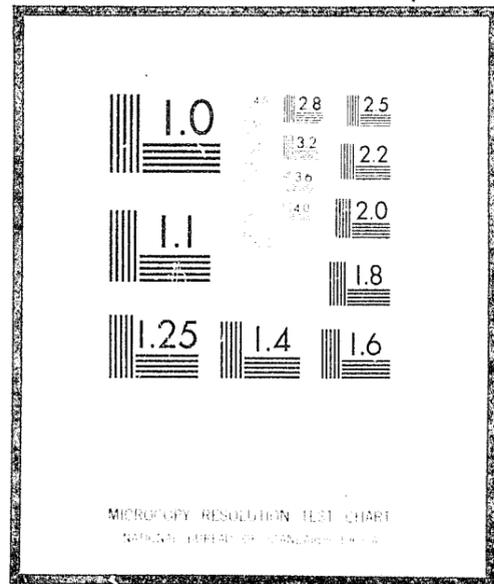


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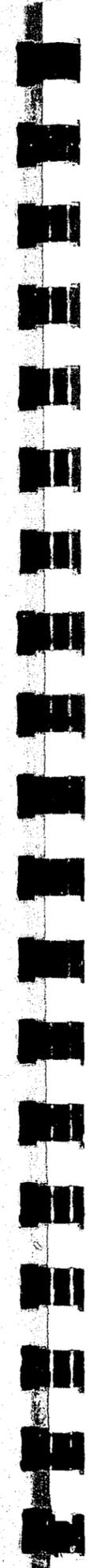
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A research report
prepared by the
EVALUATION UNIT
of the
Governor's Commission on Crime Prevention
and Control
March, 1977

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JUN 24 1977
ACQUISITIONS

COST-EFFECTIVENESS OF
RESIDENTIAL COMMUNITY CORRECTIONS
AN ANALYTICAL PROTOTYPE

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COST EFFECTIVENESS OF RESIDENTIAL COMMUNITY CORRECTIONS:

AN ANALYTICAL PROTOTYPE

A. INTRODUCTION

1. Purpose

The purpose of this paper is to demonstrate a technique for determining whether residential community corrections is a cost-effective alternative to two traditional methods of dealing with adult and juvenile offenders: probation and institutionalization. In particular, the question addressed is whether residential community corrections generally is more cost-effective than either traditional method both in the long run and in the short run. In this study, three basic classes of residential community corrections facilities are used: halfway houses, P.O.R.T. (probationed offenders rehabilitation and training) projects and juvenile residences. For each major class of residential facilities, comparisons are made between residential community corrections projects and probation (or parole) and institutionalization.

The preliminary evaluation of residential community corrections did not attempt a detailed analysis of the relative costs of residential community corrections compared to institutionalization or probation.¹ Most comparisons that have been done have focused on the average daily cost of treatment in community corrections versus institutions, and the virtually

¹Residential Community Corrections Programs: A Preliminary Evaluation, Evaluation Unit, Governor's Commission on Crime Prevention and Control, April, 1975. This is a characteristic common to most studies of community corrections to this date.

unanimous conclusion of all these studies (including the preliminary evaluation) has been that community corrections is generally cheaper than institutionalization. The consensus among these studies is that community corrections also does no worse than institutionalization in terms of preventing recidivism, so it therefore follows that community corrections is a more cost-effective alternative to institutionalization (i.e., the same amount of benefit--reduced recidivism--can be achieved at a cheaper cost). This conclusion is, however, premature. This report is designed to provide detailed information on the cost-effectiveness of community corrections using a methodology considerably more refined than other cost studies done to date.

2. Level of Analysis

In this analysis, it is assumed that a major purpose of the criminal justice system (CJS) is to minimize the social costs of crime. This assumption is inherent in the economic approach to crime and the CJS.¹ Crime imposes substantial costs upon society. Victims lose something of value, including sometimes life itself; potential victims suffer the disutility of fear and apprehension; and society bears the costs of operating the CJS.

In the last ten years, economists have begun to respond to increased concern about crime and have now produced a substantial body of theoretical and empirical research results.² This study draws heavily upon these prior contributions. Within the criminal justice system, the corrections subsystem is

¹For example, see Harold L. Votey and Llad Phillips, "Social Goals and Appropriate Policy for Corrections: An Economic Appraisal," Journal of Criminal Justice, 1 (1973), pp. 219-240.

²The pioneering work is that by Gary Becker, "Crime and Punishment: An Economic Approach," Journal of Political Economy, 76 (March/April, 1968), pp. 169-217. See also R. F. Sullivan, "The Economics of Crime: An introduction to the Literature," Crime and Delinquency, 19 (April, 1973), pp. 138-149.

assumed to have three major purposes above and beyond mere punishment of offenders: (a) deterrence of crime by potential offenders; (b) deterrence of further crime by past offenders; and (c) prevention of further crime by current offenders.

Whether one uses either the "treatment" or "punishment" paradigm, the major focus of correctional programs is to alter the behavior of those who are placed in such programs so that they no longer commit criminal acts (or, at minimum, commit fewer or less severe criminal acts than they would have had they not been put in the program). If the system is efficient, the benefits of correctional programs will outweigh the costs. That is, from an efficiency standpoint, it would not be wise to spend \$3,000 to rehabilitate an offender who would only have caused \$500 in social costs due to crimes he would have committed in the absence of treatment. This report will not address the broader issue of whether the system itself is efficient. The focus will be on determining which correctional programs can attain a particular goal (reduction of recidivism) at the lowest cost. No efforts will be made to determine whether the benefits obtained from a particular reduction in recidivism outweigh the costs of achieving the reduction.¹ The term "corrections department" is used throughout to identify the CJS component which carries out the corrections function.

The analysis will be performed from the perspective of society as a whole rather than just the state of Minnesota. That is, if federal funds help subsidize the Minnesota correctional system (which they do), these expenditures will still be treated as costs even though Minnesota citizens

¹Clearly, this is an important question, and numerous recent studies have contributed substantially to the knowledge required to conduct such studies. See, for example, Neil M. Singer, "The Value of Inmate Manpower," Journal of Research in Crime and Delinquency, 13, 1 (January, 1976), pp. 3-12.

themselves might regard these expenditures as being cost-free to their state. Both money and nonmoney costs will be included in an attempt to measure the overall social cost of correctional alternatives in the state of Minnesota.

B. METHODOLOGY:

1. Level of Measurement

Any correctional program is made up of three major components. First, there are tasks or activities performed on a day-to-day basis within the program. Second, there are outputs or intermediate products or subgoals which result from the daily activity in the program. Finally, there are outcomes, or final products or goals which represent what a program seeks to achieve. In a prison, for example, the major day-to-day activity is taking care of inmates. An output or intermediate product is "treatment," which begins when an inmate enters the facility and is regarded as completed when the inmate leaves. But treatment is not an end in itself. Treatment is provided in order to achieve a goal or outcome, which in this section is assumed to be reduced recidivism. Thus, one final product or outcome of a prison system is reduced recidivism. Table 1 outlines alternative ways of conceptualizing the distinction between inputs, outputs, and outcomes.

TABLE 1 CONCEPTS USED IN COST-EFFECTIVENESS ANALYSIS			
	FOCUS OF ANALYSIS		
	HOW	WHAT	WHY
ALTERNATIVE CONCEPTUALIZATIONS:	Activity Task Inputs	Objectives Subgoals Intermediate Products Outputs	Goals Final Goals Final Products Outcomes
EXAMPLE:	Group Counseling Food and Clothing Recreation	"Treatment" or "Rehabilitation"	Reduced Recidivism
COST MEASURE:	Input Cost	Output Cost	Outcome Cost
EXAMPLE:	Cost per Day	Cost per Case	Cost per Reduced Arrest

a. Input Costs

Many cost studies to date have focused on input costs of correctional alternatives. Thus, for example, in the 1975 Residential Community Corrections Programs report, it was reported that the average cost per day of institutionalization was generally higher for adults than the average cost per day of community corrections programs if community corrections programs run at 90% capacity.¹ In a report on residential juvenile corrections, it was reported that overall average costs per offender-year for community-based programs are substantially less--40.0%--than those incurred for institutionalized delinquents.² And a report on institutional-based programs and parole compared the "average cost per inmate-year" for various institutional alternatives.³ But the cost per day or cost per year does not accurately reflect output costs. If one treatment alternative has a length of stay that is twice as long as another treatment program, then the cost of treatment will be twice as great, even if both programs have identical costs per client-day.

In addition, the studies just cited did not take into account significant external costs connected with residential community corrections. A recent report on community-based facilities in the Twin Cities area has identified

¹Residential Community Corrections Programs: A Preliminary Evaluation, p. 198.

²Robert D. Vinter, George Downs and John Hall, Juvenile Corrections in the States: Residential Programs and Deinstitutionalization--A Preliminary Report (National Assessment of Juvenile Corrections, Institute of Continuing Legal Education, School of Social Work, University of Michigan, 1976), p. 45

³Neil M. Singer and Virginia B. Wright, Cost Analysis of Correctional Standards: Institutional-Based Programs and Parole, Volume 1 (Correctional Economics Center of the American Bar Association, December, 1975), p. 16.

this failure to take into account social service support as an important shortcoming of crude comparisons of per diem rates at institutions compared to residential facilities.¹ However, this problem has been nearly eradicated in an exhaustive study of halfway houses which detailed the costs of providing outside social services, such as drug rehabilitation, alcohol therapy, mental health services and education and training costs. In addition, the study even took into account the opportunity costs of clients in halfway houses and costs incurred by the neighborhood in which halfway houses are located. However, here again, the emphasis was on cost of inputs, while output costs and outcome costs were ignored altogether.²

b. Output Costs

Studies do exist which calculate output costs. For example, the Silverlake study showed that the cost per offender treated was about \$2,000 less in an experimental treatment than in an alternative treatment.³ In this case, the recidivism rates of the experimental and control groups were not significantly different. Hence, it was reasonable to conclude that Silverlake was more cost-effective since it achieved the same outcome for less cost. Had there been differences in recidivism, however, the focus on output costs (cost per case) would have been inappropriate since the treatment method with the lowest cost per client treated may have had a higher cost per unit of reduced recidivism. An evaluation of halfway houses in Ohio⁴ also devel-

¹Alan S. Friedlob and Thomas L. Anding, Community-Based Residential Facilities in the Twin Cities Metropolitan Area(Minneapolis, Center for Urban and Regional Affairs, University of Minnesota, December, 1975).

²Donald J. Thalheimer, Cost Analysis of Correctional Standards: Halfway Houses, Volume II (Correctional Economics Center, American Bar Association, October, 1975), p. 103.

³LaMar T. Empey and Steven G. Lubeck, The Silverlake Experiment: Testing Delinquency Theory and Community Intervention (Chicago: Aldine Pub. Co., 1971).

⁴Richard P. Seiter, Joan R. Petersilia, and Harry E. Allen, Evaluation of Adult Halfway Houses in Ohio, Volume II (Columbus: Ohio State University Program for the Study of Crime and Delinquency, 1975).

oped a cost methodology which took into account length of stay. Of equal importance was the fact that the study isolated variable costs from fixed costs in making predictions of changes in costs that would occur with changes in the number of offenders in different correctional alternatives-- a feature that is absent from many cost studies in corrections.

c. Outcome Costs

This report will present information on input and output costs for each type of correctional alternative to allow comparison with cost analyses of residential community corrections programs. However, this type of analysis does not answer questions of cost-effectiveness. A detailed design has been developed and tested for measuring the cost-effectiveness of correctional alternatives for juveniles. The results of this effort are also presented in this report. In addition to the presentation of the results, a proposed framework for utilization of these results relative to a number of policy options for juvenile corrections is presented. If this approach proves useful to policy decision-makers, outcome costs may be analyzed for other correctional systems.

The analysis of outcome costs assumes that the desired outcome, or final goal, of the corrections subsystem is to reduce recidivism of offenders and delinquents placed in correctional programs.¹ Consequently, outcome costs will be analyzed in terms of the cost per unit of reduced recidivism. For example, if recidivism among delinquents is measured in terms of sustained offenses, the following example demonstrates how an outcome cost can be calculated: Suppose a group of delinquents is treated at a cost of \$50,000 and has 50 fewer sustained offenses (as a group) than a set of

¹This is treated more fully in Appendix B.

delinquents who did not receive that treatment. Then the cost per reduced sustained offense is (\$50,000 divided by 50) or \$1,000. If an alternative treatment also cost \$50,000 and produced 100 fewer sustained offenses than the number for the group that did not receive treatment, then the cost per reduced sustained offense would be only \$500. If reduction in the number of sustained offenses is assumed to be an important goal of the corrections sub-system, then the latter treatment is twice as cost-effective as the former treatment program, because outcome is doubled without increasing costs.

2. Facilities Used in the Cost-Effectiveness Evaluation

This analysis is restricted to residential community corrections facilities which have been funded by the Governor's Commission on Crime Prevention and Control, and to state correctional institutions. All projects included in this analysis were still operational as of January 1, 1976. The halfway houses used in the cost-effectiveness study include Alpha House, Anishinabe Longhouse, Retreat House, 180 Degrees, Reshape SRM, and Freedom House. The P.O.R.T. projects included in this study are Bremer House, P.O.R.T. of Crow Wing County, Nexus, Portland House, Project Elan, and Hillcrest House. The juvenile residences included here are Duluth Indian Group Home, Project MORAD, the Northwestern Minnesota Regional Juvenile Training Center, Muench Boys' Ranch, Winona County Group Home, and the Zion Northside Group Home.

The adult correctional institutions used in this study include the Minnesota State Prison, the State Reformatory for Men, and the Minnesota Correctional Institution for Women. All these facilities are maximum/medium security institutions. Also included is the Minnesota Metropolitan Training Center, which during 1975 was making a transition from a juvenile

institution to a medium/minimum security facility for adults. Two other juvenile correctional facilities are also included: Minnesota Home School and the State Training School.

3. Sources of Cost Data

For the residential community corrections projects, there were two basic sources of information. First, a survey instrument was used to collect basic project cost data for calendar year 1975, including estimates of services received by project clients from outside social service agencies.¹ These figures were supplemented with fairly detailed cost figures that are required as part of a budget justification in each grant application to the Commission for funding. Since all projects included in this study are or have been funded by the Commission, this grant application budget information was available for all projects, although some proposed project budgets were considerably more detailed than others. However, all cost information was compiled and then sent back to each project for review to ensure that the estimates were a fair reflection of actual calendar year operating costs.

There were also two basic sources of information for each large-scale correctional facility included in this study. First, there were the actual operating budgets for FY 1975 and for FY 1976 (through January 31, 1976). The FY 1975 budgets were detailed line-item budgets that permitted estimates to be made of costs in seven major areas: food, personal, medical, education, travel, incidental, and security/counseling. The FY 1976 budget was an activity budget which categorized expenditures into eight major areas: residential care, security, personal supplies, food service, plant operations, education, medical and general support. In addition, the Minnesota Department of Corrections issues an annual spending plan which is based on projected

¹This instrument is attached in Appendix C.

population levels; the FY 1976 spending plan was also constructed in an activity budget format. As with the residential facilities, each business manager at the correctional institutions was given an opportunity to review and criticize the final estimates to ensure that they accurately reflected actual operating costs.

Probation costs were estimated from salary and caseload information obtained from the Minnesota Department of Corrections. In addition, indirect cost of probation were estimated from a study of probationers done in Winona County.¹ Finally, since no information was available on services provided to probationers or parolees by outside social service agencies, it was assumed that these outside costs would be the same for probationers as they were for residential clients (since information on outside social service agency costs had been collected for residential clients).

One reason that community-based facilities frequently appear to be so much cheaper than institutions is that they do not have to internalize a number of costs, including education, some medical services, drug or alcohol rehabilitation, employment counseling and other services.² Since the agencies which provide these services incur costs that are directly related to the presence of a community-based facility in a neighborhood, it would have been inappropriate to exclude their costs from the analysis. Accordingly, both project and outside costs were assessed for residential community corrections projects.³

¹James Reynolds and James Bedtke, "The Relative Effectiveness of Selected Treatment Alternatives for Juvenile Offenders in Winona County: The Group Home Versus Probation."

²It should be pointed out that some portion of the costs of residential treatment are borne by the institutions. That is, without the availability of the institutions as a repository of treatment "failures," operating costs of the residential centers would quite likely be higher. This report does not provide for an adjustment to internalize such costs.

³This accounts for some of the differences between cost figures used in this report and those found in Chapter 4 of Residential Community Corrections Programs in Minnesota.

Three time dimensions are used in this study, since at least three different types of decisions are possible on the part of the corrections authority. One would be the recurring question of where to place an additional offender; another would be whether, given a change in population, to change staffing; and third, whether to construct new facilities. If a corrections department is to make efficient allocations of resources in the long run, it must consider the replacement cost of capital used in whatever program is being operated. So in addition to determining the actual daily outlays made on projects and institutions, this analysis makes estimates of the average daily amount per client or inmate that would have to be invested now if the state wished to replace an existing correctional program once the lifetime of capital used in that program was completed.¹

C. EMPIRICAL FINDINGS

1. Input Costs

Table 2 summarizes the method used to determine costs of probation. The figures obtained in table 2 were averaged for metropolitan and rural counties in order to reach the mean cost per day reported in table 3.

Table 2 also summarizes the estimated social costs of alternative corrections programs for both adults and juveniles. Each residential program is paired with the treatment alternative that is thought to be most likely to have been used in the event that the community-based treatment option was not available. Thus, halfway houses are assumed to be an alternative to further maximum/medium security institutionalization; P.O.R.T.

¹The amortization of long-run costs over the expected lifetime of capital used in a program accounts for further differences between the figures presented in this report and those in Chapter 4 of Residential Community Corrections Programs in Minnesota: An Evaluation Report. The time dimensions are discussed more fully in Appendix B.

projects are assumed to be an alternative to institutionalization or to probation; and juvenile projects are assumed to be an alternative to either institutionalization or probation. In addition, the P.O.R.T. projects serving only females are assumed to be an alternative to institutionalization at the Minnesota Correctional Institution for Women or to probation.

adult treatment forms in the very short run range from \$2.13 per client-day for probation or parole to \$6.92 for adult halfway houses. Probation or parole for juveniles has a very short-run cost of \$3.02 per client-day, whereas juvenile institutions cost \$3.27 and juvenile residences cost \$5.96. Consequently, in the very short run, institutions also are consistently cheaper than community-based residential alternatives--with some institutions being only half as expensive in very short-run costs per client-day.

TABLE 2
ESTIMATED COST OF JUVENILE AND ADULT PROBATION OR PAROLE

	Annual Correc- tional Agent Salary	Average Daily Caseload (in work units) ^a	Average Cost per Workload Unit Day	Average Outside Social Service Agency Costs ^b	Average Daily Indirect Costs per Case ^c	Total Daily Cost per Client	Average Length of Stay ^d	Cost per Case
SHORT RUN								
<u>Metropolitan Area</u>								
Adult probation/ parole	\$16,366	÷ 50	= \$ 0.90	+ \$1.42	+ \$ 0.00	= \$2.32	X 365	= \$ 847
Juvenile proba- tion/parole	13,105	÷ 30	= 1.65	+ 1.68	+ 0.00	= 3.33	X 167	= 556
<u>Nonmetropolitan Area</u>								
Adult probation/ parole	\$17,043	÷ 90	= \$ 0.52	+ \$1.42	+ \$ 0.00	= \$1.94	X 365	= \$ 708
Juvenile proba- tion/parole	17,043	÷ 45	= 1.04	+ 1.68	+ 0.00	= 2.72	X 167	= 454
LONG RUN								
<u>Metropolitan Area</u>								
Adult	\$16,366	÷ 50	= \$ 0.90	+ \$2.27	+ \$ 0.06	= \$3.23	X 365	= \$1,179
Juvenile	13,105	÷ 30	= 1.65	+ 2.55	+ 0.06	= 4.26	X 167	= 711
<u>Nonmetropolitan Area</u>								
Adult	\$17,043	÷ 90	= \$ 0.52	+ \$2.27	+ \$ 0.06	= \$2.85	X 365	= \$1,040
Juvenile	17,043	÷ 45	= 1.04	+ 2.55	+ 0.06	= 3.65	X 167	= 610

^a 1 regular probationer/parolee = 1 work unit (contacted usually once a month).
^b 5 minimum supervision cases = 1 work unit (contact phased out gradually from once a month).
^c 10 modified parole cases = 1 work unit (contacted usually once per year).
^d 1 intensive parole = 2 work units (contacted usually once a week).

^b Assumes that outside social agency costs from probationers are identical to outside costs at residential projects. For adults, outside costs assumed to be the same as at P.O.R.T. projects. For juveniles, outside costs assumed to be the same as at residential facilities.

^c Estimated from James R. Reynolds and James H. Bedtke, "The Relative Effectiveness of Selected Treatment Alternatives for Juvenile Offenders in Winona County: The Group Home Versus Probation." Indirect costs include support staff, utilities, travel, supplies, etc. The estimated rental value of space used by probation offices is not included in the figures shown.

^d Length of stay estimated for adults. Juvenile estimates based on Reynolds and Bedtke, op. cit.

TABLE 3
COST PER CLIENT-DAY OF CORRECTIONAL ALTERNATIVES:
PROBATION/PAROLE, INSTITUTIONALIZATION
AND RESIDENTIAL COMMUNITY CORRECTIONS

	AVERAGE COST PER CLIENT-DAY		
	Very Short Run	Short Run	Long Run
Adult Parole	\$ 2.13	\$ 2.13	\$ 3.04
Halfway Houses	6.92	12.01	33.63
Medium-Minimum Security Institution ^a	3.44	14.03	66.58
Maximum Security Institu- tion (Male) ^b	3.65	7.22	55.12
Adult Probation	\$ 2.13	\$ 2.13	\$ 3.04
P.O.R.T. Projects (Male)	4.07	5.68	28.86
Medium-Minimum Security Institution ^a	3.44	14.03	66.58
Maximum Security Institu- tion (Male) ^b	3.65	7.22	55.12
Adult Probation	\$ 2.13	\$ 2.13	\$ 3.04
P.O.R.T. Projects (Female)	5.42	8.14	29.76
Medium-Minimum Security Institution ^a	3.44	14.03	66.58
Maximum Security Institu- tion (Female) ^c	3.91	10.56	66.79
Juvenile Parole/Probation	\$ 3.02	\$ 3.02	\$ 3.96
Juvenile Residences ^d	5.96	6.74	29.43
Juvenile Institutions ^d	3.27	13.67	66.53

^a Costs for Minnesota Metropolitan Training Center.

^b Costs averaged for Minnesota State Prison and State Reformatory for Men.

^c Costs for Minnesota Correctional Institution for Women.

^d Costs averaged for Minnesota Home School and State Training School.

As is shown in table 3, probation or parole consistently entails the lowest cost per day among the corrections alternatives. Costs per day for

Although probation or parole is the least costly alternative, in the short run both P.O.R.T. projects (for either men or women) and juvenile

residences have lower costs per client-day than their corresponding institutional alternatives. Adult halfway houses have higher short-run costs than maximum security institutions, but lower short-run costs than the medium/maximum security institution.

Finally, in the long run, institutional placement is usually about twice as expensive as placement in residential facilities. Long-run costs per client-day ranged from \$28.86 per day for P.O.R.T. projects for men to \$33.63 per day for adult halfway houses. In contrast, the long-run costs per client-day for institutions ranged from \$55.12 for maximum security institutions for men to \$66.58 for the maximum security institution for women. Again, the long-run costs for probation or parole were lowest, with \$3.04 per client-day for adults and \$3.96 per client-day for juveniles.

2. Output Costs

Table 4 presents information on costs per client treated, or cost per case, for various correctional alternatives. Unlike the figures on cost per client-day (input costs), the cost per case figures (output costs) do not reveal a treatment mode that is consistently less expensive than are other modes of treatment. Because the cost per case of a particular mode of treatment is dependent upon the average length of stay in that mode, differences in costs per case among treatment modes may change dramatically if there should be changes in the length of time individuals remain in a treatment program.

On a cost per case basis, probation or parole remains the least costly alternative in the short run and long run. However, this is not the case in the very short run. Because the average length of stay is relatively short at the Metropolitan Training Center, the medium/minimum security

TABLE 4

COST PER CASE OF CORRECTIONAL ALTERNATIVES:
PROBATION/PAROLE, INSTITUTIONALIZATION
AND RESIDENTIAL COMMUNITY CORRECTIONS

	PER CAPITA DAILY COST			AVERAGE LENGTH OF STAY in days	COST PER CLIENT TREATED		
	Very Short Run	Short Run	Long Run		Very Short Run	Short Run	Long Run
Adult Parole	\$ 2.13	\$ 2.13	\$ 3.04	X	\$ 777	\$ 777	\$ 1,110
Halfway Houses	6.92	12.01	33.63	X	858	1,489	4,170
Medium-Minimum Security Institution ^a	3.44	14.03	66.58	X	330	1,347	6,392
Maximum Security Institution (Male) ^b	3.65	7.22	55.12	X	1,445	2,859	21,828
Adult Probation	\$ 2.13	\$ 2.13	\$ 3.04	X	\$ 777	\$ 777	\$ 1,110
P.O.R.T. Projects (Male)	4.07	5.68	28.86	X	798	1,113	5,657
Medium-Minimum Security Institution ^a	3.44	14.03	66.58	X	330	1,347	6,392
Maximum Security Institution (Male) ^b	3.65	7.22	55.12	X	1,445	2,859	21,828
Adult Probation	\$ 2.13	\$ 2.13	\$ 3.04	X	\$ 777	\$ 777	\$ 1,110
P.O.R.T. Projects (Female)	5.42	8.14	29.76	X	705	1,058	3,869
Medium-Minimum Security Institution ^a	3.44	14.03	66.58	X	330	1,347	6,392
Maximum Security Institution (Female) ^c	3.91	10.56	66.79	X	1,204	3,252	20,571
Juvenile Parole/Probation	\$ 3.02	\$ 3.02	\$ 3.96	X	\$ 504	\$ 504	\$ 661
Residential Clients --							
No Prior Institutionalization	5.96	6.74	29.43	X	739	836	3,649
Residential Clients --							
Prior Institutionalization	5.96	6.74	29.43	X	1,132	1,281	5,592
Juvenile Institutions ^d	3.27	13.67	66.53	X	621	2,597	12,641

^aCosts for Minnesota Metropolitan Training Center.

^bCosts averaged for Minnesota State Prison and State Reformatory for Men.

^cCosts for Minnesota Correctional Institution for Women.

^dCosts averaged for Minnesota Home School and State Training School.

institution has the lowest cost per case for adults in the very short run, whereas probation or parole has the lowest very short-run cost per case for juveniles. In addition, for adult males, very short-run costs per case show that community-based residential facilities are more expensive than probation or parole but less expensive than placement in a maximum security institution. In contrast, the cost per case figures for alternatives for adult women show that placement in a P.O.R.T. project for women is less expensive than either confinement in a maximum security institution or placement on probation or parole. For juveniles, costs per case for the very short run show that placement on probation or parole or placement in an institution is less costly than placement in community-based residential facilities.

In the short run and the long run, maximum security institutions for adults and state institutions for juveniles are the most expensive treatment modes on a cost per case basis. Although the medium/minimum security institution is less expensive than halfway houses in the short run, in the long run it is more expensive than halfway houses on a cost per case basis. P.O.R.T. projects, for men and for women, have lower costs per case than any of the adult state institutions in both the short run and the long run. In contrast to the very short-run figures, juvenile residences have lower costs per case than do institutions in both the short run and long run.

3. Outcome Costs

Once costs per client treated have been calculated, the next step is to tie these cost data to recidivism data. In this section, an analysis of outcome costs--using cost data and recidivism data--is presented to show how outcome costs may be used as a basis for policy decision-making. Table 5 illustrates the methodology used for estimating cost per reduction in

TABLE 5
COST PER REDUCTION IN RECIDIVISM
FOR CORRECTIONAL ALTERNATIVES

CORRECTIONAL ALTERNATIVE	Cost per Client Treated	Net Reduction in Offenses Sustained Due to Treatment	Cost per Reduced Offense Sustained	Cost per Reduced Offense Filed	Cost per Reduced Nonstatus Offense Sustained	Cost per Reduction in	
						Seriousness of Offenses Sustained	Severity of Offenses Sustained
<u>Juvenile Probation</u>							
Very Short Run	\$ 504	4.3	\$ 117	\$ 105	\$ 180	\$ 4	\$ 81
Short Run	504	4.3	117	105	180	4	81
Long Run	661	4.3	154	138	236	9	107
<u>Residential Clients-- No Prior Institutionalization</u>							
Very Short Run	\$ 739	4.2	\$ 176	\$ 154	\$ 352	\$ 14	\$ 101
Short Run	836	4.2	199	174	398	16	114
Long Run	3,649	4.2	869	760	1,738	68	500
<u>Residential Clients-- Prior Institutionalization</u>							
Very Short Run	\$ 1,132	6.2	\$ 183	\$ 283	\$ 1,415	\$ 25	\$ 166
Short Run	1,281	6.2	207	320	1,601	28	188
Long Run	5,592	6.2	902	1,398	6,990	123	822
<u>Juvenile Institutions</u>							
Very Short Run	\$ 621	6.3	\$ 99	\$ 109	\$ 222	\$ 8	\$ 65
Short Run	2,597	6.3	412	456	928	34	412
Long Run	12,641	6.3	2,006	2,218	4,515	165	1,317

recidivism in juvenile correctional programs.

Costs per reduction in recidivism are calculated for five measures of recidivism by juveniles: offenses filed, nonstatus offenses sustained, seriousness of offenses sustained, and severity of offenses sustained.¹ The results in table 5 show that, for clients who have never been institutionalized, under all five measures of recidivism, probation appears to be more cost-effective than community-based residential treatment. This conclusion holds for the very short run, the short run, and the long run. The results also show that, without exception, institutional placement of juveniles is more cost-effective than residential community corrections projects in the very short run. In contrast, with the sole exception in which recidivism is measured in terms of nonstatus offenses sustained, residential community corrections projects are more cost-effective than are institutions in both the short run and long run.

These results cast some doubt on a policy of using community corrections to deal with clients who otherwise would have been placed on probation. They also raise serious questions about the desirability of new construction of juvenile facilities. However, there are policy options that fall short of excluding certain juveniles from residential projects or not building new juvenile institutions. These are outlined in table 6 using offenses sustained as the recidivism measure.

One simple option is to operate facilities at 90% capacity. Currently, the occupancy rates at juvenile residential facilities are approximately 83% and those at juvenile institutions are about 75%. Needless to say,

¹For further clarification of these measures of recidivism, see the discussion of juvenile recidivism in Residential Community Corrections Programs in Minnesota and Appendix A to this report.

TABLE 6
POLICY OPTIONS TO MAXIMIZE THE EFFICIENCY
OF CORRECTIONAL ALTERNATIVES

TREATMENT GROUP: LONG-RUN COSTS: POLICY OPTION	RESIDENTIAL CLIENTS											
	Juvenile Probationers			No Prior Institutionalization			Prior Institutionalization			Juvenile parolees		
	Cost per Client Treated	Cost per Reduced Offense Sustained	Cost per Client Treated	Cost per Reduced Offense Sustained	Cost per Client Treated	Cost per Reduced Offense Sustained	Cost per Client Treated	Cost per Reduced Offense Sustained	Cost per Client Treated	Cost per Reduced Offense Sustained	Cost per Client Treated	Cost per Reduced Offense Sustained
Operate juvenile facilities at 90% capacity	\$ 661	\$ 154	\$ 3,246	\$ 773	\$ 4,988	\$ 804	\$ 10,418	\$ 1,654				
Assume duration of treatment effect is 5 years	661	57	3,649	312	5,592	293	12,641	741				
Reduce length of stay in more expensive alternatives by 50 percent	661	154	1,824	434	5,592	904	6,320	1,006				
Double client:staff ratios in more expensive alternatives	661	154	2,679	637	5,592	904	9,170	1,455				
Pursue all four options simultaneously	661	57	1,143	97	5,592	293	4,584	268				

however, the occupancy rates depend in part on decisions of people outside the facilities themselves. Thus, changes in occupancy rates depend on decision-makers who are not program managers.

Another possibility is to assume that treatment effects last 5 years. Most studies, however, show that the effects of residential treatment wear out after 2 to 3 years, so there would have to be empirical justification for such an assumption before it could be made.

Another option is to substantially reduce the length of stay in the less cost-effective alternatives. However, such a policy would need to be buttressed with solid evidence that decreasing length of stay would not adversely affect recidivism in the follow-up period.

Finally, policy-makers could double client:staff ratios in the more expensive facilities. Here again, preliminary research would have to be done in order to determine the probable impact of such a policy on recidivism rates. However, at the present time, the ratio of counseling staff to clients ranges between 1:2.3 to 1:3.2 at juvenile institutions and the ratio of all staff (including secretaries, etc.) to clients ranges from 1:1 to 1:2.4 at residential projects. So there seems to be considerable leeway in terms of how many staff appear to be necessary to handle juvenile clients. Such a policy may be infeasible, however, in small residential projects. For example, the Department of Corrections estimates that it takes 5.5 full-time staff members to provide 24-hour coverage in a residential facility, once vacation time and sick time are taken into account. For a project with a capacity of 6, it seems inevitable that the staff:client ratio would be high.

Under each of these policy options, placement on probation of a juvenile

with no prior institutionalization would be more cost-effective in the long run than would be placement in a residential facility. Also under each option, it would be more cost-effective in the long run to place a juvenile with prior institutionalization in a community residence than in a state institution. An additional policy option would be to implement all four options simultaneously. As can be seen from table 6, when all policy options are implemented together, probation continues to be most cost-effective in the long run. But, under this alternative, the cost estimates also indicate that, for juveniles with prior institutionalization, institutionalization would be more effective in the long run than would be placement in community residences.

This analysis of outcome costs illustrates the utility of combining cost information with recidivism results in order to make cost-effective policy decisions. Further use of this type of analysis, of course, would require extensive involvement of policy decision-makers, so that policies under consideration are certain to be evaluated. Finally, it should also be noted that the utilization of cost-effectiveness analyses ultimately depends upon the extent to which policy decisions will be based on the results of these analyses.

D. CONCLUSIONS

Economics is the study of the principles of constrained choice. Choices are constrained because resources are scarce; that is, when resources are put to one use, other possible uses are foregone. This is a lesson of which public policy-makers are becoming painfully aware as the choices among pressing public policy options become more and more difficult. This is particularly the case in the area of criminal justice, which is an extremely emotional topic for the average citizen in our major cities and

towns and, unfortunately, increasingly so for the rural citizenry as well. Moreover, since substantial public investments are made in this sector, attention to the most efficient and effective means to allocate such resources is imperative.

This report has attempted to demonstrate that economic reasoning can be a useful tool in clarifying the issues pertaining to correctional alternatives. This type of analysis takes the various treatment programs as given and assesses only their relative costs and outputs. Several assumptions made this analysis more manageable; those assumptions pertaining to the effects of alternative institutional arrangements on subsequent client performance are critical. If these assumptions are changed and/or adjusted (e.g., client:staff ratio, occupancy, post-treatment benefit period, long run, short run, etc.), the results may lead one to very different conclusions.

Perhaps most important, however, is that this genre of analysis highlights factors which are susceptible to manipulation by policy-makers, rather than factors inherent to the clients themselves which are either difficult, or perhaps even impossible to change or are perhaps not socially desirable as alternatives. In short, economic reasoning offers considerable promise to policy-makers by focusing on the central objectives of the criminal justice system, and then empirically defining these objectives so as to increase the overall productivity of the system.

A P P E N D I X A

METHODOLOGY

FOR

JUVENILE RECIDIVISM EVALUATION

METHODOLOGY
FOR
JUVENILE RECIDIVISM EVALUATION¹

For the present report, as well as a more comprehensive evaluation, it was decided that two comparison groups would be necessary in analyzing juvenile residences, because some juveniles are put into such residences as an alternative to probation while others would have been committed to state juvenile institutions had they not been placed in residential facilities. Since data had to be collected from court and probation files for the comparison groups, the decision was made to collect information on the residential clients as well (even though information on juvenile clients had already been collected by project staff on intake, termination and follow-up forms). The advantage of this approach was that it allowed new measures of recidivism to be included in this evaluation and also guaranteed that data collection would be uniform for each type of "treatment" (residential treatment, probation, institutionalization). Accordingly, all data collected for the recidivism evaluation utilized the same sources of information and same measures of recidivism for all juveniles included in the larger evaluation.

A. CHARACTERISTICS OF EXPERIMENTAL AND COMPARISON GROUPS

1. Residential Treatment Group

Seven juvenile residences were evaluated in the recidivism study

¹This appendix appears, with minor editorial changes, as Appendix E of *Residential Community Corrections Programs in Minnesota: An Evaluation Report*, Governor's Commission on Crime Prevention and Control, November, 1976.

because they were the only projects which had a substantial number of clients with at least a one-year follow-up period. These residences included three metropolitan area projects: The Community Continuum (The Mansion, which closed in December, 1974), Turnabout (which closed in January, 1975),¹ and Zion Northside; and four nonmetropolitan area projects: Winona County Group Home, Project MORAD, Renville/Redwood Counties Group Home and Northwestern Minnesota Regional Juvenile Training Center. These projects took clients of both sexes and a variety of ethnic backgrounds. Nearly 90% of the clients in these projects with one-year follow-up data came from nine counties: Beltrami, Cass, Clearwater, Hennepin, Morrison, Ramsey, Redwood, Renville and Winona. The final sample included all clients with one-year follow-ups from the seven projects and nine counties just mentioned; the sample excluded those who were in residential treatment for less than two weeks and those who moved out of state within the follow-up period or who otherwise lacked complete data from the major sources of data used. Clients used in this evaluation were in juvenile residences sometime in the period between December, 1972, and December 31, 1974, so all had a minimum of one-year follow-up information.

2. Probationer Comparison Group

The probationer comparison group was randomly selected from all cases of formal county court probation placements made by the nine counties in which the residential treatment clients lived (see above). Informal, supervisory probation cases were not included in the sample. The sample was selected from a group of all probation placements made during the period January 1, 1973, through September 15, 1974, to allow a minimum of a one-year follow-up (see

¹Although the Mansion and Turnabout have closed, they are included in the recidivism analysis because both were open through the time period of residence covered in this analysis, i.e., December, 1974.

Section C, 1, of this appendix for an explanation of the date follow-up began). The only restriction on the selection of the sample was to exclude any cases of homicide or manslaughter (there were none in the sample chosen anyway). Within each county, the size of the probationer sample was determined by the size of the group of residential treatment clients who had no prior history of institutionalization, because that group would most likely have been placed on probation had the residential treatment alternative not been available. Beyond those restrictions, the sample may be regarded as a random sample from the counties used in this evaluation.

3. Institutional Comparison Group

The parolee comparison group was randomly selected from a group of all juveniles released from Lino Lakes, Red Wing and Sauk Centre during the period January 1, 1973, to December 15, 1974.¹ This group was restricted to residents of the nine counties included in this evaluation. For outstate counties, the entire population of juvenile parolees in this period was used. For metropolitan counties, a random sample was drawn that equalled approximately one-half of the total population of metropolitan area juveniles placed on parole in the two-year period.

Table A-1 shows the number of cases in each sample selected for this evaluation. The original samples are larger than the final samples due chiefly to cases dropped because of incomplete information and to attrition due to death or due to juveniles who moved out of state within the follow-up period and who, therefore, did not have complete information. Care was taken to avoid duplication, so no juvenile appears in more than one treatment group.

¹Although releases were restricted to these three institutions, there were numerous juveniles included in the sample who were transferred to Thisledew Forestry Camp or Willow River Camp to serve part of their commitment.

COUNTY OF RESIDENCE	RESIDENTIAL TREATMENT GROUP		PROBATIONER COMPARISON GROUP		INSTITUTIONAL COMPARISON GROUP	
	Original Sample	Final Sample	Original Sample	Final Sample	Original Sample	Final Sample
Hennepin	73	48	30	30	45	29
Ramsey	53	40	30	30	23	14
Beltrami	6	6	12	11	10	9
Cass	5	3	12	12	16	14
Clearwater	4	4	12	12	6	6
Morrison	11	9	10	10	6	4
Redwood	4	4	10	10	3	3
Renville	4	3	10	10	3	3
Winona	20	17	20	19	6	5
Outstate Counties ^a	13	12	0	0	0	0
TOTAL:	190	146	146	144	118	87

^aHubbard, Koochiching, Lake of the Woods, Pennington and Roseau Counties.

B. SOURCES OF DATA USED IN JUVENILE RECIDIVISM EVALUATION

1. Data Sources

As mentioned in the beginning of this appendix, all information for this evaluation was collected from identical data sources for both the experimental and comparison groups. Basic information regarding demographics and petitions filed, sustained and dismissed was obtained primarily from manual case files used by county probation departments. In certain cases where information was missing, or a file incomplete, the regular court files were utilized as well. The only county in which manual case files were not used was Hennepin County, where, instead, a computer printout was used to obtain the necessary information on each group. This printout (labeled the "Alpha" printout) was often difficult to use accurately, inasmuch as the printout format often did not allow a particular disposition to be tied directly back to a referral originally made for a particular offense. In many cases, educated guesses were the only means available for determining exactly which referrals, in fact, resulted in court hearings and which were dismissed. In

addition, it is impossible to determine which offenses actually appeared on petitions filed in juvenile court. As a result, the final figures obtained from the printout undoubtedly overstate the number of petitions sustained for each juvenile from Hennepin County, but this bias was distributed across all groups and across time periods so that the overall distortion due to this data collection problem should not have been severe.

For all juveniles who were ever committed to the Department of Corrections, an additional source of information was utilized to obtain accurate information on offenses which occurred subsequent to commitment. In many cases, probation files simply ended once a commitment had been made, and there was no way of telling from that source exactly what had happened to a juvenile in the institution. Accordingly, the manual files kept by the Department of Corrections for each juvenile committed to an institution were used to obtain this information.

An additional deficiency with the county files was that they usually ended once a juvenile turned age eighteen. Therefore, to ensure that accurate data on offenses after age eighteen were obtained, a search was made of BCA (Bureau of Criminal Apprehension) records. All told, the data collection procedure employed for this evaluation rendered a fairly complete profile on the delinquent activities of juveniles in each group and this profile is far more accurate and complete than the information on juveniles used in the *Preliminary Evaluation*.

2. The Problem of Confidentiality in Data Collection on Juveniles

The Evaluation Unit was fortunate in that it received excellent cooperation from county court judges, probation officers and records clerks in obtaining information for the evaluation. For all projects except one (N.W.

Regional Training Center), the Evaluation Unit already had the names of juveniles in residential facilities since these were routinely reported as part of the regular data collection procedures.¹ Furthermore, the Department of Corrections had provided the Evaluation Unit with a list of juveniles released from juvenile institutions in order to obtain a sample of juvenile parolees. To safeguard the confidentiality of information collected on probationers, it was decided to collect information without using names. (This procedure was not employed in Hennepin and Ramsey counties due to the large number of probationers sampled.) In each county, the probation officer or records clerk drew a random sample of probationers and each juvenile was given a unique identification number. Then a member of the Evaluation Unit went to each county and collected the information by asking the probation officer for certain information from files. Thus, it was not necessary for members of the Evaluation Unit to know the names of juveniles involved in the probationer sample. The only case in which names of probationers were obtained occurred when a juvenile had been committed to the Department of Corrections; in cases where the juvenile had turned eighteen during the treatment or follow-up period, the probation department checked BCA records and relayed information on adult arrests to the Evaluation Unit. All data on juveniles whose names were known were collected directly by Evaluation Unit staff, using manual case files.

The only exception to this general data collection procedure was for N.W. Regional Training Center. In that case, a member of the Regional Training Center staff collected all information on juveniles in 5 outstate

¹Under changes in security and privacy regulations on juveniles, this procedure of collecting names is no longer followed.

counties¹ and a member of the Evaluation Unit collected the information on N.W. Regional clients from Beltrami, Cass and Clearwater counties. All in all, the procedures used to ensure anonymity within the probationer sample and the group of N.W. Regional clients included in the study made data collection somewhat more complicated than if names were known to the Evaluation Unit, but with cooperation from all parties involved, these procedures worked out fairly smoothly and all data were collected as needed.

G. MEASURES USED IN JUVENILE RECIDIVISM EVALUATION

1. Time Periods Used in Juvenile Recidivism Evaluation

Three periods of time were used in this analysis. First, the pre-treatment period was the three-year period immediately preceding a juvenile's being placed in a residential facility, on probation or in an institution. The treatment period itself depended on the type of "treatment." For those in residential facilities, the treatment period included only the days a client was in residence at a residential facility. In some cases, clients were no longer in residence but were still considered by project staff as part of the treatment program. However, only the period of residence was regarded as a treatment period in this evaluation because it is in that phase that counseling, supervision and other elements of treatment are concentrated. The "treatment" period for all probation cases was set at 90 days for everyone, regardless of the actual amount of time spent on probation. The rationale for using a period of this length (rather than waiting for probation supervision to be formally ended on the date of discharge from probation) was that many juveniles are on probation for periods that often are quite long (two to three years, in some cases); also, many probation discharges occur

¹These counties are Hubbard, Koochiching, Lake of the Woods, Pennington and Roseau.

because a juvenile has turned eighteen, not because the juvenile has "successfully" completed probation and is no longer thought to be a problem to the community. One example of distortions that this could cause involves the recidivism rates of those released at age eighteen. Theoretically, these might look significantly lower than the rates of those released at age seventeen or younger simply because status offenses would no longer be adjudicated for those over eighteen. That is, in terms of gross number of offenses of all types, those over eighteen would appear to have lower recidivism rates. To the degree that release from probation consistently came at or near age eighteen, this bias in apparent recidivism could have been severe. Also, it was assumed that if a juvenile was not influenced by probation counseling within the first three months of "treatment," the likelihood of probation counseling becoming effective after that period would be very small. Hence, the decision was made to begin the follow-up immediately following the first 90 days on probation,¹ and the final date of placement on probation for inclusion in the comparison group was set at September 15, 1974.

For the institutional comparison group, the treatment period begins on the day a juvenile first arrived at the institution after having been committed by court to the Department of Corrections. Treatment ends on the day that a juvenile is first released on general (as opposed to limited) parole. This means that in cases where regular parole is eventually revoked, a portion of the follow-up period consists of more treatment. This is a problem that

¹Such a procedure is not without precedent. The Center for Criminal Justice at the Harvard Law School has been running a longitudinal evaluation of community corrections in Massachusetts and has also chosen to use a 3-month cutoff period for nonresidential programs such as probation, and the follow-up period is measured from that cutoff date. See Robert B. Coates, Alden D. Miller and Lloyd E. Ohlin, "Exploratory Analysis of Recidivism and Cohort Data on the Massachusetts Youth Correctional System," (Center for Criminal Justice, Harvard Law School, July, 1975), p. 20.

is true for all forms of treatment. In many cases in this study the juveniles were introduced to more treatment within a year of having been released from treatment. It would have severely biased the results to simply select that subset of juveniles who were not returned to institutions or juvenile residences within the follow-up period and to have restricted analysis to that group, since such a procedure would have severely understated the amount of recidivism among all groups in the follow-up period. Instead, it was decided to simply use a follow-up period of a uniform length for all cases and to recognize that the effects of "treatment" in the treatment period are inevitably and inextricably tied up with the effects of further "treatment" that occurs within the follow-up period itself. This is a knotty problem of experimental design that does not seem resolvable in the area of recidivism studies. Presumably, if subsequent treatment within the follow-up period is an intervening variable that is randomly distributed across different treatment groups, then this would not be a problem. Unfortunately, this assumption is almost certainly not valid. A priori, one would suspect the residential treatment clients and institutionalized offenders would have a far higher likelihood of finding their way into residential facilities or institutions in the follow-up period than would, for example, the probationer comparison group.

2. Volume of Recidivism Measures Used in Juvenile Recidivism Evaluation

The juvenile justice system is substantially different from the adult court system, and for that reason different measures of recidivism had to be employed. When charges are made against a juvenile, they are made in the form of a petition filed in juvenile court. That petition may either be sustained (if the judge finds the facts of the case to be true or if the juvenile admits to the charges on the petition) or dismissed. On any given petition, a number of separate charges may be brought, even if they occurred on a

number of different dates. In some cases, a judge will "continue" a petition until he has learned more about the juvenile from a probation officer or social worker, and if subsequent delinquent acts are committed by that juvenile, these may appear on an amended petition that is finally sustained by the judge. In any case, two juveniles may both have the same number of petitions filed and sustained, but one juvenile may have committed far fewer actual delinquent acts than the other. So, rather than using the petition itself as a basic unit of analysis, the decision was made to look at individual offenses.

In addition to offenses on petitions filed, two other indicators of offenses officially recognized as delinquent were employed. For anyone on probation (regardless of which sample group he was in), a probation violation report filed by a probation officer was treated as a petition filed (since in most cases the judge merely makes a recommendation based on that report rather than requiring that a formal petition be filed). However, because many violation reports listed a large number of minor status offenses which collectively constituted a probation violation, it was decided to simply count all these offenses as one single technical violation and this was scored as the equivalent of one offense filed on a petition. In cases where the violation report mentioned specific nonstatus offenses, only the most serious of these was coded, so once again, that report--even if it contained many offenses--was counted as the equivalent of one petition filed. For juveniles in institutions, any warrant issued for a runaway was counted as the equivalent of a single offense (runaway) on a petition filed. However, if a violation report was subsequently issued by the institution and that report detailed specific nonstatus offenses committed during the course of the runaway, then these, too, were individually treated as the equivalent of offenses filed on

petitions. Double counting was avoided. For example, if a warrant was issued for a runaway and a violation report was filed, the runaway was scored only as a single offense.

3. Definitions

a. Offenses on Petitions Filed refers to the total number of individual offenses that appeared either on petitions filed in juvenile court or on probation violation reports, or on institutional violation reports. Each runaway from an institution also counted as one offense.

b. Nonstatus Offenses on Petitions Filed refers to the total number of individual nonstatus offenses that appeared on petitions filed in juvenile court, probation violation reports and institutional violation reports. Each runaway from an institution counted as one nonstatus offense. Any technical probation or parole violation counted as a status offense unless the offense constituting the violation was a nonstatus offense.

c. Petitioned Offenses Sustained refers to the total number of individual offenses which both appeared on petitions filed and were actually sustained in juvenile court. Each probation violation report was assumed to contain only offenses for which the facts were true unless a subsequent court hearing dismissed offenses filed in that report. Similarly, all runaways from institutions were automatically counted as offenses sustained, as was each offense listed in institutional violation reports.

d. Petitioned Nonstatus Offenses Sustained is similar to Petitioned Offenses Sustained except that it refers only to nonstatus offenses which were listed in petitions filed, probation violation reports and institutional violation reports. Each runaway from an institution was counted as a

nonstatus offense sustained.

D. SERIOUSNESS OF RECIDIVISM MEASURE USED IN JUVENILE RECIDIVISM EVALUATION

Some crude measure of seriousness can be obtained simply by seeing how many times a juvenile is either committed by court to the Department of Corrections or the number of times he is returned to an institution due to either a parole violation or having run away from the institution. A more refined measure may be obtained by looking at the total number of weeks that a juvenile spends in juvenile correctional facilities, since presumably this will have some relation to how seriously his offenses are regarded by society. Both of these measures fail, however, to give a very accurate picture of just how serious an offender really is overall. A measure that could give such an accurate picture would have to be able to give offenses seriousness weights relative to each other and would have to be able to take into account the overall volume of offenses multiplied by the seriousness of each offense. Two such measures were used in order to obtain a more refined picture of seriousness.

Comparisons of the sheer volume of recidivism between different groups may mask the fact that one group is engaged in substantially more serious delinquent behavior. Thus, even if there are no differences in the volume of offenses committed by each group in the follow-up period, it is possible that there are significant differences in the seriousness of delinquent offenses between groups due to the effectiveness of a particular kind of treatment in deterring juveniles from more serious offenses. To obtain weights necessary to measure this possible effect of treatment, two seriousness scales were employed.

1. Seriousness Scale

The first scale is the result of rankings done by a statewide sample of probation and parole officers as well as counselors at Lino Lakes. A total of 48 rankings by these individuals were used to construct the final scale. Each "judge" was given a list of 41 offenses and was told to rate them as "high," "medium" or "low" seriousness. The mean scores of these ratings were then taken for each offense and the results were rank ordered. "Homicide," for example, received a mean rating of 1.02, meaning that nearly everyone ranked it as a "high" seriousness offense. "Curfew" and "Loitering" were given mean ratings of 3.00, meaning that all raters regarded those status offenses as of low seriousness. The result of this survey was a rank ordering of major juvenile offenses, ranging from 1.02 to 3.00 in seriousness.

Using this ordinal scale as a base, the Evaluation Unit then transformed it into an interval scale ranging from 0 to 100--where each additional gradation represented an increase in seriousness. Under this transformation, "homicide" received a seriousness weight of 94.1, while a curfew offense was weighted as 3.7. Table A-2 shows the original ordinal scale and the transformed scale used in this evaluation. A note of caution is in order regarding the use of the scale. The ordinal rankings can be assumed to reflect the genuine rank orderings that were made by probation and parole officers and institutional staff from juvenile institutions. However, in the transformed scale, it is not correct to regard the ratios between offenses as a reflection of the opinions of probation/parole officers and institutional staff. That is, since "vandalism" is scored as 10.0 in the transformed scale and "auto theft" is scored as 19.3, it is not appropriate to say that the raters whose judgments were used to construct the ordinal scales really believe that auto theft is about twice as serious as vandalism. All that can be said is that

for those readers who do agree that the transformed scale reflects a reasonable judgment, then the seriousness index in this report will adequately capture changes in seriousness levels between groups. If the relative rankings do not appear reasonable to the reader, then the differences between groups on seriousness lose their meaning inasmuch as they could be caused by a relative overweighting of one offense relative to the others (e.g., if a reader believes that "auto theft" ought to be scored only 5.0 in seriousness, then a high average seriousness score for one group of juveniles may merely reflect the fact that they are engaged in many auto thefts, and if the scores were recomputed using a weight of 5.0 instead of 19.3 for auto thefts, their mean score could drop as much as 75 percent).

2. Severity Index

There will be some who read this report who are dissatisfied with the transformation of an ordinal variable into an interval variable and who disagree with the relative scores between offenses that resulted in table A-2. Therefore, a second, more "objective" seriousness scale was constructed, and is referred to as the "severity index" in this report. This index also more closely approximates what may be termed a "social welfare" indicator.¹ The severity index was obtained by taking the maximum adult prison sentence for offenses (measured in years) and recoding it into a scale running from 1 to 100. This recoding was achieved by taking the average expected lifetime of a U.S. citizen (71.3 years) and determining the proportion of that lifetime that would be consumed were a person to be sent to prison for the maximum length of stay for a certain crime. Thus, since the maximum sentence for homicide is life imprisonment, it was scored as 100. The maximum sentence for simple robbery is 10 years, which is 14% of 71.3 years, so it received a severity score of 14. This scale can be said to roughly reflect the judgment of the legislature regarding the relative seriousness of offenses committed

¹ See William J. Baumol, Welfare Economics and the Theory of the State, 2nd ed., (Cambridge: Harvard University Press, 1967).

(not just the ordinal rankings between offenses). It can be interpreted as the maximum percentage of a person's life that the legislature believes should be spent in institutions as penalty for offenses committed against society.

There are two criticisms that may be leveled at the severity index. First, it measures maximum sentences rather than actual sentences served. If all offenders actually served only a small proportion of the maximum sentence and that proportion were the same for everyone (for example, 25 percent), there would be no problem, since the relative amount of time served would still be the same (e.g., a simple robber would still only serve 14 percent of the amount of time served by a murderer). But the proportion is not the same. First degree murderers spend an average of 240 months in prison in Minnesota which is 28 percent of their expected total lifetime. But manslaughter convicts serve, on average, 39 months out of a maximum sentence of 15 years--which is only 21 percent of that maximum sentence. Unfortunately, figures were not available on the average prison sentence for all offenses coded in this study, so the statutory maximum was all that could be used.

A second criticism of the severity index is that the statutory maximums in certain cases do not reflect current norms. For example, in this evaluation, possession of less than 1.5 ounces of marijuana was punishable with up to one year in prison and therefore was coded as 1.4. Yet the new law regarding marijuana possession now makes first-time possession only a petty misdemeanor, punishable by fine with no prison sentence. Thus, its seriousness is overstated in this analysis. Table A-2 summarizes the severity weights attached to each offense sustained for each offender. These weights were then added for each offender to get an overall estimate of the severity of offenses sustained. Status offenses were all arbitrarily assigned a weight

of 0.1 in the severity index to avoid their being ignored altogether.

3. Definitions

a. Court Commitments and Noncourt Referrals to Department of Corrections include all court commitments to Department of Corrections. A "stayed" commitment counted as one-half of a full commitment and a commitment for diagnostic and evaluation tests counted as four-fifths of a full commitment. If a diagnostic and evaluation commitment led directly to a full court commitment (within a month of release from a diagnostic and evaluation commitment), then only the full commitment was scored (which counted as 1). Any return from runaway from an institution was also scored as 1 (i.e., the equivalent of a full court commitment), as were any returns to the institution for parole revocation hearings. A return for replacement only (i.e., a temporary return to the institution until a new placement can be found) was not scored as a return.

b. Number of Weeks in Juvenile Correctional Facilities refers to the total number of weeks (rounded to the nearest full week) that a juvenile was in a state juvenile institution or adult institution (including jails and workhouses, if such information was available).

c. Seriousness Index of Offenses Sustained. Each offense sustained was given a weighting (see table A-2) and these weights were added for each period to give each juvenile an overall score for each period. Weightings were derived as explained earlier in this section. A probation or parole violation automatically received a score of 6.9, unless the seriousness of the offense constituting the violation had a higher seriousness score, in which case that score was used.

TABLE A-2
SERIOUSNESS AND SEVERITY SCALES USED
IN JUVENILE RECIDIVISM EVALUATION

OFFENSES RATED	SERIOUSNESS SCALE		SEVERITY SCALE
	Mean Seriousness Ratings ^a	Converted Seriousness Weights ^b	Severity Weights ^c
HIGH SERIOUSNESS			
Homicide	1.02	94.1	100
Aggravated Rape	1.08*	79.4	42.1
Rape	1.08	79.4	14.0
Aggravated Arson	1.10	75.1	35.1
Simple Arson over \$100			
Simple Arson under \$100			
Aggravated Assault	1.15	65.8	7.0
Simple Assault			
Kidnapping	1.15*	65.8	28.0
Aggravated Robbery			28.0
Simple Robbery	1.32	43.4	14.0
Auto Theft	1.73	19.3	7.0
Unauthorized Use of Motor Vehicle	1.73*	19.3	4.2
Burglary (occupied dwelling)	1.76	18.3	14.0
Burglary			
Burglary (intent to steal)			
Lookout for Burglary	1.76*	18.3	0.7
Attempted Burglary	1.76*	18.3	0.7
Possession Burglary Tools	1.76*	18.3	4.2
Sex Offenses (except rape)	1.80	17.1	---
Indecent Liberties	1.80*	17.1	7.0
Immoral Conduct	1.80*	17.1	7.0
Soliciting Prostitute	1.80*	17.1	7.0
Attempted Rape	1.80*	17.1	7.0
Prostitution	1.80*	17.1	7.0
Indecent Exposure	1.80*	17.1	0.4
Aggravated Forgery	1.82	16.5	14.0
Simple Forgery			
Uttering a Forged Instrument			
Drug Laws (except alcohol and glue)	1.84	16.0	---
Possession Narcotics	1.84*	16.0	7.0
Possession with Intent to Sell Marijuana	1.84*	16.0	2.1
Possession Marijuana	1.84*	16.0	1.4
Possession or Sale Controlled Substance	1.84*	16.0	1.4
Possession Hypodermics	1.84*	16.0	1.4
Larceny (theft over \$100, under \$2,500)	1.84	16.0	7.0
Theft (under \$100)	1.97	13.1	0.4
Aggravated Criminal Damage to Property	1.97	13.1	7.0
Criminal Damage to Property			
Dangerous Use of Firearms	1.97*	13.1	0.4
Escape from Correctional Institution	2.00	12.5	0.4
Runaway from Correctional Institution	2.00*	12.5	0.4
MODERATELY HIGH SERIOUSNESS			

TABLE A-2 -- continued

OFFENSES RATED	SERIOUSNESS SCALE		SEVERITY SCALE
	Mean Seriousness Ratings ^a	Converted Seriousness Weights ^b	Severity Weights ^c
Purse Snatching	2.10	10.8	0.4
Receiving Stolen Property (over \$100, under \$2,500)	2.15	10.0	7.0
Receiving Stolen Property under \$100			
Possession Concealed Weapons	2.15*	10.0	0.4
Possession Burglary Tools	2.15*	10.0	4.2
Vandalism	2.15	10.0	0.4
Breaking and Entering	2.15*	10.0	2.1
Riding Stolen Vehicle	2.15*	10.0	2.1
Glue Sniffing	2.15	10.0	1.4
Beyond Control of Parents**	2.43	6.9	0.1***
Parole Violation	2.43	6.9	0.2***
Probation Violation	2.43*	6.9	0.2***
Department Injurious to Self**	2.43*	6.9	0.1***
Attempted Suicide	2.43*	6.9	10.5
Resisting Arrest	2.43*	6.9	1.4
Rioting	2.43*	6.9	1.4
False Fire Alarm	2.50	6.4	0.4
Shoplifting	2.52	6.2	0.4
Opening Sealed Letters	2.52*	6.2	0.4
Cash Check with Insufficient Funds	2.52	6.2	0.4
Traffic Offense (except parking)	2.52	6.2	0.4
Tampering	2.58	5.8	2.1
Game Law Violations	2.65	5.3	0.4
Incorrigibility**	2.67	5.3	0.1***
Obscene Phone Calls	2.67*	5.3	0.4
Liquor Law Violations	2.69	5.1	0.4
Disorderly Conduct	2.69	5.1	0.4
Disobedient**	2.78	4.7	0.1***
Contempt of Court	2.78*	4.7	0.4
Trespassing	2.82	4.5	0.4
Absenting**	2.87	4.2	0.1***
Runaway**	2.91	4.1	0.1***
Truancy**	2.91	4.1	0.1***
Wayward**	2.91	4.1	0.1***
Curfew** and Loitering	3.00	3.7	0.1***
Lurking	3.00*	3.7	0.4

^aRatings by 25 probation/parole officers and 23 staff members of Minnesota Reception and Diagnostic Center. See Clyde H. Hudson, "An Experimental Study of the Effects of Differential Exposure to Parole Supervision of a Group of Male and Female Juvenile Parolees." Unpublished Ph.D. dissertation, University of Minnesota, 1972. The rating numbers are intended to reflect ordinal rankings, not relative weights.

^bWeights derived by the following formula:

$$\text{Seriousness Weight} = \frac{1}{(\text{Seriousness Rating})^3} \times 100$$

^cSeverity weights derived by taking maximum statutory sentence for each offense and dividing by 71.3, which is the average life expectancy of a United States citizen, and multiplying by 100.

*No rating was actually given to these offenses by the 48 raters since they were not included in the list of offenses to be rated. It is assumed that they would have received the indicated rating had they been included in the list.

**Status Offenses.

***No statutory maximum exists for these offenses, so they were given weights intended to reflect their seriousness relative to other offenses.

d. Severity Index of Offenses Sustained. Each offense sustained was given a weighting (see table A-2) and these weights were added for each period to give each juvenile an overall score for each period. Weightings were derived as explained earlier in this section. A probation or parole violation automatically received a score of 0.2 unless the seriousness of the offense constituting the violation had a higher seriousness score, in which case that score was used.

E. EXTENT OF RECIDIVISM MEASURES USED IN JUVENILE RECIDIVISM EVALUATION

Even if treatments have no impact on long-run recidivism of juveniles, it is possible that different treatments can postpone the recurrence of delinquent behavior, and this is an impact that should not be ignored.

The variable "Weeks to First Petition Filed in Follow-Up Period" indicates the number of weeks (rounded to the nearest full week) between the time a juvenile ended his treatment period to the time that either a petition was sustained against him, or the individual committed an offense for which a probation violation report was written, or he had been returned to the institution for a parole violation.

F. ADJUSTMENT FOR RISK TIME

An important problem in analyzing recidivism rates for juveniles is the fact that different opportunities for delinquent behavior exist for different juveniles. In particular, when a juvenile is placed in a juvenile correctional institution and is under constant supervision, his opportunities for subsequent recidivism are sharply curtailed. As explained earlier, many juveniles in this evaluation were placed into institutions at some point during their follow-up period. To have excluded this group from the recidivism study on the grounds that the treatment effect had been "muddied" by their having

received subsequent treatment in follow-up (i.e., institutionalization) would have severely biased the results, for in the real world this constant intermingling of treatment effects is widespread. Accordingly, to adjust for the fact that a juvenile had much less opportunity to commit delinquent offenses while in institutions, an adjustment was made for days spent in juvenile correctional institutions. For each period, the number of days spent in juvenile institutions was determined for each juvenile. The proportion of institutional time to total time within a period was then derived. By dividing the number of offenses actually committed in that period by the proportion of that period not spent in an institution, the number of offenses per unit of "risk time" was obtained. For example, if in a three-year pre-treatment period (*P*) a juvenile spent one-quarter of his time in an institution (*I*) and had committed 9 offenses, then a measure of the rate of offenses he committed per year of risk time would be:

$$\frac{9 \text{ offenses}}{3 \text{ years}} \times \frac{P}{P - I}$$

In this example, *I* = 39 weeks and *P* = 156 weeks, so the number of offenses per year was:

$$\frac{9}{3} \times \frac{156}{156 - 39} = 4 \text{ offenses per year of risk time.}$$

The implicit assumption underlying this type of adjustment is that the juvenile offender would have continued to commit offenses at the same rate had he not been placed in an institution. Such an assumption is inherently untestable using the data available for this evaluation. However, it seemed a more reasonable assumption to make than to assume that no offenses would have occurred in the absence of institutionalization, and the latter assumption would have been required had the analysis proceeded without the above adjustment for risk time.

The procedure of putting offenses into an annualized rate could have produced bizarre results in some cases, so conventions were adopted to avoid this prospect. For example, if a person had committed his very first offense in the pre-treatment period and was immediately placed in a residential facility, then the procedure of dividing the number of offenses by the number of years in each period would produce the result that this individual could be assumed to commit only 1/3 of one offense per year in the absence of treatment, (i.e., one offense divided by three years). In most cases, this would probably underestimate the actual amount that this individual would have committed if not placed in treatment. Accordingly, the following conventions were used. If the individual were adjudicated delinquent prior to the beginning of the pre-treatment period, all measures of recidivism were divided by 3 in order to obtain the rate of offenses committed per year. The same procedure was used if the individual's first petition filed occurred within 1 year of the beginning of the pre-treatment period. However, if the first petition filed came after 1 year but before 2 years of the pre-treatment period were completed, then all recidivism was divided by only 2 to obtain the number of offenses per year. If the first petition filed did not occur until after 2 years of pre-treatment were over, then the number of offenses committed was assumed to represent the annual rate of offenses, unless the first offense did not occur until within six months of treatment, in which case each recidivism measure was doubled to obtain an estimate of annual offenses per year.

Another adjustment was used to correct for juveniles who spent an inordinately large proportion of time in juvenile correctional institutions in any given period. Under the normal procedure of converting offenses committed into offenses committed per year of risk time, an individual who spent 48 out

of 52 weeks of a follow-up period in an institution and who committed 1 offense in that period would be scored as having committed 13 offenses per year of risk time (since $52/4 = 13$). This probably overstates the actual amount of offenses that would have been committed by that individual had he not been institutionalized. To adjust for this, the recidivism rates in a period were divided by 4 for any individual that spent more than 75 percent of his time during that period in juvenile correctional facilities. For any individual who spent between 50 and 75 percent of his time in institutions, the recidivism scores in that period were divided by 2. In the above example, this adjustment procedure would mean that the juvenile would be scored as having committed offenses at the rate of 3.25 per year. Of course, there is no way of determining the accuracy of this adjustment procedure (that is, there is no way of telling what an offender would have done had he not been in an institution). The best that can be said is that it appears to be a more reasonable estimate of offenses committed than simple extrapolation based on a very short period of risk time. It also seems more reasonable than to assume that no offenses would have occurred had the juvenile not been in an institution.



A P P E N D I X B

THE ECONOMIC PERSPECTIVE

THE ECONOMIC PERSPECTIVE

A. The Supply of Offenses

Economists have for the most part viewed offenders as behaving rationally.¹ That is, offenders engage in a rational calculation of the expected benefits and costs of a variety of alternative behaviors; sometimes the optimum choice is one which is deemed illegal by society. The factors which impinge upon an individual's decision-making include policy variables amenable to manipulation, such as the offender's estimate of the probability of apprehension or severity of punishment. Additional relevant variables are age, income level, and other possible determinants of behavior.

The likelihood of any person's committing an offense depends upon the values of these variables. The relationship among the actual number of offenses and the variables is referred to as the "supply of offenses function," which takes the following form:

$$(1) \quad O_j = O_j(X_1, \dots, X_n),$$

where O_j is the number of offenses committed by the j th person in a given time period, and the X_i are the appropriate variables. This supply function exists in time, as depicted in Figure 1, where the vertical distance measures the number of offenses per time period and the horizontal distance is time. That portion of time from t_{0-n} to t_0 represents a period prior to coming within the jurisdiction of a "corrections department." The line labeled O indicates actual offenses committed by the individual during this pre-treatment period.

The "economic" model suggests that the corrections department seeks to alter the values of the relevant policy variables to achieve a reduction in

¹Becker, op, cit.; Isaac Ehrlich, "Participation in Illegitimate Activities: An Economic Analysis," Journal of Political Economy, 81 (May/June, 1973), pp. 521-565.

the number of offenses per time period, that is, to reduce O . During the treatment period, the actual number of offenses might be represented by O^* . In the post-treatment benefit period, offenses are measured by \hat{O} . From t_0 to t_{1+m} , O is the predicted, rather than the actual, number of offenses.

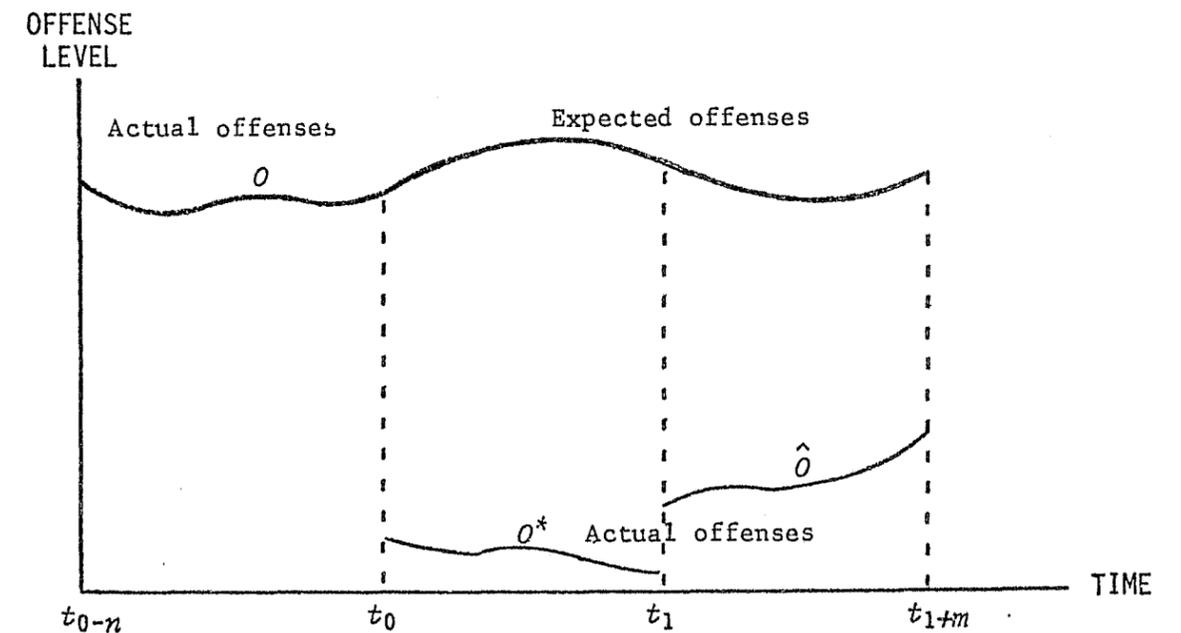


FIGURE B1- Actual and Predicted Offense Levels: Impact of Treatment.

2. Output Determination

Now it is possible to identify a potential output measure for the corrections department. Specifically, recidivism prevented is the measure. More formally, output can be indicated by:

$$(2) \quad R = \int_{t_0}^{t_1} (O_t - O_t^*) dt + \int_{t_1}^{t_{1+m}} (O_t - \hat{O}_t) dt,$$

that is, the total difference between predicted and actual recidivism beginning with the initiation of treatment.

Each treatment mode--i.e., prisons, community corrections, parole--consists

of a unique process or series of techniques designed to reduce recidivism for each offender. This can be represented by a "production function,"

$$(3) \quad R_i = R_i(P_i),$$

which simply indicates that, given the budget, a treatment mode i can treat P_i offenders to achieve an output of R_i .¹ The total output for the Corrections Department in this case is the sum of the outputs of all treatment modes.

C. Cost Determination

A major constraint operating upon the corrections department is its budget. In a given time period, usually a fiscal year, this is relatively fixed, say at B . Then the total costs of treating offenders in all treatment modes cannot exceed B . The costs at each treatment mode depend on the treatment population:

$$(4) \quad C_i = C_i(P_i).$$

The C_i are the treatment mode cost functions. It follows, then, that in this case,

$$(5) \quad B = \sum C_i.$$

1. Definition of Costs

(a) Fixed and Variable Costs. A fixed cost is any cost that will remain the same even though the client population within a correctional alternative is changing. For example, a project director's salary would remain fixed even though the number of clients in the project goes up or down during the course of the year. Any cost which fluctuates in response to changes in

¹A production function is more typically of the form $R = R(X_1, X_2, \dots, X_n)$ where the X_i are productive factors such as labor and capital. The assumption implicit in the function used here is that the productive factors are themselves functions of the offender population. That is, if $R = F(L, K)$ and $L = L(P)$, $K = K(P)$, then $R = R(P)$.

the client population is considered a variable cost. Food costs are considered variable, since if one client is added to a program or project, he must be fed, and therefore food costs will rise.

(b) Very Short-Run Costs. If project or program expenditures are viewed on a short-term basis (for example, week-to-week), the only costs which will be variable are the direct costs of maintaining each client. Food, clothing, medical care and other expenditures that are directly attributable to a particular client would all be variable in the very short run.

(c) Short-Run Costs. If a longer-term perspective is used (for example, month-to-month), then other costs are considered variable. For example, in the very short run, all staff costs can be considered fixed, since no increase or decrease in staff can be expected to result from even a large temporary deviation from the average daily number of clients in the project. In the short run, however, if the deviation persists, new staff might be hired in order to handle the additional load. Thus, some salary costs will be considered variable in the short run, but not all (e.g., the project director's salary will still be fixed).

(d) Long-Run Costs. In the long run (year-to-year, or longer), all costs are considered variable by definition. For example, even rental costs may move up or down if a project is relocated in a different area. Similarly, all staff costs are variable since drastic increases or decreases in staff size may occur as the result of a change in program philosophy or techniques. The long run also takes into account the replacement cost of capital used in a project once it has worn out. For example, in the very short run or short run, the cost of acquiring a vehicle would have to be considered fixed since it will not change later on as a result of increasing or decreasing the

client population. However, in the long run one must take into account the fact that the vehicle must be replaced after its usable lifetime is over.

In the long run, a discount rate is used to reflect the "opportunity cost" of funds spent (or rental earnings foregone) on capital used in correctional programs. For example, if the state purchases a house to be used as a residential facility for adult offenders, then the "opportunity cost" of the house is the purchase cost plus an amount equal to the earnings which could have been obtained by investing the funds in some other activity (e.g., long-term Federal Treasury bonds). Even if the house is donated, this opportunity cost still exists, for in the absence of using the facility for corrections, the house could have been earning rent for its former owner or for the state, so the "cost" remains even though the state did not formally pay for the building. The discount rate may be viewed either as the income that could have been earned by using the house for something besides a correctional facility or as the amount of interest the state must pay over the lifetime of the facility if funds were borrowed to purchase it.

(e) Social Costs. Social costs refer to all money and nonmoney costs of undertaking an activity, including the "opportunity costs" of all productive factors. Opportunity cost is the valuation of a factor in its best alternative use. A social cost is incurred whenever there is a net transfer of goods or services between nonfamily members. For example, if individual *A* donates an hour of his time to help individual *B*, then the opportunity cost, and hence a portion of social cost, of that action is equivalent to whatever *A* could have earned in the same amount of time. If *A* could have worked overtime for \$5.00 an hour, then the opportunity cost of his one hour of donated time is \$5.00 since that is what he could have earned had he not helped *B*. However,

if individual *A* donates 1 hour of time to *B* in exchange for a \$5.00 piece of jewelry, no social cost is incurred since *A* and *B* are both equally well-off as before the exchange (assuming that *A* values the piece of jewelry at exactly \$5.00). In this analysis, those who donate small amounts of leisure time for helping others are not assumed to incur a cost (e.g., Big Brothers, etc.). However, those who are publicly subsidized to make donations of time or who spend a large portion of potential working hours donating time are assumed to incur social costs.

2. Diagrammatic Presentation

Figure 2 depicts two short-run cost curves, C_1 and C_2 .

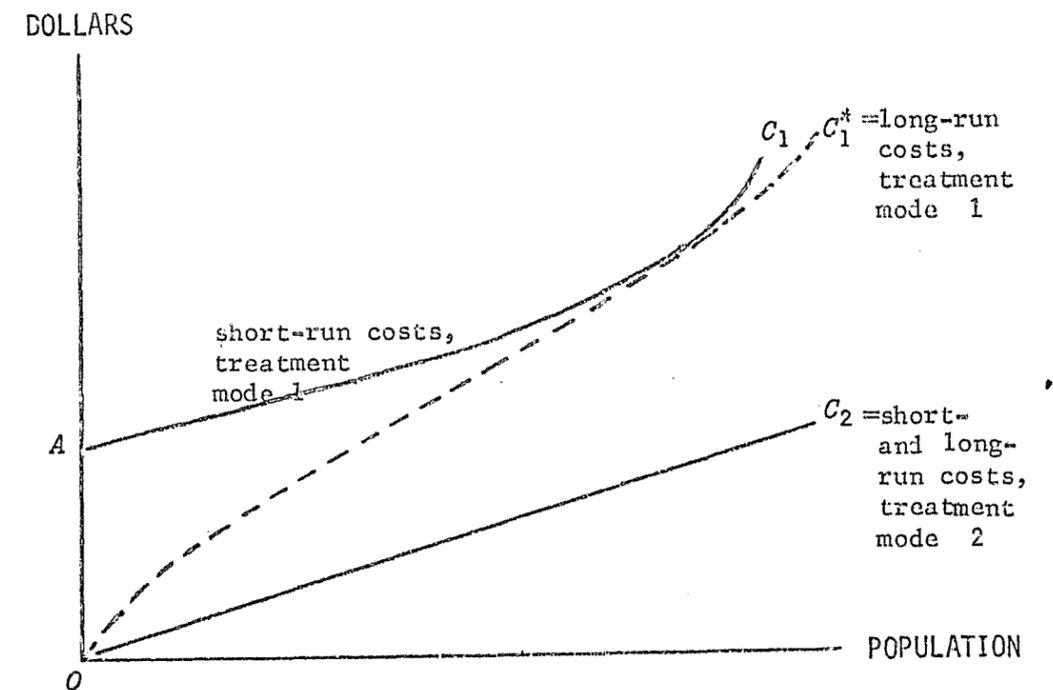


FIGURE B2: Hypothetical Short- and Long-Run Cost Functions.

C_1 contains substantial fixed costs, equal to OA , that do not change as output changes. Only the variable costs change in the short run. In the long

run, however, the scale of the treatment mode can be changed; in that case, all costs are considered variable. C_1^* is a long-run cost curve. We can reasonably regard C_1 as representing short-run costs for a prison of given size, C_1^* as long-run costs for that prison, and C_2 as costs for residential treatment centers (RTC), which entail relatively slight fixed costs.

D. Output Maximization

1. Short-Run Efficiency

The optimality rule for allocating offenders among treatment modes can be obtained by constructing the Lagrangian:¹

$$(6) \quad L = \sum_{i=1}^n R_i(P_i) + \lambda [B - \sum_{i=1}^n C_i(P_i)]$$

and differentiating with respect to the P_i , then setting the partials equal to zero.

$$(7) \quad \frac{\partial L}{\partial P_1} = R_1'(P_1) - \lambda C_1'(P_1) = 0$$

$$\frac{\partial L}{\partial P_2} = R_2'(P_2) - \lambda C_2'(P_2) = 0$$

. . .

$$\frac{\partial L}{\partial P_n} = R_n'(P_n) - \lambda C_n'(P_n) = 0.$$

It follows from this that

$$(8) \quad \frac{R_1'(P_1)}{C_1'(P_1)} = \frac{R_2'(P_2)}{C_2'(P_2)} = \dots = \frac{R_n'(P_n)}{C_n'(P_n)},$$

i.e., optimality--maximum output--is achieved when offenders are allocated so that the ratio of marginal product to marginal cost is the same in all treatment modes.

¹For a discussion of this technique, see James M. Henderson and Richard E. Quandt, Microeconomic Theory: A Mathematical Approach, 2nd ed. (New York: McGraw-Hill, 1971).

This is illustrated diagrammatically in Figure 3, where various combinations of treatment mode population yield various output levels.

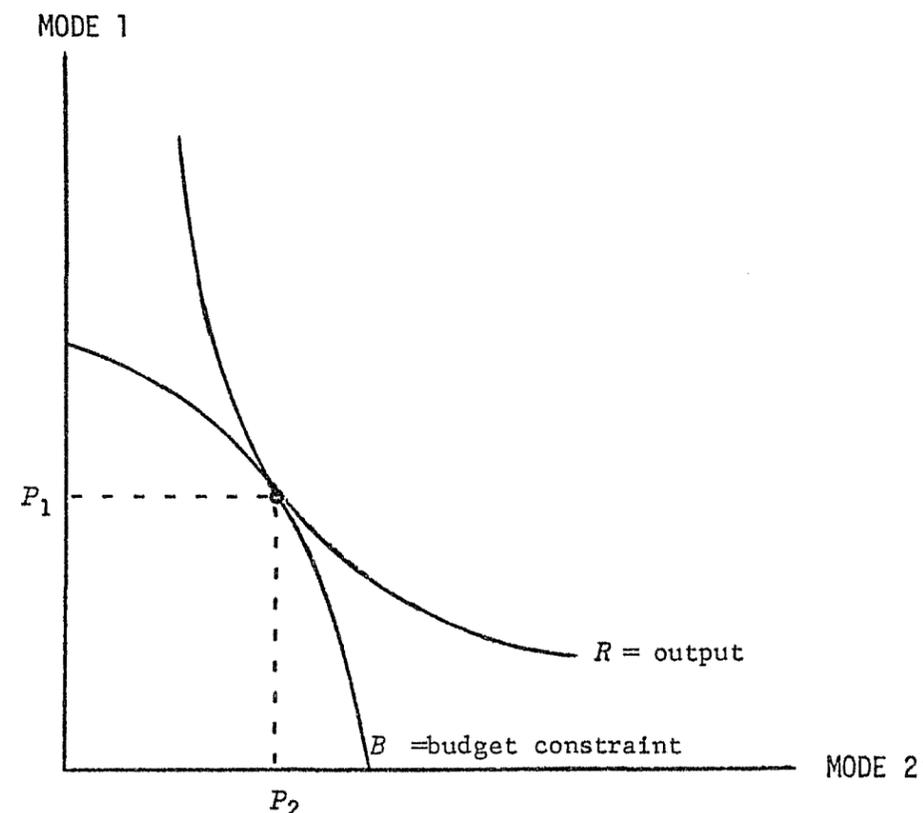


FIGURE B3: Constrained Output Maximization in Corrections.

The curved line B represents attainable recidivism reduction, given two treatment modes and the legislative budget.¹ R represents a standard isoquant, a set of different combinations of modes 1 and 2 that yield a constant output, or recidivism reduction.

¹The budget size, B , operates as a prior constraint on how much the corrections department can do. It is not likely to be the only constraint. For example, an external requirement may be that all types of treatment must be "humane," thus eliminating from consideration some potential low-cost alternatives.

As drawn, R is the highest output attainable by this corrections department, operating with budget B . The total offender population is allocated such that P_1 are in mode 1 and P_2 in mode 2. The slope of B at any point is

$$-\frac{C_2'(P_2)}{C_1'(P_1)} \text{ and the slope of } R \text{ is } -\frac{R_2'(P_2)}{R_1'(P_1)}. \text{ At the point of tangency, they are equal, i.e., } \frac{C_2'(P_2)}{C_1'(P_1)} = \frac{R_2'(P_2)}{R_1'(P_1)}, \text{ which is algebraically equivalent to the}$$

optimality condition, (8).

2. Long-Run Efficiency

In the long run, allowing for new plant construction, all costs are variable. The budget constraint is

$$(9) \quad B = \sum_i \bar{C}_i(P_i),$$

where the bar represents the long run, i.e., inclusion of investment costs.

With reference to Figure 2, cost curve C_1^* is effective. Since the slope of this curve is steeper than C_2 throughout, offenders would never be allocated to mode 2 in the long run.

The corresponding optimization rule can be obtained in a manner similar to the short-run case and is as follows:

$$(10) \quad \frac{R_1'(P)}{\bar{C}_1(P_1)} = \frac{R_2'(P)}{\bar{C}_2(P_2)},$$

where the ratio of marginal product to long-run marginal costs is the same for all treatment modes. This rule is relevant for those situations where construction of new facilities is being considered, and tends to favor treatment modes with low fixed costs.

A P P E N D I X C

PROJECT COST SURVEY FORM

BENEFIT-COST ANALYSIS OF RESIDENTIAL TREATMENT FACILITIES

Project Cost Data

FIXED COSTS

1. Original cost of purchasing or constructing facility (including land): \$ _____

Date Facility Acquired: _____

This figure should indicate the full fair market value of the facility at the time it was acquired (even if the project did not have to pay the full fair market value or is using a mortgage to pay for the facility).

For facilities that are rented, do NOT fill in the above. Simply indicate the total annual rental cost of the facility in calendar year 1975: \$ _____

2. Cost of major additions to facilities (or improvements on grounds), construction work, remodeling, etc. Please show year that each major addition was made:

Cost of Addition: Year: _____

\$ _____

\$ _____

\$ _____

This figure should reflect all major expenditures for upgrading the facility since the facility was first acquired.

3. Cost of all major office equipment, furniture and vehicles purchased since facility was acquired (include only items worth over \$25):

\$ _____

If some furniture, equipment or vehicles are rented, indicate total annual rental costs for such items in calendar year 1975: \$ _____

In addition, if some major furniture items, equipment or vehicles were donated, roughly estimate the total fair market value of such donated items: \$ _____

Finally, estimate total annual repair costs in 1975 for such major items of furniture, equipment and vehicles (include minor house repairs, decorating): \$ _____

4. Total utility costs in calendar year 1975: \$ _____

Include all costs for electricity, water, gas, heat, garbage collection, telephone and other utilities.

5. Personnel costs (include total costs for calendar year 1975)

A. Total salary payments to Director: \$ _____

B. Total payments to Houseparents (if applicable): \$ _____

C. Total salary payments to all other personnel except interns and counselors: \$ _____

D. Total fringe benefits to all personnel except interns and counselors: \$ _____

6. Insurance costs in 1975: \$ _____

This should include liability insurance, fire insurance, workman's compensation and any other insurance costs paid by the project. If the project carries medical insurance for clients, this also should be included. It should not include costs included in fringe benefits (part D, above).

7. Business travel in 1975: \$ _____

This should NOT include travel by clients (unless the client has a staff position and is traveling to conduct project business) but, instead, should be restricted to travel by project staff that is paid for by the project.

OUTSIDE VARIABLE COSTS

This section should include ONLY costs for which the project did NOT have to pay money. The costs of any public social services received by project clients should be included. In addition, if a service was subsidized (i.e., paid for by taxpayers or charity), the subsidized portion of the costs of those services should be included in this section.

For example, if the project paid \$3.00 for a client's visit to a public clinic and the client received an X-ray worth \$25, then, in essence, the project obtained \$22 worth of free services. This \$22 should be included as an outside variable cost. The \$3 paid by the project is an internal variable cost and, therefore, should not be included in this section.

1. Public Assistance

List all agencies which provided income support to project clients in 1975 (e.g., Food Stamps, cash assistance, etc.). Do NOT include money that was ultimately spent by the project on operating the facility. For example, do not include welfare per diem payments paid directly to the project.

Estimated dollar value of assistance given to project clients in 1975:

- Agency 1. _____
- Agency 2. _____
- Agency 3. _____

2. Medical (includes dental services)

List all agencies which provided free or subsidized medical services to project clients in 1975. Any services paid for by Medicaid should be included. Estimate the rough dollar value of all such assistance in 1975 by either calling the agency and asking them how much services are worth or by using your knowledge of what similar services would cost in a private clinic or doctor's office.

Estimated dollar value of medical services provided to project clients:

- Agency 1. _____
- Agency 2. _____
- Agency 3. _____

3. Psychiatric/Mental Health

List all agencies which provided free or subsidized psychiatric or mental health services to project clients in 1975. Use project records to estimate total hours of such services provided in 1975.

Estimated number of hours of service provided to project clients in 1975:

- Agency 1. _____
- Agency 2. _____
- Agency 3. _____

4. Legal Assistance

List all agencies which provided free or subsidized legal services. Use project records to roughly estimate total hours of legal assistance provided to project clients.

Estimated number of hours of service provided to project clients in 1975:

- Agency 1. _____
- Agency 2. _____
- Agency 3. _____

5. Drug/Alcohol Rehabilitation

List all agencies which provided free or subsidized drug/alcohol rehabilitation treatment. Use project records to roughly estimate total hours of such treatment provided to project clients.

Estimated number of hours of service provided to project clients in 1975:

- Agency 1. _____
- Agency 2. _____
- Agency 3. _____

6. School (non-vocational)

Estimated 1975 client-days* of elementary or secondary schooling (or tutoring for G.E.D. preparation) for which project did not provide schooling or pay costs:

Schools attended by clients:

- 1. _____
- 2. _____
- 3. _____

*A client-day is any day a client attended school for at least one-half day.

Number of clients in 1975 who attended college full-time (for which project did not pay costs):

Total number of months of full-time college attendance spent by the above clients in 1975:

Colleges attended full-time by clients:

- 1. _____
- 2. _____
- 3. _____

Number of clients attending full-time:

Number of clients in 1975 who attended college part-time (for which project did not pay costs):

Total number of months of part-time college attendance spent by the above clients in 1975:

Colleges attended part-time by clients:

- 1. _____
- 2. _____
- 3. _____

Number of clients attending part-time:

7. Vocational Training

Number of clients who attended vocational school full-time in 1975 (for which project did not pay costs):

This should include clients who took vocational training courses as the major part of studies in high school or college, as well as those who went to vo-tech schools. Remember to include only schools which provided such training for free or at reduced costs. Any client included in this section should not be included in the non-vocational school section.

Vocational schools attended full-time by clients:

- 1. _____
- 2. _____
- 3. _____

Number of clients attending full-time:

Number of clients who attended vocational school part-time in 1975 (for which project did not pay costs):

Vocational schools attended part-time by clients:

Number of clients attending part-time:

- 1. _____
- 2. _____
- 3. _____

8. Other Social Services

List all other agencies not included above which provided free or subsidized social services to project clients in 1975 (e.g., child-care services). If approximate quantity of services (e.g., 200 hours of child-care services) is known or the approximate dollar value of the services can be estimated, please indicate.

Estimated quantity or dollar value of services given to project clients in 1975:

- 1. _____
Phone number: _____
- 2. _____
Phone number: _____
- 3. _____
Phone number: _____