Client-difficulty level	MMPI tests or other psychological exams of random sample of inmates at intake and at discharge
To rehabilitate (reduction in criminal activity)	8. *Criminal involvement while under parole*	Client-difficulty level	State criminal justice information network, corrections intake records, FBI RAP sheet follow-up on random sample of parolees
	a. Percentage of all offenders on parole in the past 12 months who are *arrested* (or whose arrest passes a preliminary hearing) for a criminal offense allegedly committed prior to completion of parole, or		
	b. Percentage of all offenders on parole in the past 12 months who are *convicted* of a criminal offense that was committed while on parole; or		
	c. Percentage of all offenders who successfully complete parole *without revocation* for a criminal offense		

Objective Characteristic	Measures	Principal Data Breakouts	Data Collection Means/Source
	9. *Criminal involvement when no longer under supervision* a. Percentage of offenders *arrested* (or whose arrest passes a preliminary hearing) for a criminal offense within 12 months of completion of parole or unconditional discharge; or b. Percentage of offenders *convicted* for a criminal offense committed within 12 months of completion of parole or unconditional discharge: or c. Percentage of offenders *reincarcerated* for a criminal offense within 12 months of completion of parole or unconditional discharge	Client-difficulty level	State criminal justice information network, corrections intake records, FBI RAP sheet follow-up on random sample of former inmates
	10. *Reincarceration:* Number and percentage of offenders entering prison who have previously been incarcerated in the state prison system		Corrections agency records. FBI RAP sheets, court records
To rehabilitate (increase in social productivity)	11. Percentage of ex-offenders *employed* or otherwise socially productive full time when released from parole	Client employment-difficulty level	Parole agent reports. or special tracking of sample about to be released

Source: Louis H. Blair, et al., Monitoring the Impacts of Prison and Parole Services: An Initial Examination (Washington, D.C.: The Urban Institute, 1977), pp. 2-3.

Appendix C-2

ADDITIONAL MEASURES OF EFFECTIVENESS

This chapter includes 100 additional measures for assessing the effectiveness of probation and parole agencies. Several measures of efficiency are also included and are marked with an asterisk. The measures were selected after an extensive review of the literature on probation and parole, and an analysis of relative utility, ease of data collection, and technical strength of the various measures identified. These measures summarize many variations found in the literature.

These measures are listed under the same four goals described in Chapter Two and are also classified by "level" of complexity. Level 1 measures are the least complex. They involve collection of the total number of events only, such as the total number of re-arrests. Level 2 measures involve a breakdown of the total, such as the number of re-arrests by type of offense. Also classified under Level 2 are those measures that require two different pieces of data, such as the number of telephone contacts per agent.

Obviously, many more extensive breakdowns are possible, such as the number of arrests not only by type of offense, but also by age and sex of the offender. These more detailed measures have not been listed to keep the list simple and manageable. Some agencies may wish to generate such detailed measures. Part Two describes procedures for doing that.

Goal and Criteria	Level	Measure
REDUCE CRIMINAL ACTIVITY		
Arrests	Level 1:	#,% new arrests
		#,% re-arrests
		#,% jailed, awaiting trial
		# arrest warrants issued
	Level 2:	#,% re-arrests by type of offense
		mean length of time between release and arrest
Convictions	Level 1:	#,% new convictions
	Level 2:	#,% convictions by type of offense
		mean length of time between release and conviction
Incarcerations	Level 1:	#,% new incarcerations
		#,% incarceration within designated time limit
		# short-term reconfinements
		mean length of time between release and reincarceration
		# jail days
New Offense	Level 1:	#,% repeat offense
		#,% new offense
		#,% multiple new offenses
		# charged with indictable offense
	Level 2:	Degree of severity of new offense

Goal and Criteria	Level	Measure
IMPROVE SOCIAL PRODUCTIVITY		
Employment/Training	Level 1:	#,% employed while on probation/parole
		#,% employed at release from probation/parole
		#,% placed in vocational training programs
		#,% continuing vocational training
		#,% developed skills (passed tests)
		#,% developed occupational skills
		#,% placed in jobs
		#,% unemployed
		#,% changed jobs
		mean length of time in job
	Level 2:	#,% employed by type of job
Education	Level 1:	#,% placed in education programs
		#,% education achievement (test scores)
		#,% high school diplomas awarded
		#,% continuing academic education
Alcohol/Drug Abstinence	Level 1:	#,% returned to alcohol/drug use or abuse
		#,% refrained from alcohol/drug use
		#,% subjected to nalline testing
Economic Self-Sufficiency	Level 1:	#,% self-supporting at release from probation/parole
		mean annual/monthly/weekly income
Residence Stability	Level 1:	# of residences
		mean length of stay in residence

Goal and Criteria	Level	Measure
IMPROVE SUCCESSFUL COMPLETIONS OF TERM		
Violations	Level 1:	#,% violations
		#,% technical violations
		#,% violations other than arrests
		#,% absconded
		#,% violations with firearms
Revocations	Level 1:	#,% parole/probation revoked
		#,% revoked and re-paroled
Completions	Level 1:	#,% closed by expiration of term
		#,% terminated early
		#,% favorable completions
		#,% non-violators
		#,% conditional discharges
		#,% administrative terminations
		#,% suspended sentences
	Level 2:	#,% discharged by improvement status
		#,% complied with special conditions
Restitution	Level 1:	#,% clients completing restitution
		#,% dollars collected
		#,% accounts not in arrears
		#,% accounts paid in full

Goal and Criteria	Level	Measure
IMPROVE CASELOAD MANAGEMENT		
Contacts	Level 1:	#,% total face-to-face contacts with client, institutional staff, courts, parents, employers, school, etc.
		#,% total telephone contacts with above
	Level 2:	# face-to-face contacts per agent*
		# telephone contacts per agent*
		# collateral contacts per agent*
		# office contacts per agent*
Caseload	Level 1:	# cases
		#,% active cases
		#,% closed cases
		#,% cases under professional treatment
		#,% clients on intensive supervision
	Level 2:	# cases per officer*
		#,% clients by level of supervision
Services	Level 1:	#,% received alcohol/drug counseling
		#,% received individual counseling
		#,% received group counseling
		#,% received family counseling
		#,% community referrals made
		#,% enrolled in special programs
		#,% completed special programs

*Measure of efficiency.

Goal and Criteria	Level	Measure
IMPROVE CASELOAD MANAGEMENT (continued)		
Agent Time	Level 1:	# hours average handling time per case*
		#,% hours face-to-face contact
		# minutes per contact*
		#,% hours spent on PSI reports, pre-pardon reports, contact reports, etc.
		#,% hours spent on supervision
		#,% hours spent on administrative/ managerial functions
		#,% hours spent on nondirect services (vacation, holidays, sick, etc.)
		#,% hours spent in training
	Level 2:	% time in court, field, office
Personnel	Level 1:	# staff
		# officers
		# volunteers
		# aides
		# specialized staff
		# staff available for supervision
		# staff received/receiving training

*Measure of efficiency.

Goal and Criteria	Level	Measure
IMPROVE CASELOAD MANAGEMENT (continued)		
Client Classification	Level 2:	Personal Data
		age sex socio-economic status marital status dependents military record race ethnicity religion family history drug/alcohol use intelligence health status language family income citizenship homosexuality status
	Level 2:	Offense-Related Data
		prior offenses prior arrests convictions prior incarcerations time in prison type sentence (multiple, simple) nonprison sentences date of last release # times on parole/probation # referrals to probation offense type crimes against persons property offenses felonies/misdemeanors homicide/robbery/burglary/larceny/ forgery/sex offense/narcotics/ auto theft/other court of commitment county, city of commitment risk score

Source: Jack Reynolds, Performance Measurement in Probation and Parole (Washington, D.C.: University Research Corporation, 1979), pp. 22-28.

Appendix C-3

ILLUSTRATIVE OUTCOME MEASURES CONSTRUCTED AS SIMPLE COUNTS FOR A HYPOTHETICAL PROBATION TREATMENT PROGRAM

Concept Measured	Measures Related to Concept
Decreased dependence on drugs and alcohol	Number of probationers no longer dependent upon drugs, as reported by counselors, employers, peers, family
Improved interpersonal relations	Number of probationers whose interpersonal relations have improved, as determined by probation staff, self-reports, and standard psychological tests
Increased family stability	Number of probationers who show improved family stability, as measured by the St. Paul Scale of Family Functions Number of probationers who perceived a positive change in their family relationships
Improved attitude toward society	Number of probationers whose attitudes became more acceptable, as measured by Jesness, California Psychological Inventory, and MMPI
Increased socially acceptable behavior	Number of probationers showing increased socially acceptable behavior, as measured on the ABC behavior scale
Increased probation success	Number of probationers who complete their terms without revocation Number of violations of probation terms
Increased financial independence	Number of probationers whose credit rating improved Number of probationers who, after financial counseling, are able to pay rent, buy clothes, and make large purchases

ILLUSTRATIVE MEASURES CONSTRUCTED AS RATIOS OR PERCENTAGES FOR A HYPOTHETICAL PROBATION TREATMENT PROGRAM

Outcome Concept Measured	Ratio Measures Related to Concept
Increased safety in the community	Reported crime rate Victimization rate
Decreased dependence on drugs and alcohol	% of probationers depending on drugs for normal functioning
Reduced criminal activity	Arrest rate of probationers % of probationers with no further criminal associations for 1 year after discharge from probation
Increased socially acceptable behavior	% of time probationer was employed during follow-up period
Service Characteristic Concept Measured for Counseling, Treatment, and Therapy Activities	
Client satisfaction	% of time counselor is rated effective/competent/helpful by probationers
Service availability	% of probationers for whom treatment needs are met
Timeliness	% of probationers who receive treatment within 2 weeks after referral

Source: Gloria A. Grizzle, et al., Measuring Corrections Performance: Final Report Submitted to the National Institute of Justice (1980), pp. 86-87.

Appendix C-4

A MEASURE OF RELATIVE ADJUSTMENT

To determine the effectiveness of halfway houses in assisting in the reintegration of offenders, a new outcome measure entitled relative adjustment was developed. Relative adjustment (RA) is founded on the premise that the correctional philosophy of reintegration emphasizes the development of acceptable living patterns to replace the offender's prior reliance on deviant behavior.

If one were to accept the reintegrative model, the successful adjustment of an offender should not be judged on his criminal behavior alone. What should be considered is his prior history of behavior, the present criminal involvement, and also his positive or acceptable behavior patterns. In this sense, the total exorcism of all criminal tendencies will not occur immediately, but reliance on criminal behavior will slowly be replaced as acceptable behavior is practiced and reinforced.

Therefore, a single measure of recidivism or return to crime is not seen as a valid measure of the effectiveness of a reintegrative program and should not be used. In place of the traditional measure of recidivism, a continuous scale of criminal behavior (according to the frequency and severity of offenses) will be combined with a quantitative measure of acceptable behavior patterns. These two scores, in combination with the utilization of analysis of covariance to control for the relative difference in the comparison and experimental groups, make up the "relative adjustment" outcome criteria.

Criminal Behavior Outcome Criteria

To replace the dichotomous measure of recidivism where an offender is either classified a "success" or "failure," a continuous scale of criminal behavior has been used. The continuous scale is based on the severity of the offense as prescribed in the Ohio Criminal Code. The Code was developed after consultation with criminal justice experts and was passed by the the Ohio Legislature. The offense severity assignments are therefore accepted as valid. Of course, other scales can easily be developed to reflect the seriousness of offenses as prescribed by the criminal codes of other states.

To assure the reliability of the scale, only the offender's behavior (the actual offense) is considered. Usually, recidivism measures are based on the disposition of the offense; however, dispositions could vary from court to court. In utilizing the continuous criminal behavior criteria, the offender is assigned a score based on the offense of which he has been found guilty or has confessed to committing. Although charges are often reduced from the actual offense, this is assumed to occur equally between the groups and therefore has no biased effect on the outcome scores.

Since multiple offenses can occur during the twelve-month outcome analysis, the severity score for each offense is added. It is then theoretically possible for the offender to exceed the highest score on the scale. Also added to the scale are severity scores for technical parole or probation violations and absconding or being declared a

violator at large. Table E-1 illustrates the severity categories to which offenses are assigned.

TABLE E-1. CRIMINAL BEHAVIOR SEVERITY INDEX

Degree of Offense	Assigned Score
Aggravated Murder	11
Murder	10
Felony 1st	9
Felony 2nd	8
Felony 3rd	7
Felony 4th	6
Misdemeanor 1st	5
Misdemeanor 2nd	4
Misdemeanor 3rd	3
Misdemeanor 4th	2
Minor Misdemeanor	1
Violator at Large	1
Technical Violation	0.5

Adjustment Criteria Index

The second element in the development of this total outcome criterion is the construction of a scale of "acceptable living patterns." Since the reintegration model is not perceived as a sudden change in behavior, but movement toward acceptable societal norms, an adjustment scale should be included as well as a criminal behavior scale. Several items generally considered to demonstrate "acceptable societal behavior" are presented in Table E-2. These are not ascribed as total indicators of success, but merely as an index of adjustment within the community.

TABLE E-2. ADJUSTMENT CRITERIA INDEX

Assigned Score	Adjustment Criterion
+1	Employed, enrolled in school, or participating in a program for more than 50 percent of the follow-up period.
+1	Held any one job (or continued in educational or vocational program) for more than a six-month period during follow-up.
+1	Attained vertical mobility in employment, educational, or vocational program. This could be a raise in pay, promotion of status, movement to a better job, or continuous progression through educational or vocational program.
+1	For the last half of a follow-up period, individual was self-supporting and supported any immediate family.
+1	Individual shows stability in residency. Either lived in the same residence for more than 6 months or moved at suggestion or with the agreement of supervising officer.
+1	Individual has avoided any critical incidents that show instability, immaturity, or inability to solve problems acceptably.
+1	Attainment of financial stability. This is indicated by the individual living within his means, opening bank accounts or meeting debt payments.
+1	Participation in self-improvement programs. These could be vocational, educational, group counseling, alcohol or drug maintenance programs.
+1	Individual making satisfactory progress through probation or parole periods. This could be moving downward in levels of supervision or obtaining final release within period.
+1	No illegal activities on any available records during the follow-up period.

The major emphasis of the adjustment scale is on work or educational stability, although also included are self-improvement qualities, financial responsibility, parole or probation progress, and absence of critical incidents or illegal activities. Although these items are somewhat discretionary and do not include all the qualities which could be defined as adjustment, each does suggest stability, responsibility, maturity, and a general order in life style that is correlated with socially accepted patterns of behavior.

The construction of this adjustment scale was subjected to tests for validity and reliability. To validate the scale, various parole and probation officers, research associates, members of the Ohio Citizens Task Force on Corrections, and other professionals in the field were consulted to determine items generally considered as acceptable adjustment. To test the reliability of the scale, scoring of the adjustment criterion was initially done by several individuals. This resulted in the formulation of certain standards for scoring, which led to consistent scoring of the outcome index. Because of the large numbers, all of these scoring standards are not indicated in Table E-2. Many of these are standards which prevent the individual from losing points because he is making changes which should be considered beneficial to his adjustment.

Each adjustment criterion is weighted equally. Individuals receive a +1 score for each criterion for which they qualify according to scoring standards. The adjustment score is therefore the total number of criterion for which the individual has qualified, and can range from zero to plus ten.

The overall RA outcome criteria is then obtained by combining criminal and acceptable behavior index scores. With the now established RA scale, an ex-offender may counter minor delinquent behavior with adjustment factors. Also, the ex-offender who stays out of trouble, but does nothing that qualifies as adjustment, is not seen as a total success as in recidivism measures. It is our assumption that this combined score will provide a more realistic behavior criterion than had been available previously.

Sources: Harry E. Allen, et al., Halfway House (Washington, D.C.: NILECJ, 1978), pp. 72-77.

Richard P. Seiter, Evaluation Research as a Feedback Mechanism for Criminal Justice Policy Making, Unpublished Ph.D. dissertation, Ohio State University.

Appendix C-5

COMMUNITY CORRECTIONS PROJECT SURVEY INSTRUMENT

General Program Information

1. Name of program facility _____

_____

2. Name(s) and title(s) of person(s) completing survey

_____

_____

_____

3. In what month and year did your program begin? _____month _____year

4. What was the source(s) of funds used to start your program?

	Percentage of Total funds
Local Government (specify)	
_____	_____ %
_____	_____ %
State Government (specify)	
_____	_____ %
_____	_____ %
Federal Government (specify)	
_____	_____ %
_____	_____ %
Other Sources (specify)	
_____	_____ %
_____	_____ %

SOURCES OF FUNDS

What were the source of funds expended in the prior budget year?
(NOTE: Total should equal expenditures reported on preceding pages).

SOURCE	AMOUNT
Government:	
Local Government	$ _____
State Government	$ _____
Federal Government	$ _____
Subtotal, Government	$ _____
Private:	
Organization Sponsoring Program	$ _____
Individual Contributions	$ _____
United Way	$ _____
Philanthropic Foundations	$ _____
Business Operations	$ _____
Client Contributions	$ _____
Other (specify)	$ _____
Subtotal, Private	$ _____
TOTAL	$ _____

PROGRAM INFORMATION

	TOTAL	CRIMINAL JUSTICE
1) Program Capacity Residential	_____	_____
2) Average Daily Program Population Residential	_____	_____
3) Average length of Stay (DAYS) Residential	_____	_____
4) Total Admissions Last Budget Year Residential	_____	_____
5) Client Referrals Residential		
a) DOC Referrals	_____	_____
b) Other agency referrals	_____	_____
	_____	_____
6) Total Terminations Last Budget Year Residential		
a) Program completion	_____	_____
b) Dropped out	_____	_____
c) Involuntary termination	_____	_____
	_____	_____

PROGRAM INFORMATION

	TOTAL	CRIMINAL JUSTICE
1) Program Capacity Non-Residential	____	____
2) Average Daily Program Population Non-Residential	____	____
3) Average length of Stay (DAYS) Non-Residential	____	____
4) Total Admissions Last Budget Year Non-Residential	____	____
5) Client Referrals Non-Residential		
a) DOC Referrals	____	____
b) Other agency referrals	____	____
	____	____
6) Total Terminations Last Budget Year Non-Residential		
a) Program completion	____	____
b) Dropped out	____	____
c) Involuntary termination	____	____
	____	____

PROGRAM EXPENDITURES

Please itemize your expenditures for the last budget year.
Year: ____, 19___ to ____, 19 ___.

	Number of FTEs	Line Item Amount	SUBTOTALS	TOTALS
1. Personnel				
(a) Staff salaries, wages				
(1) Administrative & Managerial	____	$____		
(2) Counseling	____	____		
(3) Secretarial/Clerical	____	____		
(4) Housekeeping	____	____		
(5) Supervision/Security	____	____		
(6) Bookkeeping	____	____		
(7) Other (specify)				
_____	____	____		
_____	____	____		
TOTAL Staff				$____
(b) Consultants (Individual)				
(1) Counselors	____	____		
(2) Psychologists	____	____		
(3) Other (specify)				
_____	____	____		
_____	____	____		
TOTAL Consultants				$____
(c) Contractual Services (organization)				
(1) Linen/Laundry	____	____		
(2) Food Service	____	____		
(3) Janitorial	____	____		
(4) Other (specify)				
_____	____	____		
_____	____	____		

PROGRAM EXPENDITURES (cont'd.)

	Number of FTEs	Line Item Amount	SUBTOTALS	TOTALS
(d) Fringe benefits	_____	$_____		
(e) Volunteer	_____	_____		
TOTAL Personnel			$_____	
2. Other Direct Costs				
(a) Supplies				
(1) Stationery & Paper		_____		
(2) Housekeeping		_____		
(3) Office (e.g., stapler, etc., items under $10)		_____		
(4) Educational (e.g., books, films)		_____		
(5) Medical (e.g., firstaid, lab costs)		_____		
(6) Equipment (value between $25 - $100; e.g., mattresses; linen)		_____		
(7) Food		_____		
(8) Client Stipends (loan)		_____		
(9) Other (specify)				
_____		_____		
_____		_____		
TOTAL Other Direct Costs			$_____	
3. Travel				
(a) Transportation (airfare, gas, etc.)		_____		
(b) Subsistence (meals, lodging)		_____		
(c) Maintenance of vehicles		_____		
TOTAL Travel				$_____

PROGRAM EXPENDITURES (cont'd.)

	Line Items Amount	SUBTOTALS	TOTALS
4. Indirect Costs			
(a) Rent/mortgage	$_____		
(b) Maintenance	_____		
(c) Building Insurance	_____		
(d) Utilities	_____		
(e) Communications (postage, telephone, xerox, printing)	_____		
(f) Other (specify)			
_____	_____		
_____	_____		
_____	_____		
TOTAL Indirect Costs		$_____	
TOTAL OPERATING (DIRECT AND INDIRECT COSTS)			$_____
5. Capital Costs			
(a) Major Equipment (items over $100; e.g., stoves, typewriter, cars)	_____		
(b) Capital construction (new construction)	_____		
(c) Property acquisitions	_____		
(d) Renovation, remodeling	_____		
TOTAL Capital Costs			$_____
TOTAL EXPENDITURES			$_____
TOTAL PRECEDING YEAR EXPENDITURES		$_____	
TOTAL ESTIMATED EXPENDITURES FOR CURRENT YEAR		$_____	

ORGANIZATION RESOURCES RECEIVED IN KIND

Please list the major resources that you received or were donated in kind rather than cash during the past budget year.

1. CAPITAL ASSETS — VALUE

   Donation # 1 _____ _____

   # 2 _____ _____

   # 3 _____ _____

   # 4 _____ _____

2. CONSUMABLE SUPPLIES (medical, food, office, etc.)

   Donation # 1 _____ _____

   # 2 _____ _____

   # 3 _____ _____

   # 4 _____ _____

3. NONPROGRAM DONATED SERVICES (such as restorations and rehabilitation of physical facilities, equipment maintenance)

   Donation # 1 _____ _____

   Donation # 2 _____ _____

   Donation # 3 _____ _____

   Donation # 4 _____ _____

SERVICES

Which of the following services are available to criminal justice referrals to your program and how are they provided?

Service	Provider			
	In-House	Outside a/ C	Outside a/ NC	Both
Individual counseling	____	__	__	____
Group counseling	____	__	__	____
Other counseling (e.g. family)	____	__	__	____
Educational/Academic	____	__	__	____
Vocational Training	____	__	__	____
Job referral/placement	____	__	__	____
Housing services	____	__	__	____
Religious services	____	__	__	____
Financial support	____	__	__	____
Legal services	____	__	__	____
Clinical (medical & mental)	____	__	__	____
Alcohol	____	__	__	____
Drug	____	__	__	____
Other (specify)	____	__	__	____

a/ Indicate whether services provided by an outside organization are under a formal contract (C) or without a formal contract (NC).

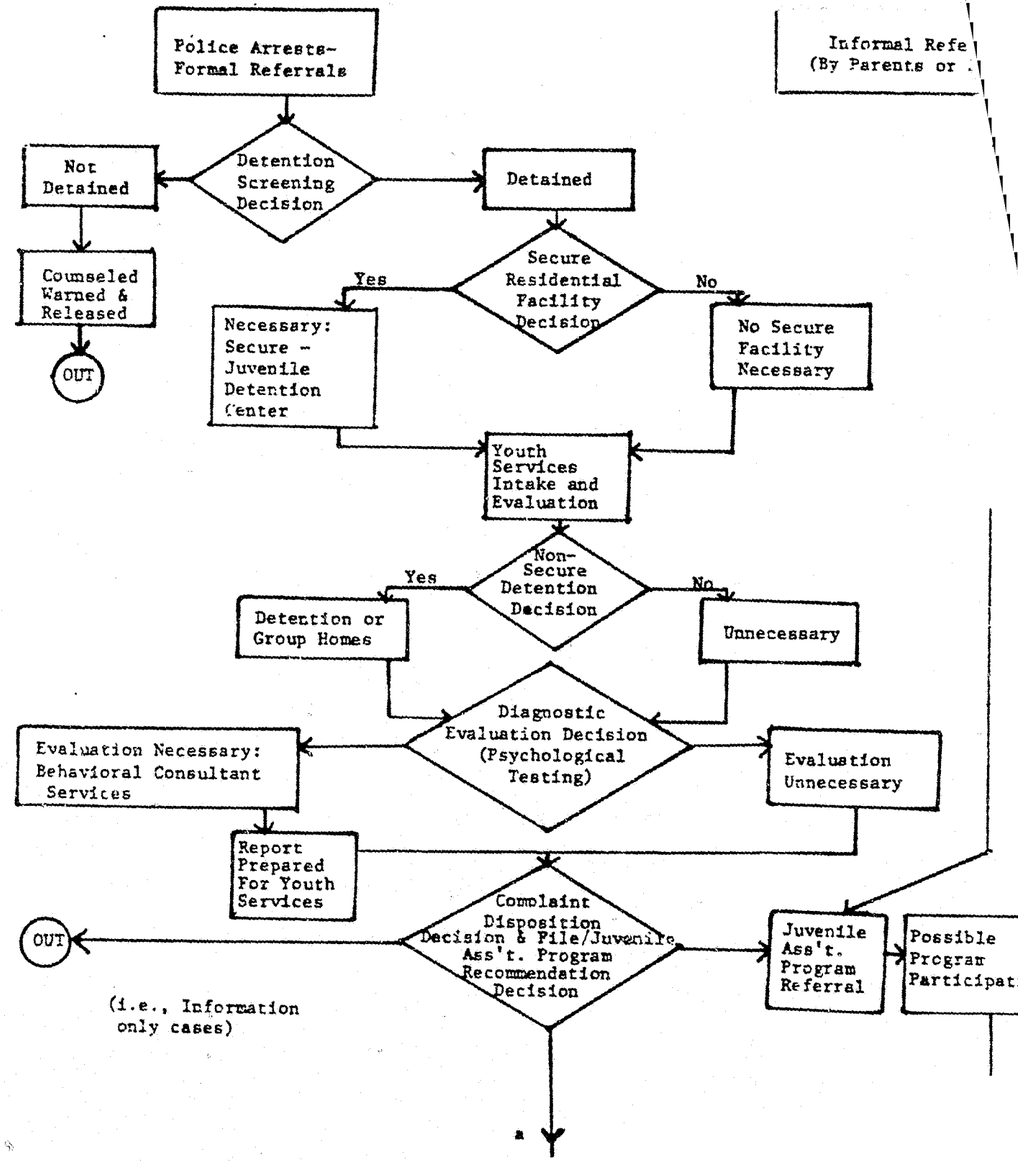
VOLUNTEER SERVICES

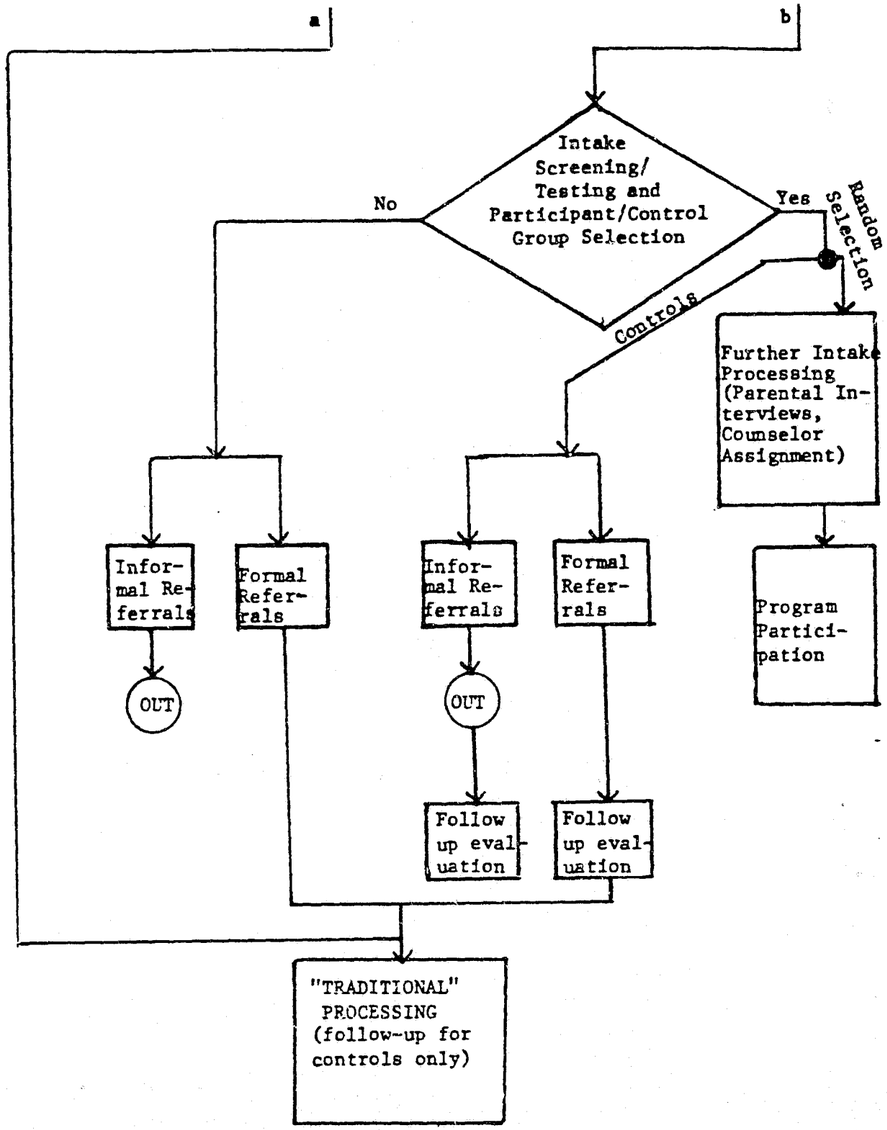
Please estimate the services provided by volunteers during your last budget year.

Service	Vol. Hours	
	weekly	annual

Appendix D-1

INTAKE FLOW CHART: JUVENILE DIVERSION PROGRAM





Appendix D-2

SUGGESTED GOALS AND OBJECTIVES FOR A DIVERSION PROGRAM

The desired outcomes of the Program impact on individuals, organizations and groups. One possible method for conceptualizing its goals and objectives incorporates the following four perspectives:

I. Individual

1. To minimize penetration of youth into the juvenile justice system (avoidance or reduction in contact with system clients, actors).
2. To improve basic educational (e.g., verbal, mathematical) skills.
3. To provide employment preparation.
4. To promote positive motivational and attitudinal changes to increase participants' self-esteem.

II. System

1. To minimize penetration of clients into the juvenile justice system (reduction in the number of cases requiring processing and court disposition).
2. To facilitate other social service agencies in service provision by promoting additional clients' awareness of and accessibility to community resources.

III. Societal

1. In the long term to reduce juvenile and adult arrests.
2. To increase juvenile offenders' involvement and integration into the community.

IV. Organizational

1. To develop the program in a manner that permits replicability.
2. To develop community support and assistance for the program.

Appendix D-3

II. Calculation of Costs of a Juvenile Trial

The derivation of the cost of an "average juvenile trial" is in many ways meaningless because each hearing is subject to so many variables. The court cost indicated throughout this analysis is actually a weighted average which attempts to account for some differences in the way juvenile cases are processed.

Of the 2,536 juvenile cases who went to court in the County in 1974, approximately 53 percent (Group I) denied charges. The remainder (Group II) did not deny charges. The 53 percent were responsible for the majority of costs incurred. Eighty-five percent of the judges' (and, by implication, the court's) time was spent on their cases. Total public defender costs and advisory hearings are attributable to each other.

Salaries for two full-time juvenile court judges and 15% Fringe Benefits	$80,000
Bailiff, two secretaries for judges and 15% Fringe Benefits	26,150
Court clerk's office: Personnel (includes Fringe Benefits)	98,970
Office Operations (utilities, building maintenance, communications, witness fees, court reporters)	79,970
Total	$284,880

Of this total, $242,148 (85% of total costs) is assigned to Group I, the juveniles who denied charges (53%); and $42,723 (15%) to Group II, the juveniles who did not deny charges.

Prosecutorial and public defender costs must also be assigned to each group.

Group I -- Denied charges - 53%:

Prosecution (Salaries and Fringe Benefits)[1]	$100,900
Public Defender's Office (for 1,228 cases):	
3 Part-time defenders and Fringe Benefits	$22,425
1 Investigator, 1 Interviewer and 1 Secretary and Fringe Benefits	27,025
Total Public Defender's Office[2]	49,450
Total additional costs incurred by Group I	150,350

Group II -- Those who did not deny charges - 47%

Prosecution (Salaries and Fringe Benefits)[1]	15,603

Group I -- Costs of court hearing

Court costs attributable to Group I	242,145
Total additional prosecutorial and Public Defender costs	150,350
Total costs	$392,495

$392,495 ÷ 1,350 = $290.74/Group I juvenile case

Group II - Costs of court hearing

Court costs attributable to Group II	42,732
Additional prosecutorial costs	15,603
Total costs	$58,335

$58,335 ÷ 1,186 = $49.19/Group II juvenile case

The weighted average of Group I and Group II costs is:

($290.74)(.53) + ($49.19)(.47) = $177.20, the average cost of a juvenile court trial.

1/ Office maintenance and supportive staff are not included in the cost of prosecution.
2/ Office maintenance is not included.

Source: Sally F. Familton, A Benefit-Cost Analysis of the Juvenile Services Programs for Pinellas County, Florida, pp. 73-74.

Appendix D-4

INDICATORS OF COSTS AND BENEFITS OF ALTERNATIVE PROGRAMS

Specific to the Individual Ex-offender and to Other Ex-offenders

1. Hourly wages from paid employment
2. Number of hours worked per week
3. Welfare and unemployment benefits received
4. Any subsidies on room and board in the C.R.C.'s (or alternatives)
5. Any subsidies on medical and health care
6. Child Support payments
7. Restitution for previous crimes
8. Income taxes paid
9. Sales taxes paid
10. Number of subsequent convictions
11. Type and amount of sentence imposed for each, i.e., length of prison sentence or amount of fine
12. Estimates of the benefits, i.e., loot obtained as a result of such criminal activity
13. Stability and type of living arrangements
14. marriage or breakdown of marriage or equivalent
15. Number of jobs held over a year
16. Number of hours devoted to community service
17. Number and type of conflicts with neighbors or acquaintances
18. Number of close friends maintained

Specific to the Rest of Society

19. The average profit made on an hour's labor of C.R.C. residents or "graduates"
20. Medical bills as a result of crimes committed by offenders in the C.R.C. type group
21. Property stolen by these offenders
22. The C.J.C. system costs per conviction
23. Estimates of the capital, labor, and other operating costs of running the programs being evaluated
24. Stolen property recovered
25. Restitution enforced
26. Fines paid by convicted offenders
27. Complaints received by neighbors regarding the C.R.C.'s
28. Number of crimes committed
29. Number of newspaper articles praising or criticizing the new programs
30. Other "informed surveys" of public opinion

Source: Robert G. Hann and Richard Sullivan, "A Cost-Benefit Approach to Evaluating Community Residential Centres," Report to the (Canadian) Task Force on Community Based Residential Centres.

Appendix D-5

BENEFITS AND COSTS WORKSHEET

PROGRAM GOAL / PERSPECTIVE		MINIMIZE PENETRATION AND REDUCE RECIDIVISM	DEVELOP COMMUNITY ASSISTANCE AND SUPPORT	FACILITATE PROGRAM REPLICABILITY
		BENEFITS AND COSTS	BENEFITS AND COSTS	BENEFITS AND COSTS
SYSTEM				
221				
	SOCIETY			
	INDIVIDUAL			

Appendix D-6

DATA SOURCE WORKSHEET OUTLINE

Comments or Questions	
Possible Data Sources	Names, Offices, Agencies, Documents, Reports, Articles
Data Elements	What data are needed to derive the information component (if not clear from information component, should be from description)--what budget records;specifically, what statistical records--e.g., for steady state program operations the following list may be needed: Program budget (1) Personnel - salaried employees • Wages • Fringe benefits (2) Office Operations • Supplies • Telephone • Utilities • Xerox, reproduction (3) Services (other than personnel salaries) • Educational • Counseling • Evaluation, diagnostic • Other (4) Capital Expenditures • Rent • Car (amortized) and maintenance • Furniture and equipment (amortized) • Equipment repairs, servicing NOTE: This list is not exhaustive and may not include all elements necessary for deriving a specific agency or program operating cost.
Description	Define or describe the information component if it is not clear from its name--e.g., for average operating cost per participant, it may be "all direct costs incurred in program operations divided by number of participants"
Information Component	What information is needed to derive the cost or benefit? This will usually be a synthesized or constructed component, e.g., average daily cost per inmate, average operating cost per participant
Stage in System	Indicate all stages in the criminal justice system that affect this cost or benefit
Cost/ Benefit	State the cost or benefit being addressed

Appendix D-7

DATA SOURCE WORKSHEET

Cost/ Benefit	Stage in System	Information Component and Description	Data Elements	Possible Data Sources	Comments or Questions

Glossary

Average Client Cost: This is the cost of providing services (e.g., food, counseling, housing) for the duration of the time that a client is in the program. It is calculated by multiplying the average daily cost by the average number of days that clients are in the program or facility.

Average Daily Cost: This is the cost of providing services (e.g., housing, food, counseling) to a client for one day. It is calculated by dividing total operating costs (including operating capital costs such as maintenance and repairs) by the average daily population and then dividing the results by 365 (days).

Benefits: The return on an investment in a social program is measured as the program benefits. Program benefits may accrue to the individual in the form of earnings, to the system as cost savings, and to society through increases in taxes.

Capital: Capital resources are those resources, such as prisons, jails and equipment, that have long-term life expectancies. The cost of capital construction and utilization, therefore, extends beyond duration of a fiscal year. Consequently, the value of capital resources used in any one year should be determined by depreciating the value of capital stock.

Causality: A causal relationship is a statement of cause and effect (e.g., A causes B to occur). Causality is an important criterion in allocating costs. Analysts should identify the resources (staff, automobiles, etc.) that in theory are necessary causes of program outcomes when estimating the costs of a program. Similarly, benefits or program effects should be caused by or result from the program to be included in a cost-benefit or cost-effectiveness analysis.

Comparative Cost Analysis: Is a comparison of the value of resources (inputs) used in two or more program activities. It is used when a decisionmaker is deciding whether to allocate resources to one program or another, both of which have different organizational schemes (i.e., production processes).

Cost (Indirect and Direct): The value of resources utilized in a production process or in the provision of services represents an economic cost. Direct costs are those costs incurred directly in the provision of a service or in the production of an output. Indirect costs include costs that are incurred for a common or joint purpose and not readily assignable to the cost objective specifically benefited (e.g., overhead or administrative costs).

Cost Allocation: This technique involves allocating costs from one program (or budget) to another. For example, the costs that an executive agency such as the Treasurers Office incurrs in management and oversight of a correctional agency's program(s) should be attributed or allocated to the total cost of the correctional program(s). Cost allocations should be based on materiality and causality.

Cost Analysis: Is the assessment of the value of resources (inputs) used in a process, program or activity.

Cost-Benefit Analysis: Is a technique for measuring the return on investments in social programs. Benefits are quantified in dollar terms -- the future stream of benefits are reduced to their present value -- and related to program costs. Positive net benefits (costs - benefits) or a cost-benefit ratio (costs/benefits) greater than one, indicate an efficient expenditure.

Cost-Benefit Ratio: The fraction which includes the value of output in the numerator and the value of resources used to produce that output in the denominator. For example, if two job placements generate $1,000 in benefits:

$$\frac{\$1,000 \text{ Program Benefit}}{\$\ 500 \text{ Program Cost}} = 2$$

It is a measure of return on investment.

Cost-Effectiveness Analysis: A process for relating the value of inputs to measurable results for the purpose of comparing which of two or more ways of producing results is more efficient.

Cost-Effectiveness Ratio: The fraction which includes a measure of cost in the numerator and some measure of effect, results, or output in the denominator. For example:

$$\frac{\$500 \text{ Program Cost}}{2 \text{ Job Placements}} = \$250 \text{ Per Placement}$$

It is a measure of program efficiency.

Direct (Primary) Benefits: Benefits that can be directly attributed to a program's objectives are direct or primary benefits. They are the intended results one would expect to find from a reading of the program's objectives.

Discount Rate: Since the value of the future stream of benefits and costs is influenced by inflation, they should be converted into present values by reducing their monetary value in accordance with a discount rate.

Effectiveness: The extent to which a program or activity attains stated objective or achieves a desired result.

Efficiency: The relationship between inputs (labor capital) and outputs or results. A program is efficient when it obtains maximum results for a given level of input; when it minimizes cost at a given level of output.

Expenditures: Are actual outlays on government (correctional) programs. Expenditures differ from budgets in that budgets are only intended or planned allocations whereas expenditures are actual allocations. It is advisable to estimate program costs from expenditures rather than budgets.

External Costs: Are costs incurred outside the unit being analyzed. For example, in assessing the costs of a correctional program other criminal justice system costs (such as police or court costs) incurred as a result of the correctional program are considered external costs.

Fixed Cost: During a given time period, certain costs are fixed. That is, a certain level of costs will be incurred regardless of the level of output produced. For example, it may cost $1 million to heat a prison for a certain time period whether there are 500 prisoners in it or only one.

Index: A measure which combines values from several variables into a single indicator and relates the combined value to some base. For example,

$$\text{Service Index} = \frac{\text{Units Per Client}_{A}}{\text{Mean Units}_{N}} \times 100$$

Where A is a specific program and N is the total number of programs.

Indirect (Secondary) Benefits: Indirect benefits derive essentially as by-products or positive externalities of a program. They are unintended yet favorable results of program activities which one can not anticipate from the programs objectives.

Input: Labor, capital, technical knowledge and in rehabilitation programs, clients needs which are combined to produce some resulting product or service.

Investment: An investment is an expenditure on a social program for which the government expects or anticipates a return. The investment includes initial, start-up costs and on-going costs of the program. In cost-benefit analysis, the analyst measures the return or benefits that accrue from the investment.

Marginal Costs: Is the incremented costs resulting from the provision of correctional services, an increase in a population, etc. It represents the costs that is incurred in providing one additional unit of outputs.

Materiality: Implies that a cost allocated to a particular program is of sufficient magnitude to make it worthwhile to include the cost in the total cost of the program.

Model: A model is a description of reality, that is, reality is simplified and represented by the variables or factors which in theory comprise a social or physical situation. A cost model of a prison, for example, might show that prison costs include security, programs, etc. The model, therefore, describes the components that determine prison costs.

Model Budgeting: Is a technique for developing a line item budget for a new or "model" program or agency. Budget estimates are generally prepared from the anticipated workload.

Net Benefits: The benefits that are attributable to a program intervention are net benefits. For example, the difference in earnings between a control and a experimental group would be a net benefit.

Objectives: A verbal description of the observable results or effects expected from an organization, program or activity (e.g., to place 50 persons in jobs paying $3.00 per hour for 6 months).

Operating Costs: Are on-going costs of running a program, activity, or service. Operating costs include personnel, supplies, transportation, etc. The main distinguishing features between operating costs and capital costs is that the former are incurred as the resources are used and the use of the resources is for a relatively short duration.

Opportunity Cost: The cost of forgone opportunities represents the price that resources could command in alternative uses. For example, the value of prison land might include foregone taxes, that is, the amount of taxes that would be collected if the land was alternatively used for residential purposes. Opportunity costs are "real" costs and serve as estimates of the value of resources that do not have market prices in their present use.

Output: The good, service or effect, which results from transforming inputs (labor, capital, technical knowledge).

Present Value (Present Worth): Future benefits and costs are generally of less value than present costs and benefits because of inflation. A future dollar purchase less than a present dollar, therefore, future dollars should be discounted or converted to their present values so that the stream of costs and benefits are equivalent.

Priorities: May be defined as a ranking of objectives. In other words, program objectives are ranked according to their importance (in relation to an organization's goals) and the resultant ranking indicates the organization's priorities.

Productivity Rate: Are ordinarily used in cost-benefit analysis when lifetime earnings constitute a program benefit. They incorporate assumptions about increases in worker productivity over time as measured by changes in wage rates.

Program Budgeting: Involves categorizing all correctional activities into programs and then estimating the cost of each program. Rather than formulating a line item budget, resources (e.g., personnel, equipment, supplies) are allocated to the various programs. This provides decisionmakers with information on program costs.

Proxies: Substitute measures, which are used when actual measures are not available, are called proxies.

Real Dollars: In economics, changes in income, wealth and benefits may be real or "pecuniary." Real benefits reflect real changes in community welfare, productivity, etc. For example, if earnings increase by 10 percent, part of the increase may be due to inflation (i.e., a pecuniary increase) and part may be due to increases in productivity or demand (i.e., real increases in the value of money).

Regression Analysis: Is a technique for estimating the relative contribution of one or more independent variables in determining (or causing) a dependent variable to take on a particular value.

Sample Budgeting: Is a technique for developing a line item budget for a new program or agency from a sample of budgets from other, similar programs or agencies.

Sensitivity Analysis: Because cost-benifit ratios (or net statements of benefits less costs) are sensitive to discount rates, a sensitivity analysis should be performed. The sensitivity analysis would show the cost-benefit ratios that would result from various assumptions about the discount rates.

Shadow Prices: Are used to measure the value of goods or services when no market prices exist.

Spillover Effects: See external costs.

Time Use Study: Time use studies are conducted by measuring the time it takes for labor or machines to complete an activity or produce an output. The time factor can then be used to estimate the resource cost used in the production process. For example, if it takes five person hours to transport prisoners from a jail to the courthouse and return and wages are $10 per hour, then the labor component of transportation costs would be $50 per trip.

Variable Cost: Beyond fixed costs, certain costs vary with the level of output produced or services provided. For example, each additional client in a halfway house will incur a "variable costs," that is, those costs that would not be incurred if the client were not admitted to the halfway house.

Workload Measures: The amount of effort that resources have to expend to complete a task or activity is measured as the workload. For example, the time it takes to complete a presentence investigation is a workload measure for probation officers.

END