A RAND NOTE

The RAND Intermediate-Sanction Cost Estimation Model

Peter W. Greenwood, Joan Petersilia, C. Peter Rydell, Susan Turner

September 1989
The research described in this report was supported by a grant from The Edna McConnell Clark Foundation, and by The RAND Corporation using its own research funds.

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N-2983-EMC/RC

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Prepared for
The Edna McConnell Clark Foundation

RAND
PREFACE

This study was sponsored by the Edna McConnell Clark Foundation as part of its continuing effort to develop alternatives to prison and to reduce our nation’s reliance on incarceration.

The current study was undertaken with the goal of developing a methodology that would weigh the economic costs and crime-reduction benefits of alternative criminal sanctions. The RAND Intermediate-Sanction Cost Estimation Model developed here takes into account the daily costs of supervision, the different risks that sanctions pose to the community, the different likelihoods of detecting a new offense or technical violation, and the different probabilities of future recidivism (i.e., rehabilitation). The model allows correctional policymakers to explore and evaluate the expanding number of supervision and treatment options that have been developed during the past decade. It can also be used to determine how effective a particular program must be in order to justify its costs.

This report describes the basic features of the model and uses nationwide data to estimate the cost and crime-reduction impacts of intensive probation supervision versus prison. The authors are circulating it at this time for comment and review.

A more detailed user’s guide for the model is available from Peter Rydell at RAND.
SUMMARY

Comparing recidivism rates or the distribution of time to first failure are appropriate analytic techniques for evaluating the effectiveness of alternative correctional programs when they involve the same amount of confinement/incapacitation. However, when one alternative involves substantially less confinement and early return to the community, albeit under some form of enhanced supervision/surveillance, simple comparisons of recidivism rate or average time to failure ignore differences in the impacts on incapacitation effects attributable to particular sanctions. The RAND Intermediate-Sanction Cost Estimation Model (RISCEM) was designed to make such comparisons possible.

No treatment program designed for serious or chronic offenders is going to turn all of them into completely law abiding citizens. Our most optimistic hope is that effective programs can cut the return-to-custody rates, which are now running around 40 or 50 percent, down to 20 or 30 percent. When offenders are granted early release from custody to participate in structured transitional programs such as work-release or intensive supervision, it is assumed that the loss in incapacitation effects will be more than offset by a reduction in recidivism among the participating offenders.

However, offenders who return to crime following release from any correctional program do not continue committing offenses with impunity. Most are eventually apprehended and reincarcerated. The more closely they are supervised following their release, the more likely they are to be apprehended for any new criminal acts. In fact, many intensive supervision programs will revoke an offender's parole if he or she continues to violate such technical conditions of that parole as being home by a specified hour, or paying restitution to the victim. The form of post-release supervision can alter not only the likelihood that offenders will recidivate, but the likelihood of their being detected and reincarcerated if they do.

RISCEM has been designed to estimate the consequences of subjecting different types of offenders to different lengths of incarceration, different forms of correctional programming, and different forms of post-release supervision. Outcomes are measured in terms of future crimes, and correctional and other criminal justice system costs (arrest, prosecution, etc.).
Within the model offenders are differentiated by their recidivism rates, following various correctional program options, and their frequency of offending when they have returned to criminal activity. Programs are differentiated in terms of their daily cost, length, within-program failure rate, recidivism rate, and disposition pattern for technical violations or new offenses.

The process of evaluating different sentencing and correctional program options with this model, within a specific jurisdiction, begins by requiring the analyst to specify the characteristics (described above) of the typical offenders and programs that are to be considered. Once those parameters have been provided, RISCEM simulates the flow of 1000 cases through the systems specified, recording all new criminal acts, violations, and movement among program options on a quarterly (three-month) basis, over a five-year period. Using Symphony™ on personal computers with adequate memory capacity, the running time for the simulation is usually under one minute.

The final product of these simulations is a series of graphs and tables containing the processes and outcome measures: The criminal activities of the sample cohort; their arrests, convictions and correctional placements; and the amount of time served in various types of placement. The model can be used to test the sensitivity of future crimes and costs to a variety of assumptions about offender behavior, sanctioning policy, and program effectiveness. With this model, policymakers can explore the consequences of implementing a wide variety of sanction policies and program formats before committing themselves to a particular course of action.
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I. INTRODUCTION

A recent report by Edwin W. Zedlewski (1987) of the National Institute of Justice (NIJ), entitled "Making Confinement Decisions," challenged the growing consensus among criminal justice professionals that prisons are a scarce and expensive resource. The NIJ report concluded instead that "prisons appear to be good investments for reducing crimes. Building more prisons and filling them with criminals costs less than what communities pay for crimes by offenders who are free."

To reach that conclusion, Zedlewski estimated that "prisoners when they were on the streets committed an average of 187 crimes a year, costing an estimated $430,000 in law enforcement expenditures, victim losses and private security measures. But it costs just $25,000 a year to build a prison cell and maintain a prisoner in it."

Zedlewski's study received considerable public and media attention (see "Building New Prisons a Plus, Study Says," Los Angeles Times, July 4, 1988) and stirred controversy among criminologists. Respected analysts\(^1\) who examined the report severely criticized it, stating that its cost estimates were unfairly inflated;\(^2\) that the estimates of the amount of crime offenders commit while free in the community were grossly exaggerated;\(^3\) and that the study assumes that a substantial deterrent effect can be

---

\(^1\) Austin (1988); Mauer (1988); Zimring and Hawkins (1988).

\(^2\) To derive his cost estimates, Zedlewski correctly includes victim losses and total expenditures for police, courts, and corrections in estimating $2,300 in costs per crime. However, he also adds questionable costs such as private security, insurance, real estate depreciation, and guard dogs, which cannot be directly tied to these crimes.

\(^3\) The study depends heavily on the results of a RAND Corporation survey of 2,200 prison and jail admissions from three states that asked offenders to report the amount of crime they committed two years before being sentenced to prison or jail (Chaiken and Chaiken, 1982). Inmates reported an average of 187 crimes per year, although half the people in that study reported committed fewer than 15 crimes per year. The distribution of these self-reported offenses was extremely skewed toward the high end. In other words, a small fraction of offenders reported much higher rates of activity, which raised the average for the sample several times higher than it should be realistically. The median was less than 15 crimes per year. Zedlewski uses the 187 figure to estimate the amount of crime prevented per year of imprisonment, which is the highest that he could have found in NIJ-sponsored research on which to base assessment of the extent of incapacitation effects.
achieved by increasing the severity of punishment, an assumption that has never been scientifically proven.\(^4\)

After extensively reviewing the Zedlewski report, Zimring and Hawkins wrote:

\[
\ldots \text{the conclusions advanced in "Making Confinement Decisions" are not simply wrong, but rather they are case studies in compound catastrophic error.}
\]

In a similar manner, David Stockman, former Office of Management and Budget director, was quoted recently in Crime Control Digest as saying, "The numbers just don’t add up."

Most now agree that the methods and particular estimates used by Zedlewski in his analyses were faulty. Yet the study and the controversy surrounding it brought to the fore the need to develop more refined methods of estimating the costs and benefits of various sentencing options, particularly prison as compared to probation. These alternatives differ greatly in terms of the demand placed on society’s scarce resources, and limited budgets are forcing government officials to question whether the more expensive incarceration alternatives are worth it to society.

To date, the debate concerning the relative costs and benefits of imprisonment has been overly simplistic. In most policy discussions, the annual operating cost of prisons (usually cited to be about $14,000 per year per offender) is compared with the annual cost of probation (about $2,000 per year per offender). Comparing those two figures fuels the popular notion that probation is far cheaper than prison.

But such cost comparisons fail to reflect a number of important components. First, the annual operating costs of prisons overlook capital costs, fringe benefits and pensions, and other expenditures required for operating a prison, which, if added, more than double the annual costs of prisons (Harris and Clear, 1988; McDonald, 1989; Funke, 1985). If one considers these additional costs, a year in prison might cost as much as $30,000—not $12,000 to 14,000, as is commonly assumed.

But probation is not as inexpensive as commonly assumed, either—particularly if one considers the cost of reprocessing failures. Probationers sometimes commit new crimes while in the community, estimates run as high as one to two new arrests per year of street time for the average adult felony offender on routine probation (Petersilia and

\(^4\)For a review of the deterrence literature, see Blumstein et al. (1978).
Turner, 1986). Moreover, some probationers fail to comply with technical probation conditions. Offenders who are rearrested or who violate their technical conditions may be brought back into court, reprocessed, and, depending on the action taken by the courts, sentenced to jail or to prison.

If probation results in more arrests, court appearances, and subsequent jail time, the system must bear the reprocessing costs. In that sense, probation has not saved incarceration costs but has simply postponed them.

There are further complications as well. It can be argued that crimes committed by probationers also entail "social costs," such as victims' losses from work and hospital bills as well as increased fear, which may translate into the purchase of more private security. Zedlewski (1985) argues that those social costs should also be added into the total costs of imposing a probation sentence.

But proponents of probation maintain that there are economic "credits" when offenders are retained in the community. For example, offenders who are on probation can maintain jobs and therefore pay taxes. They can also compensate their victims and help subsidize the cost of their supervision by paying probation fees. Moreover, the state saves the welfare costs often required to support the families of offenders who are incarcerated. Policymakers now agree that the list of possible "credits" and "debits" involved in comparing sanctions could be extended considerably. Furthermore, some of the known costs cannot be reliably monetarized (e.g., victims' pain and fear, diminished social interaction, and an individual's sense of security).

Recent developments have made these cost comparisons even more complicated. Because of prison crowding, most states have developed a number of intermediate-sanction programs designed to fall between normal probation and prison in terms of punishment and control. The most popular intermediate sanctions are house arrest, electronic monitoring, intensive supervision, and community service. Because these programs monitor offenders more closely, they cost more to operate than regular probation. However, such programs may also be more successful at rehabilitation, and hence the higher costs of supervision could be offset by the lower costs of handling failures. On the other hand, if offenders are not rehabilitated but continue to actively engage in crime, closer supervision is more likely to detect technical violations or new crimes, resulting in more revocations and returns to custody and hence in increased costs.

For complete descriptions of these programs, see Petersilia (1987).
What this means is that each different combination of custody and supervision is likely to result in different direct costs and impacts on subsequent criminal activity and criminal justice system costs. These costs and impacts are no simple matter to estimate. This Note describes a model and a computer program that were developed to simplify and facilitate this estimation process.

The RAND Intermediate-Sanction Cost Estimation Model (RISCEM) was designed to evaluate the consequences of using different sentencing options for different types of offenders. To use the model for a specific jurisdiction, the analyst begins by specifying the characteristics of the offenders and programs that are to be compared. (The model is preloaded with values reflecting national averages, which can be accepted or modified with local data.) Within the model, offenders are differentiated by their recidivism rates, rate of offending, and probability of arrest while under formal supervision and after their supervision has ended. Correctional programs are differentiated in terms of their daily cost, length of commitment, and disposition pattern for technical violations or new offenses.

Once the characteristics of the offenders and the sanctions have been specified, the model begins a series of computations reflecting the passage of 1,000 cases through each of the sentencing options specified. When the computations are completed, the analyst can view either a series of graphs reflecting the outcomes associated with sentencing a particular type of offender to the specified sanctions (e.g., total number of crimes committed, total number of arrests incurred, or total costs) or a series of tables providing more detailed intermediate (one, three, and five years after sentencing) and final outcome data (five years after sentencing). On personal computers with expanded memory capacity, the running time for the simulation is usually under one minute.

The model allows correctional policymakers to compare sanctions in terms of their effect on public safety and costs. For instance, they can use the Model to explore the following kinds of questions:

- How does the cost of intensively supervised probation (ISP) compare with those of normal probation, split sentences (i.e., jail plus probation), and prison if the costs of reprocessing the failures of each are taken into account?
- At what level of recidivism does an ISP program become more expensive than a prison term? Or, put another way, what kinds of failure rates are
acceptable within an ISP program if it is to be considered superior either to prison or to regular probation?

- What are the cost and crime implications of responding more or less harshly to those who violate the technical conditions of probation,\textsuperscript{6} where "harsher" policies sentence more technical violators to custody?
- How much must a new correctional treatment program reduce recidivism to justify its additional cost over a more custodial approach?
- What is the sentence length that makes ISP and prison equivalent in terms of costs and public safety?

It must be made clear at the outset that answers to these questions can only be approximated at this time owing to data limitations. More accurate answers will require more solid estimates than now exist of parameters such as the recidivism and offense rates of persons who are placed on probation or sentenced to ISP or prison, and the percentage of these groups' arrests that leads to conviction and incarceration. The parameters now used in the RAND model computations are based on the best estimates currently available from a small number of studies.

It is also true that when one relies on national estimates such as those used here, significant local and regional differences are masked. For example, the U.S. average yearly cost of housing a prisoner is $14,000. In Alaska, however, it costs $40,000 and in Arkansas and Mississippi $8,000 (Corrections Yearbook, 1986). Recidivism rates for felony probationers have been estimated to vary from 65 to 25 percent across different jurisdictions. One of the more useful features of this model is that it allows local jurisdictions to insert their own estimates of their cost and crime data and compare their specific sentencing options. The simulations we conduct in Sec. III use nationwide averages.

However, even though firm data are not available for all the parameters required by the model, the ability to run simulations for a range of estimates allows the analyst to determine those variables for which the model outcomes are most sensitive. For instance, having observed the outcomes, the analyst can explore other sentencing policies by changing the duration or cost of specific sentencing components or the disposition

\textsuperscript{6}Technical violations occur when the offender fails to abide by the rules and conditions of probation or parole, as distinguished from committing new criminal acts.
pattern for new crimes or technical violations. The sensitivity of the results to particular parameter values reflecting either the characteristics of the offenders (e.g., offense or persistence rates) or the efficiency of the system in dealing with them (e.g., arrest or conviction rates, processing costs) can be tested by running the model for a range of parameter estimates. This kind of sensitivity testing can allow the analyst to give policymakers some idea of the consequences of their decisions under a variety of possible circumstances.

As we discuss in Sec. III, we have preloaded RISCEM with default values that we believe reflect the most accurate information that now exists, based on national averages. However, the continued development and usefulness of this model depends in part on a continuing process of sharpening the estimates of these key parameters.\(^7\)

This report is designed to acquaint potential users with the basic characteristics and operations of the model and to show how it might be used in exploring real sentencing and correctional programming options. Section II presents the conceptual background for the model and describes how RISCEM works. Section III demonstrates how RISCEM can be used to answer questions like those listed above and provides some preliminary estimates of how intermediate sanctions are likely to compare with more traditional custodial or probation sentences.

\(^7\)RAND is currently involved in field research designed to test the effectiveness of community versus incarceration sentences in 15 jurisdictions. When this research project is completed in 1990, better estimates for the recidivism rates and the costs of various placements for the study sample will be available. We hope to use these data in further refinements of the RAND sentencing and cost model.
II. MODELING THE COSTS AND BENEFITS OF ALTERNATIVE CRIMINAL SANCTIONS

CHARACTERIZING THE CRIMINAL CAREER

If differences in outcomes among different sentencing or corrections policies are to be evaluated and compared, it is necessary to have some way of describing both the future criminal behavior of the offenders who will be the subject of these policies and the impact of specific sanctions or program interventions on that behavior. In recent years, the most generally accepted model for characterizing repeat criminal behavior invokes the concept of the criminal career (Blumstein, Cohen, Roth, and Visher, 1986).

The assumptions and structure of this model have been developed and tested using offender self-reports and arrest histories covering several years of the sampled offenders’ lives. Variations of the model have been used to predict the incapacitation effects of incarceration (Shinnar and Shinnar, 1975; Cohen, 1978, 1983; Greenwood and Abrahamse, 1982) and the reductions in future crimes and prison commitments that would result from more effective rehabilitation programs (Rydell, 1986; Greenwood and Turner, 1987).

The key parameters of any criminal career model include:

\[
\begin{align*}
L &= \text{individual offense rate (average number of crimes in which the average free offender participates per time period)}; \\
q &= \text{individual arrest rate (probability that an offender will be arrested for a given crime in which that offender participates)}; \\
j &= \text{conviction rate (probability that an arrest leads to a conviction)}; \\
s &= \text{sentencing rate (probability that a conviction leads to a sentence)}; \\
m &= \text{number of offenders per crime (equivalent to the number of offenses per crime where an offense is a person participating in a crime).}
\end{align*}
\]

The amount of crime that will be committed during a time period, \(C(t)\), equals the number of crimes per free offender multiplied by the number of free offenders. The number of crimes per free offender is the individual offense rate, \(L\), divided by the average number of offenders per crime, \(m\). The number of free offenders equals the total offender population, \(N(t)\), less the incapacitated population, \(P(t)\). The completed relationship is therefore given by the following equation:
\[ C(t) = \frac{L}{m} [N(t) - P(t)] \]

where \( C(t) \) = crimes committed during time period \( t \),
\( N(t) \) = total offenders, and
\( P(t) \) = incapacitated offenders.

The number of offenders arrested equals the number of crimes times the arrest rate times offenders per crime:

\[ A(t) = [qm] C(t) \]

where \( A(t) \) = arrests during time period \( t \).

The number of sentencings equals the number of arrests times the product of the conviction rate and the sentencing rate:

\[ F(t) = [js] A(t) \]

where \( F(t) \) = sentencings during time period \( t \).

The number of incapacitated offenders in one time period equals the number in the previous time period plus inflow less outflow, where the outflow is the inflow that occurred long enough ago for the sentence duration to have been reached:

\[ P(t + 1) = P(t) + F(t) - F(t - d) \]

where \( P(t) \) = incapacitated offenders and
\( d \) = sentence duration.

The criminal justice system costs incurred by imposing this sanction are of two types—the cost of processing arrests through disposition and the cost of the incapacitation program:

\[ B(t) = aA(t) + bP(t) \]

where \( B(t) \) = criminal justice system cost during period \( t \),
\( a \) = average processing cost per arrest, and
\( b \) = incapacitation cost per offender per time period.

The simplest form of the model (and the one we use here) assumes that all active offenders have the same average offense rate\(^1\) and commit crimes at random intervals

\(^1\)If one wishes to consider a more complex case involving groups of offenders who commit crimes at different rates, then it is necessary to perform the calculations required by the model for each group separately and then to combine the results.
according to a Poisson process (i.e., the likelihood of a crime being committed during any specified length of time is always the same and does not depend on what happened during previous time periods). It is also assumed that the average probability of arrest remains the same throughout the criminal career. If there is only one type of restrictive sanction and if sentence lengths are relatively short in comparison to average career lengths, then the crime reduction effects of incarceration can be estimated with a set of closed-form equations. However, as we discussed in the introduction, there now exists a variety of forms of supervision and custody, each with its own unique structure, duration, cost, and impact on recidivism. The program described in this document was designed to handle this more complex situation. Instead of closed-form equations, it uses sophisticated computer spreadsheet software to simulate the movement of offenders through the system for a five-year period, counting significant events and measuring program population levels on a quarterly (every-three-months) basis. Each run of the model compares the outcome of sentencing offenders with the four different options specified below.

Our sentencing cost model tracks a cohort of offenders who are given a particular initial sentence. The model does this cohort tracking by quarter-year for five years from the time of initial sentencing.

Figure 2.1 diagrams the model's logic for a combination jail/intensive supervised probation sanction: Offenders go to jail for some specified sentence length and then receive ISP for an additional specified sentence length. The figure shows two sources of sentencings: initial sentencing of the cohort being analyzed and subsequent sentencings due to new offenses committed by the cohort during the evaluation period. The solid arrows show offenders moving through the two-phased sanction and back to the street. The dashed arrows show new sentencings due to new offenses committed either during ISP or when offenders are back on the street.

When offenders leave the jail portion of their sentence and enter ISP, the model recognizes that some are "temporary desisters" who will not commit any technical violations or new crimes while in ISP. The proportion of those entering ISP who are desisters is a user-specified input to the model.

The other offenders in ISP persist in doing crimes. They are also assumed to commit technical violations of the ISP rules. The rates at which they commit technical violations and new crimes are user inputs to the model. Offenders who not only commit
Fig. 2.1—Flow chart of the jail/ISP sanction in the sentencing cost model
these offenses while in ISP but are also arrested, convicted, and newly sentenced leave ISP before the completion of their initial sentence and start a new sentence.

All temporary desisters, as well as those persisters who do not receive new sentences, leave ISP at the end of their sentence durations and go back on the street. The model recognizes that some of these postsanction offenders become "permanent desisters." The proportion of those going from ISP to the street who are desisters is another user-specified input to the model. This permanent-desister rate is assumed to be lower than the temporary-desister rate governing behavior during ISP.

Permanent desisters remain on the street for all subsequent periods in the simulation. Persisters, however, commit new crimes at a rate specified by model users. Some fraction of these new offenses lead to arrests, convictions, and new sentencings.

The main summary measures used to evaluate the performance of a particular sanction are:

- The number of crimes committed during the evaluation period;
- The social cost of the crimes committed; and
- Criminal justice system costs (arrest processing costs, jail costs, and ISP costs).

To estimate the number of crimes, the model adds up the crimes committed by offenders who are in ISP and by postsanction offenders who are on the street. This addition is done across all quarter-years in the evaluation period. Note that users of the model provide two sets of offense rates, arrest rates, conviction rates, and sentencing rates: one set for persisters during ISP and another for persisters on the street.

The model's estimate of the social cost of crime is the number of crimes committed during the evaluation period times a user-specified estimate of the social cost per crime. Its estimate of the criminal justice costs of this sentencing alternative is the sum of arrest processing costs and correctional supervision costs. Arrest processing costs include those for technical violations during ISP, crimes during ISP, and crimes committed by postsanction offenders on the street. Correctional supervision costs include the initial jail sentence plus the ISP sentence. Model users provide the cost parameters that give the processing cost per arrest (of each type) and the daily supervision costs (of each type).
Each step in this model logic is very simple; however, in combination they are very complex. The sentencing cost model compiles the many individual steps into a direct connection between user-selected inputs and the output measures. This enables model users to focus on a sanction’s overall effect (the forest) rather than on the numerous detailed relationships (the trees).

Spreadsheet software is ideally suited to build this type of model. The spreadsheet keeps track of the many simple equations, provides sums that are the model’s summary outcomes, enables graphical output so results can be readily comprehended, and allows rapid recalculation when users change inputs such as offense rates, sentence durations, and cost factors.

**BASIC SENTENCING OPTIONS AND THEIR CHARACTERISTICS**

The RAND model allows the analyst to evaluate and compare four different sentence options:

- **No formal supervision:** No formal supervision or confinement.
- **Normal probation supervision preceded by jail:** Normal community probation supervision, preceded by 0 to 36 months in local jail.
- **Intensive supervision probation (ISP) preceded by jail:** Intensive supervision probation in the community preceded by 0 to 36 months in local jail.
- **Prison, followed by parole:** State prison for a specified period followed by 0 to 36 months of community parole supervision.²

Once the analyst has decided which of the above sanctions are to be compared, he proceeds to provide the characteristics of the typical offenders and programs that are to be considered. Table 2.1 specifies these "input" parameters required for the RAND model. As noted earlier, the current computerized version of the model has preloaded nationwide averages for each of these characteristics. The program prompts the analyst to accept these estimates or insert his own local data.

²The RAND model can also be used to analyze the costs and benefits of juvenile sentencing policies. In that case, the above sentencing options could be interpreted to mean no supervision; placement in a nonsecure community-based program; some combination of secure confinement and regular local probation; and state training school followed by parole.
Once these parameters have been provided, the model proceeds to simulate the flow of 1,000 cases through the systems specified, recording all new criminal acts, violations, and movement between program options on a quarterly (three-month) basis for a five-year period. The final product of the simulation is a series of graphs and tables containing a variety of process and outcome measures. These outcome measures are specified in Table 2.2.

The next section provides an example of how the model can be used to assess the costs and benefits of prison as opposed to intensive supervision and probation using national estimates of the input parameters.
Table 2.1
MODEL INPUT PARAMETERS

ABOUT THE INITIALLY-IMPOSED SANCTIONS:

Duration or length of stay. The analyst must specify a duration (in three-month intervals) for each sentence component (minimum = 0, maximum = 36). This is the length of time offenders must spend in a particular component before being placed in the succeeding component, assuming they are not convicted of any new crimes or technical violations.

Cost per day. This is the daily supervision cost per client (i.e., probation, jail, prison, or parole).

Disposition pattern for new offenses and technical violations. Clearly, all offenders will not successfully complete a sentence that allows them the opportunity to commit new crimes or imposes restrictive conditions for which they can receive additional sanctions or be moved to another program. Furthermore, we know from past experience that the disposition of these new offenses or technical violations will depend on the status of the offender at the time of the offense (i.e., which corrections component he is in). For instance, a parolee is more likely (but not certain) to be returned to prison for a new crime or technical violation than a probationer who has never done time. For each sanction, the model allows the user to specify the likely pattern of dispositions across all possible alternatives.

ABOUT THE OFFENDERS SENTENCED:

The fraction of participants who continue to engage in crime during and after formal supervision. This "persistence rate" identifies the fraction of offenders who continue to commit crimes or technical violations while under formal sentence and after formal sentence has ended. The model assumes that those in prison or jail cannot continue to commit crimes against the larger society while incarcerated. The model also assumes their persistence rate is zero. Some fraction of those offenders on probation or in ISP will undoubtedly be engaging in crime, but once formal supervision has ended, true desisters may be more common if the sentence was served in the community as opposed to prison (thus enhancing rehabilitation). The model allows the user to put in estimates of both the "in program" and "after program" desistance rates.

FOR THOSE WHO CONTINUE TO ENGAGE IN CRIME:

Offense rate: The offense rate, in crimes per year, is the rate active offenders commit crimes while in the community. We would expect both overall recidivism rates and offense rates to be lower for those offenders under more restrictive forms of supervision. In other words, increasing surveillance and restrictions should result in increasing partial incapacitation (i.e., lower offense rates).

Probability of arrest. This is the likelihood that an offender will get arrested for a given crime in which he participates, estimated by dividing the total number of arrests by the total number of individual criminal acts (two offenders committing a burglary together represent two individual criminal acts) during a specified time period.

Probability of Conviction. This is the probability that an arrested offender will be convicted. The number of convictions per year equals the number of arrests times the conviction rate.

Offenders per crime. This is the average number of offenders per crime committed.

ADDITIONAL COSTS AND CREDITS

Costs of processing a new arrest and/or technical violation. The personnel and administrative costs of the police, courts, prosecutor, etc.

Social cost per crime. This reflects the monetary value associated with costs that are in addition to the corrections cost per day, as noted above. Social costs may include, for example, the value of property stolen, security measures, hospital costs and work-time loss due to crime injuries, and housing depreciation in high crime neighborhoods.

Supervision fees and employment credits. Fees paid by the probationer to cover his costs of supervision or as extra taxes, based on his earnings.
Table 2.2
MODEL OUTCOME MEASURES

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Crimes committed</strong>: Cumulative crimes committed per person sentenced (the number of crimes per average offender in a sentencing and option during a given time period). The model shows these for one, three, five years following initial sentence.</td>
</tr>
<tr>
<td><strong>Criminal justice system costs</strong>: The average cumulative correctional, arrest, and court processing costs for a typical offender sentenced to that option at one-, three-, and five-year intervals (after initial sentence).</td>
</tr>
<tr>
<td><strong>Social costs of crime</strong>: The product of number of crimes committed times the estimated social costs per crime.</td>
</tr>
<tr>
<td><strong>The total cost of a sanction</strong>: Sum of criminal justice system costs and the social costs of crime.</td>
</tr>
<tr>
<td><strong>Correctional program involvement</strong>: The amount of time an average offender will spend under various forms of supervision and custody during the five-year period after initial sentence.</td>
</tr>
</tbody>
</table>

*Additional tables tabulate the number of events (offenses, arrests, convictions, new sanctions) occurring during specified time periods and cumulative recidivism rates.
III. EVALUATING AN INTENSIVE SUPERVISION PROGRAM FOR ADULTS

SPECIFYING THE PROGRAM AND OFFENDER CHARACTERISTICS

In the last decade, most states have experienced a now-familiar pattern: Prison crowding has led to an increase of felons on probation or on early release from prison, and their recidivism rates indicate that this is not a good alternative. This pattern has generated substantial interest in intensive supervision programs (ISPs). ISPs are variously structured, but their essential features are closer control, monitoring, and supervision than regular probation imposes. If ISPs are effective, they could have significant benefits for the criminal justice system and for society. Most important, if prison-bound offenders can be diverted to such programs without endangering the public, these sanctions would give some relief to public budgets and prison overcrowding. As policymakers consider whether to invest scarce resources in prison construction or community-based supervision, they need to understand the financial costs and public safety benefits of each. The RAND Intermediate-Sanction Cost Estimation Model (RISCEM) can be used to inform such discussions.

Let us suppose that a jurisdiction is interested in implementing an ISP program as an alternative sanction for some of its chronic property offenders. In this hypothetical case, the jurisdiction is currently sentencing its average property offender to nine months (time served, not sentence imposed) in prison, followed by six months on parole. Further assume that a local recidivism study has shown that 50 percent of parolees are rearrested while under supervision, 30 percent are eventually convicted, and 20 percent return to prison, with the daily cost of supervision in their state $41.00 for prison and $5.00 for parole. Given this situation, the jurisdiction wants its new ISP program to reduce prison commitments without compromising public safety. And they want to know what such a program will realistically cost.

SPECIFYING THE INPUTS

Sentence Duration or Length of Stay

The first decision to be made involves specifying the duration of the alternative sanctions to be compared. Given the current sentencing options of either 9 months in prison followed by six months on parole or three months in jail followed by 24 months
on probation, it would appear that a reasonable compromise sanction would involve 3 months in jail followed by 12 months of ISP. Table 3.1 shows how these figures are entered into the model.¹

**Supervision and Social Costs**

The next set of inputs pertains to the daily cost of supervision under various sanctions. Table 3.2 contains cost figures that are typical for adult sanctions (Petersilia, 1987; McDonald, 1989). Of course, one of the options in designing a new program involves determining the level of resources to expend per case. Intensive probation supervision could conceivably cost $5 to $30 per day per client, depending on whether drug testing, electronic monitoring, and the like are incorporated.²

<table>
<thead>
<tr>
<th>Sentence</th>
<th>Duration (months)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Option</td>
<td>Minimum</td>
<td>Maximum</td>
</tr>
<tr>
<td>Prison/parole</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prison</td>
<td>9</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>Parole</td>
<td>6</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Jail/ISP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jail</td>
<td>3</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>ISP</td>
<td>12</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Jail/probation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jail</td>
<td>3</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Probation</td>
<td>24</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>No formal sanction</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Table 3.1

**SENTENCE DURATION**

NOTE: Specify durations in multiples of three months.

¹Table 3.1 is a copy of the computer screen that is used to enter the numbers, which are in italics.

²It must be noted that the published cost figures of criminal sanctions are quite problematic, since they calculate costs by dividing a program’s budget by the number of offenders supervised. Obviously, crowded prisons underestimate the per diem cost of incarceration, and restrictive caseload sizes overestimate the costs of alternatives; hence it is very difficult to obtain a reliable picture of how much government services cost given the nature of accounting procedures.
These daily supervision costs do not, however, reflect an important component: the cost of reprocessing recidivists. Failure—particularly failure to comply with technical probation conditions—may be more likely in ISP programs. Thus, depending on the type of action taken by probation officials when they discover violations, the costs can increase considerably. If intermediate sanctions result in more arrests, court appearance, and subsequent jail time, the system must bear the reprocessing costs. RISCEM also allows the user to indicate the average cost of processing a technical violation and the average cost of processing a new arrest. The preloaded figures derived from Haynes and Larsen (1984), suggest that it costs about $1,500 to $2,000 to process an arrest and about $500 to process a technical violation.

Also, persons who fail after being diverted to an alternative program may do more time than they would had they not been diverted in the first place. A diversion program saves very little space if it has a 20 percent failure rate and if the failures serve three times their original sentences. Therefore, to really save space, a program must be conservative in its consequences. The model requests that the user specify how the criminal justice system will respond to technical violations and new arrests—i.e., the percentage who will be sentenced to custody.

Table 3.2
SANCTION COST COMPONENTS
(in dollars)

<table>
<thead>
<tr>
<th>Item</th>
<th>Offsets per Day</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cost per Day</td>
<td>Supervision Fees</td>
<td>Employment Credit</td>
<td>Cost per Event</td>
</tr>
<tr>
<td>Supervision costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prison</td>
<td>41</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Jail</td>
<td>22</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Intensive supervision (ISP)</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Routine probation</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Routine parole</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Criminal justice reprocessing costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Per technical violation</td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Per arrest for new crime</td>
<td></td>
<td></td>
<td></td>
<td>1,500</td>
</tr>
<tr>
<td>Social cost of crime committed (per crime)</td>
<td></td>
<td></td>
<td></td>
<td>500</td>
</tr>
</tbody>
</table>
Table 3.2 also allows the user to enter into the equation "credits" for community-based options such as probation fees (which average $10 to $300 per month) and employment credits (which may reflect additional taxes the offender pays if employed in the community). In the model simulation presented here, we chose not to assume any "credits," since none was available in which we could place much confidence.

Finally, the model allows the "social" cost of crime to be considered by assessing the overall costs of different sanctions. As discussed in the introduction, social costs pertain to victim costs, fear from crime, and the like. Our simulations use Zedlewski’s (1985) estimate of $500 per crime to estimate these social costs.

Disposition Pattern for New Offenses and Technical Violations

The next series of choices involves the disposition pattern for any new offense or technical violation that occurs while the offender is under supervision or following supervision.

Table 3.3 displays a disposition pattern that is fairly typical for the types of offenders and sanctions being considered here. The numbers provided for the different options take into account the seriousness of the subsequent crimes, differences in prior record, and predicted risk of recidivism. For instance, among offenders who are "on the street" after completing a jail/probation sentence, data might show that 30 percent of all new convictions result in commitment to prison, whereas 60 percent result in a new jail term followed by probation. If we want to consider ISP as an option for such offenders, we might elect to place about one-third of those currently being committed to prison or jail for their new crime on ISP, as shown in Table 3.3.

Our preloaded figures reflect a system that is responding somewhat mildly (although not unusually so) to new technical and crime violations—sentencing about

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4 In working through these patterns, one should try to avoid inconsistencies across different options. For instance, it would not make much sense to have a higher likelihood of prison commitment for offenders who are back on the street compared with those who are still under some form of supervision. Similarly, since jail and probation are usually considered a less serious sanction than jail and ISP, it would be unreasonable to have offenders on probation face a higher probability of prison commitment for any given type of offense than those on ISP.
Table 3.3
FRACTION OF SUBSEQUENT CONVICTIONS GIVEN EACH SENTENCE

<table>
<thead>
<tr>
<th>Sanction Where Offense Was Committed</th>
<th>Type of Subsequent Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prison</td>
</tr>
<tr>
<td>Technical Violations</td>
<td></td>
</tr>
<tr>
<td>ISP (after jail)</td>
<td>0.3</td>
</tr>
<tr>
<td>Probation (after jail)</td>
<td>0.1</td>
</tr>
<tr>
<td>Parole (after prison)</td>
<td>0.3</td>
</tr>
<tr>
<td>New Crimes</td>
<td></td>
</tr>
<tr>
<td>ISP (after jail)</td>
<td>0.3</td>
</tr>
<tr>
<td>Probation (after jail)</td>
<td>0.2</td>
</tr>
<tr>
<td>Parole (after prison)</td>
<td>0.3</td>
</tr>
<tr>
<td>Street (after prison/parole)</td>
<td>0.2</td>
</tr>
<tr>
<td>Street (after jail/ISP)</td>
<td>0.2</td>
</tr>
<tr>
<td>Street (after jail/probation)</td>
<td>0.2</td>
</tr>
<tr>
<td>Street (after no sanction)</td>
<td>0.2</td>
</tr>
</tbody>
</table>

NOTE: A row of fractions can sum to less than 1.0 if some convictions receive no sanction (stay in current state).

one-third of those who are convicted of technicals or new crimes while on parole or ISP to prison, with the remainder being retained on their current status.

To someone unfamiliar with current sentencing policies, these sanctions may appear excessively lenient or too severe, depending on their perspective. The model permits these probabilities to be changed and alternative options explored.

Recidivism Rate During and After Formal Supervision

The next set of inputs focuses on the interaction between the offenders and the sanctions: the fraction who desist from crime and the offense rates of those who continue. Table 3.4 displays a pattern of desistance that is consistent with the available data (Petersilia and Turner, 1986; Greenwood and Turner, 1987a; Greenwood and Turner 1987b; Klein and Caggiano, 1986) and current expectations. Temporary desisters cease to commit offenses during the sanction; permanent desisters cease both during the sanction and after the formal sanction has ended.

Ultimately we expect only about 20 percent to desist from criminal activity (i.e., not recidivate) when they are returned to the street. Moreover, this simulation of the
model does not assume any appreciable effect on desistance rates while the offenders are under routine probation or parole supervision.

However, while offenders are on ISP we do expect some reduction in the fraction who are active in crime—in this case 20 percent (in addition to the 20 percent who are permanent desisters)—through some combination of deterrence (they know they are being watched and do not want to go back to prison) and incapacitation (many will be under special restrictions, such as abstaining from the use of alcohol, which will limit their inclination or opportunities to commit crimes). The tighter the supervision, the stronger the temporary (and possibly permanent) desistance effects.

**Offense Rates, Arrests, and Conviction Rates**

Tables 3.5 to 3.7 contain the expected offense rates, arrest probabilities, and conviction probabilities for technical violations (3.5), new crimes while under supervision (3.6), and new crimes after completing their sentences (3.7), respectively. As we described in previous chapters, these data must be derived from self-reported or official arrest histories in the jurisdiction being considered, or they must be extrapolated from such data in other sites.

For this first run we will assume that all active offenders (those who are not desisters) will commit technical violations and new crimes at the rate of 20 per year (20 technical violations per year and 20 new crimes per year) no matter what form of

<table>
<thead>
<tr>
<th>Sanction Type</th>
<th>Proportion Refraining from New Crimes and Technicals (desistance)</th>
<th>While Under Sanction (temporary)</th>
<th>After Sanction (permanent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISP (after jail)</td>
<td>0.40</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>Probation (after jail)</td>
<td>0.20</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>Parole (after prison)</td>
<td>0.20</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>No formal sanction</td>
<td>NA</td>
<td>0.20</td>
<td></td>
</tr>
</tbody>
</table>
Table 3.5
EXPECTED TECHNICAL VIOLATIONS AND SYSTEM RESPONSE DURING SANCTION FOR PERSISTING OFFENDERS

<table>
<thead>
<tr>
<th>Sanction</th>
<th>Technical Violations (per year)</th>
<th>Arrest Probability Given Offense</th>
<th>Conviction Probability Given Arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISP (after jail)</td>
<td>20</td>
<td>0.20</td>
<td>0.70</td>
</tr>
<tr>
<td>Probation (after jail)</td>
<td>20</td>
<td>0.04</td>
<td>0.70</td>
</tr>
<tr>
<td>Parole (after prison)</td>
<td>20</td>
<td>0.08</td>
<td>0.70</td>
</tr>
</tbody>
</table>

Table 3.6
EXPECTED NEW CRIMES AND SYSTEM RESPONSE DURING SANCTION FOR PERSISTING OFFENDERS

<table>
<thead>
<tr>
<th>Sanction</th>
<th>New Offenses (per year)</th>
<th>Arrest Probability Given Offense</th>
<th>Conviction Probability Given Arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISP (after jail)</td>
<td>20</td>
<td>0.16</td>
<td>0.50</td>
</tr>
<tr>
<td>Probation (after jail)</td>
<td>20</td>
<td>0.08</td>
<td>0.50</td>
</tr>
<tr>
<td>Parole (after prison)</td>
<td>20</td>
<td>0.08</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Table 3.7
EXPECTED NEW CRIMES AND SYSTEM RESPONSE AFTER SANCTION FOR PERSISTING OFFENDERS

<table>
<thead>
<tr>
<th>Sanction</th>
<th>New Offenses (per year)</th>
<th>Arrest Probability Given Offense</th>
<th>Conviction Probability Given Arrest</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISP (after jail)</td>
<td>20</td>
<td>0.08</td>
<td>0.50</td>
</tr>
<tr>
<td>Probation (after jail)</td>
<td>20</td>
<td>0.08</td>
<td>0.50</td>
</tr>
<tr>
<td>Prison (with parole)</td>
<td>20</td>
<td>0.08</td>
<td>0.50</td>
</tr>
<tr>
<td>No formal sanction</td>
<td>20</td>
<td>0.08</td>
<td>0.50</td>
</tr>
</tbody>
</table>
supervision they are under in the community. Because they are being watched more closely, we would expect offenders on ISP to have a higher probability of arrest for either technical violations or new crimes.

**Offenders per Crime**

Finally, the average number of offenders per crime is set at 1.3, reflecting the lower rate of multiple offending expected for adults as compared with juveniles (Greenwood, Petersilia, and Zimring, 1980). As we explained earlier, this proportion is needed to convert the number of offenses committed by offenders (two offenders committing a burglary together represents two offender crimes) into the number actually experienced by the community (in this case, one burglary).

**ASSESSING THE COSTS AND CRIME REDUCTION BENEFITS OF VARIOUS SANCTIONS**

To recapitulate, the options being compared have the characteristics shown in Table 3.8. All programs assumed 1.3 offenders per crime; a social cost of $500 per crime; a reprocessing cost of $1,500 for each new crime and $500 for each technical; and no supervision fees or employment credits.

RISCEM takes the above "inputs" and runs an experiment in which 1,000 offenders are sentenced to each of four sanctions (incorporating all of their unique characteristics) and tabulates the groups' subsequent crimes and costs. These crimes and costs are summed at one, three, and five years after the sentence was initially imposed.

**Table 3.8**

<table>
<thead>
<tr>
<th>Sentence Option</th>
<th>Length (months)</th>
<th>Correctional Cost</th>
<th>During Supervision</th>
<th>After Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>No formal sanction</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.20</td>
</tr>
<tr>
<td>Jail/probation</td>
<td>3/24</td>
<td>$22/$3</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Jail/ISP</td>
<td>3/12</td>
<td>$22/$9</td>
<td>0.40</td>
<td>0.20</td>
</tr>
<tr>
<td>Prison/parole</td>
<td>9/6</td>
<td>$41/$5</td>
<td>0.20</td>
<td>0.20</td>
</tr>
</tbody>
</table>

---

5Sources of data for estimating individual offense rates include Blumstein et al., 1986; Greenwood and Turner, 1987b; Elliott, Huizinga, and Morse, 1986.
Table 3.9 and Fig. 3.1 show the number of crimes committed per offender per year under each of the options. Under the set of inputs assumed for this iteration of the model, the jail/ISP option results in the lowest amount of crime (23.1 crimes per offender over the next five years).

The bottom line of Table 3.10 and Fig. 3.2 show that the jail/ISP option also has the lowest total system cost (including both criminal justice system costs and the costs of crimes, figured at an average social cost of $500 per crime)—$33,485 compared with $33,635 for "no formal supervision," the next least costly option.

Table 3.11 and Fig. 3.3 show how much time an average offender spends under each form of custody or supervision during the next five years as a function of his initial sentence. Offenders initially committed to three months of jail followed by 24 months of probation (these were the values selected for this iteration of the model) will actually

---

### Table 3.9

<table>
<thead>
<tr>
<th>Year After</th>
<th>Crimes per Person by Year and Sentencing Option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prison</td>
</tr>
<tr>
<td>Sentencing</td>
<td></td>
</tr>
<tr>
<td>Year 1</td>
<td>3.1</td>
</tr>
<tr>
<td>Year 2</td>
<td>9.7</td>
</tr>
<tr>
<td>Year 3</td>
<td>15.8</td>
</tr>
<tr>
<td>Year 4</td>
<td>21.1</td>
</tr>
<tr>
<td>Year 5</td>
<td>25.6</td>
</tr>
</tbody>
</table>

---

### Table 3.10

**TOTAL COST (CRIMINAL JUSTICE SYSTEM AND CRIME) BY YEAR AFTER SENTENCING**  
(in dollars)

<table>
<thead>
<tr>
<th>Year After Initial Sentence</th>
<th>Cost per Person by Year and Sentencing Option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prison/Parole</td>
</tr>
<tr>
<td>Year 1</td>
<td>13,858</td>
</tr>
<tr>
<td>Year 2</td>
<td>8,870</td>
</tr>
<tr>
<td>Year 3</td>
<td>7,185</td>
</tr>
<tr>
<td>Year 4</td>
<td>6,140</td>
</tr>
<tr>
<td>Year 5</td>
<td>5,250</td>
</tr>
<tr>
<td>Total for five years</td>
<td>41,303</td>
</tr>
</tbody>
</table>
Fig. 3.1—Cumulative crime per person sentenced

Fig. 3.2—Cumulative cost (criminal justice system and crime)
Table 3.11
TOTAL MONTHS UNDER SANCTION (LENGTH OF TIME UNDER VARIOUS FORMS CUSTODY/SUPERVISION) FIVE YEARS AFTER SENTENCING

<table>
<thead>
<tr>
<th>Sanction</th>
<th>Sentencing Option</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prison/Parole</td>
</tr>
<tr>
<td>Months in prison</td>
<td>14.2</td>
</tr>
<tr>
<td>Months in jail</td>
<td>4.1</td>
</tr>
<tr>
<td>Subtotal (prison or jail)</td>
<td>18.3</td>
</tr>
<tr>
<td>Months under ISP (after jail)</td>
<td>4.5</td>
</tr>
<tr>
<td>Months under probation (after jail)</td>
<td>7.0</td>
</tr>
<tr>
<td>Months on parole (after prison)</td>
<td>7.6</td>
</tr>
<tr>
<td>Subtotal (probation or parole)</td>
<td>14.7</td>
</tr>
<tr>
<td>Total</td>
<td>37.4</td>
</tr>
</tbody>
</table>

Table 3.12
EVENT ACCOUNTING (Years 1 to 5 After Sentencing)

<table>
<thead>
<tr>
<th>Event</th>
<th>Events per Person</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>by Sentencing Option</td>
</tr>
<tr>
<td></td>
<td>Prison/Parole</td>
</tr>
<tr>
<td>Commission of technical violation</td>
<td>19.7</td>
</tr>
<tr>
<td>Arrested for technical violation</td>
<td>1.5</td>
</tr>
<tr>
<td>Convicted for technical violation</td>
<td>1.1</td>
</tr>
<tr>
<td>Given new sentence</td>
<td>0.8</td>
</tr>
<tr>
<td>Commission of new crime offense</td>
<td>33.3</td>
</tr>
<tr>
<td>Arrested for new crime offense</td>
<td>2.8</td>
</tr>
<tr>
<td>Convicted for new crime offense</td>
<td>1.4</td>
</tr>
<tr>
<td>Given new sentence</td>
<td>1.2</td>
</tr>
</tbody>
</table>

spend 4.8 months in prison, 7.7 months in jail, 5.1 months on ISP, 22.0 months on probation, and 2.4 months on parole during the five years following their initial sentence.

The average number of "events" (commission of new crimes or technical violations, arrests, and convictions) that led to these sanctions is shown in Table 3.12. In this table we see the expected pattern of fewer commissions of technical violations and
new offenses for those under ISP (compared with prisons or regular parole) but a greater number of arrests, resulting from the higher likelihood of detection.

Having reviewed these outcomes, we may now wonder to what degree the apparent superiority of the jail/ISP option depends on its anticipated suppression of criminal activity while the offenders are under supervision. To find out, we can run the model again with the temporary desistance proportion (see Table 3.4) for ISP reset to 0.20, the same value as that assumed for the other forms of supervision. Running the model under this assumption, we get the total crimes committed and total costs shown in Table 3.13.

Here we see that the ISP option still results in the least amount of crime per offender, but "no formal sanction" now results in a total cost about 1 percent lower than that of ISP. Of course, if we placed a higher social cost on each crime committed than the $500 assumed in this example, the ISP would also have the lowest total costs.

![Bar chart](image-url)

Fig. 3.3—Months in placement over a five-year period
Table 3.13
CUMULATIVE CRIMES COMMITTED AND TOTAL COST PER PERSON SENTENCED (WITH NO RESISTANCE ADVANTAGE FOR ISP DURING FIVE YEARS AFTER SENTENCING)

<table>
<thead>
<tr>
<th></th>
<th>Prison/Parole</th>
<th>Jail/ISP</th>
<th>Jail/Probation</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimes committed</td>
<td>25.6</td>
<td>21.8</td>
<td>28.3</td>
<td>33.0</td>
</tr>
<tr>
<td>Total cost</td>
<td>$42,288</td>
<td>$34,826</td>
<td>$35,737</td>
<td>$34,500</td>
</tr>
</tbody>
</table>

THE EFFECTS OF CHANGING PROGRAM DESIGN

Length of Supervision

One of the advantages of the RAND sentencing model is that it allows an analyst to systematically explore the relationship between various system design features, their presumed effects on criminal behavior, and any of the primary outcomes. For instance, a key ISP design feature is length of supervision. ISP supervision generally lasts anywhere from 6 to 24 months, with 12 months being most common.

A program manager may want to know how the projected crime and cost figures would be affected by increases in the length of ISP supervision. Would the crime reduction benefits outweigh the additional costs of supervision? Figure 3.4 plots average crimes per offender, criminal justice system cost, and total costs as a function of length of ISP supervision, where these data were obtained by running the model previously described with three different lengths of ISP supervision: 12, 24, and 36 months.

These curves show that while there is a slight decline in crimes committed with increasing length of ISP supervision, there is an equally slight increase in criminal justice system costs. Crimes go down with increasing length of ISP because active offenders are more likely to be caught (ISP has a higher probability of arrest for new crimes and technical violations than any other form of supervision) and incarcerated. Criminal justice system costs go up because of the increased processing and correctional costs. However, given the social costs of crime and processing costs of new arrests assumed for this example, the net result is a very slight decrease in total costs even with a doubling or tripling of the length of ISP supervision.

It would appear that for the combination of offender and program characteristics used in this example, fairly long periods of ISP supervision can be imposed without any
adverse financial effects on the criminal justice system. In such a situation, the length of ISP imposed by the court might be used to reflect desert\textsuperscript{6} considerations, relating to the seriousness of the defendant’s conviction offense and prior record rather than just the economic case for longer supervision.

**Increasing/Decreasing Daily Cost of Supervision**

Another critical design parameter is the cost of the ISP program components. Earlier we saw that with an estimated daily cost of jail at $22 versus $41 for prison and a cost of ISP less than twice that for regular parole, ISP was the most cost-effective option. However, if jail space really costs just as much as prison ($41 per day) and ISP

![Graph showing crimes and costs versus length of ISP supervision in months.

Fig. 3.4—Crimes and costs versus length of ISP

\textsuperscript{6}Punishment based on what the seriousness of the offense deserves, compared with other types of offenses, rather than considering any other utilitarian effect the punishment might have (i.e., deterrence, rehabilitation, incapacitation).
supervision costs three times as much as parole ($15 per day), a three-month jail/12-month ISP split term still turns out to be slightly less costly than a 9/6 prison/parole term and also results in fewer crimes, as shown in Table 3.14.

Assessing the Effects of Decreased Recidivism/Desistance

Another assumption we might want to check is the assumed recidivism rate for the sentenced offenders; 80 percent recidivism (or 20 percent desistance) may appear too high for some jurisdictions or types of offenders. We can check on the sensitivity of the results to the assumed desistance rate by changing it from 0.20 to 0.35 for all forms of supervision. Running the model under this assumption (for the three-month jail/12-month ISP option) results in the total crimes and total cost for each option shown in Table 3.15 over the five-year evaluation period. In this case, ISP is even more clearly the preferred option.

<table>
<thead>
<tr>
<th>Assumed Program Costs</th>
<th>Criminal Justice Costa</th>
<th>Total Costb</th>
</tr>
</thead>
<tbody>
<tr>
<td>$41 for prison/$5 for parole</td>
<td>$28,487</td>
<td>$41,211</td>
</tr>
<tr>
<td>$22 for jail/$9 for ISP</td>
<td>$21,841</td>
<td>$33,367</td>
</tr>
<tr>
<td>$41 for jail/$15 for ISP</td>
<td>$28,384</td>
<td>$39,910</td>
</tr>
</tbody>
</table>

aOver five years.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Prison/Parole</th>
<th>Jail/ISP</th>
<th>Jail/Probation</th>
<th>No Formal Supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total crimes per offender</td>
<td>16.9</td>
<td>12.3</td>
<td>18.0</td>
<td>22.4</td>
</tr>
<tr>
<td>Total cost per offender</td>
<td>$32,097</td>
<td>$22,854</td>
<td>$24,094</td>
<td>$22,939</td>
</tr>
</tbody>
</table>
Assessing The Effects of Strictness of Enforcement

One last design parameter we might wish to test is the severity of sanctions imposed for technical violations or new offenses during or after supervision. In previous runs we have used a sanction matrix (Table 3.1.2) in which the probability of being committed to prison for a new crime or technical violation is somewhere between 10 and 30 percent. Figure 3.5 shows what happens to the average number of crimes committed, criminal justice system costs, and total costs for the average offender as the probability of imprisonment for new crimes or technical violations increases from 20 to 80 percent. (During these runs, the probability of any disposition other than prison is zero.)

Given the other conditions we have specified, the plots in Fig. 3.5 show that while criminal justice system cost increases substantially with more severe sanctions, total costs decline slightly, while the expected number of crimes declines sharply. In many of the analysis we have run to date, even criminal justice system costs appear to decline.

Fig. 3.5—Crimes, criminal justice, and total costs versus sanction severity for new crimes
slightly as the probability of imprisonment for new crimes and technical violations increase.

Program managers faced with limited budgets may need to decide whether to increase contact levels for a limited pool of high-risk offenders (say, four to five contacts per week) versus supervising a larger number less stringently (say, one to two contacts per week). To perform this analysis, it would be necessary to estimate the impact of the different supervision levels on individual recidivism rates and rates of offending. Other issues that could be studied include the consequence of allowing early release from prison followed by intensive parole or the value of special short sanctions for technical violations.

CONCLUDING REMARKS

In summary, we have shown how the RAND Intermediate-Sanction Cost Estimation Model can be used to test the sensitivity of crimes and costs resulting from different sentencing options to a variety of assumptions about offender behavior and system performance. In the example explored here, the split sentence consisting of three months in jail and one year on ISP proved to be the preferred option over a wide range of assumed costs, recidivism rates, and sanction severity for new crimes. Increasing the lengths of ISP supervision did not appear to improve the effectiveness of that sanction, but increasing the severity of sanctions for subsequent offenses or technical violations did.

Intensive supervision is a flexible sentencing option that can be designed to fill a variety of supervisory needs. Combined with house arrest, ISP supervision can be almost as intensive as other forms of incarceration. With lower levels of monitoring, it can be just as relaxed as routine probation. In order for ISP programs to be more effective than the traditional sanctions they are designed to replace, however, the length and level of supervision and response to subsequent violations must be tailored to the population with which the program is designed to deal. That is what this model is designed to do.

Jurisdictions attempting to design such programs should attempt to collect local data that will allow them to estimate the parameters listed in Table 3.1. Armed with that

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All the inputs required for this model can be generated from a sample of approximately 1,000 rap sheets for the kinds of offenders for whom the supervision is contemplated. From that data, one can generate arrest rates; arrest and conviction probabilities; and sentencing patterns (length of time served; recidivism rates). Cost estimates for various forms of supervision can be generated from agency budgets and annual workload statistics.
information, they can then begin to vary the system design parameters (e.g., length and response to technicals), as we have done, to improve the effectiveness of their sentencing policies. Without this type of analysis there is no way of ensuring that a new ISP program is more effective than the program it was designed to replace.
REFERENCES


*Corrections Yearbook*, Criminal Justice Institute, South Salem, New York, 1986.


