BENEFIT-COST ANALYSES OF SENTENCING

A Campbell Collaboration Systematic Review

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Abstract

Introduction

Sentencing policies are most frequently designed by policy-makers and implemented by the courts with the aim of punishing, deterring and rehabilitating offenders in order to reduce future re-offending. However many sentencing decisions are made without knowledge of the effectiveness of sentences in achieving their objectives, or the costs and benefits of the different sentencing alternatives. The following systematic review was conducted in order to address these questions and to review the existing evidence on the costs and benefits of different sentencing options. Results from cost-effectiveness studies were retained to provide supporting information.

Objective

The objective of the review was to identify and assess the quality of studies of the costs and benefits of different sentencing options.

Search Strategy

Pre-screening and hand-searching of published and available unpublished literature was completed by two independent reviewers. The structured searches were carried out on studies published between 1980-2001, using nine electronic databases and by consulting experts in the field.

Selection Criteria

Studies were included in the review if they contained information on the costs and benefits of sentencing options. Due to the small number of benefit-cost studies found, cost-effectiveness study outcomes were also retained.

Data collection and analysis

Results from nine benefit-cost studies and eleven cost-effectiveness studies are reported in narrative and tabular form. Benefit-cost ratios are presented alongside benefit-cost outcome measures. The quality of studies is reported using the Maryland

Scientific Scale (Sherman, Farrington, Welsh & Mackenzie, 2002) and a Benefit-Cost Validity Scale - Revised (Cohen & McDougall, 2008, Appendix 1).

Main results

The review found only nine studies providing costs and benefits information. Six of these studies were assessed as providing a 'valid' or 'comprehensive' benefit-cost analysis, acceptable on the Benefit-Cost Validity Scale – Revised, covering a range of different sentences. Two studies of In-prison Sex Offender Treatment were found to be cost-beneficial, in addition to an Intensive Supervision program and a Youth Wilderness Program, though the two latter interventions are less well-supported by the wider research evidence. Diversion from imprisonment to drug treatment was assessed by its authors to be cost-beneficial; and imprisonment for high risk offenders was considered to be cost-beneficial, though not for less prolific offenders or for drug offenders. The three studies which provided only a 'partial' benefit-cost analysis examined effectiveness of probation vs. prison, prisoners released early compared to those serving a full term, and house arrest with electronic monitoring.

Reviewer's comments

Due to the small number of studies uncovered by the review and, in some cases, poor methodologies, it has not been possible to draw firm conclusions from the individual studies in order to make comparisons between studies on the benefit-cost of particular sentencing options. Tentative conclusions are drawn, where supporting evidence is available, and the authors recommend improved quality of research design and the development of standardized methodologies for assessing the costs and benefits of criminal justice interventions.

Introduction

In judicial systems across the world, sentences are frequently imposed without sentencers being provided with research evidence on the effectiveness of sentencing in reducing crime. It is even less likely that sentencing decisions made will take account of information on the costs and benefits or cost-effectiveness of sentencing options. This review seeks to examine economic research evidence relating to sentences in order to compare the costs and benefits of the different sentencing alternatives.

Until recent times, few studies of effectiveness of sentencing have incorporated benefit-cost analyses in their evaluations. Increasingly however information on costs and benefits of interventions is required by policy-makers and funding bodies, and indeed this study was undertaken at the request of HM Ministry of Justice (formerly HM Home Office), who were at that time considering proposed changes to sentencing legislation (Halliday, 2001).

Economic information in sentencing studies tends to be presented in three different ways, either as studies of the costs of alternative sentences, cost-effectiveness studies, or benefit-cost studies. Each of these methods can be applied, as appropriate, to address specific research questions relating to crime. Cost studies simply compare costs of alternative interventions without reference to whether one or other is more effective in terms of reducing crime, e.g. the cost of a prison sentence compared to the cost of a community penalty. Cost-effectiveness analyses go a step further and inform us about the costs of the resources used in carrying out the sentence and the non-monetary benefits and/or disbenefits associated with the use of the resources. Thus a cost-effectiveness study examining, for example, sentencing to intensive supervision in the community compared with a custodial sentence, might conclude that intensive supervision was cost-effective when compared to

imprisonment because the costs of intensive supervision were less whilst the outcomes (e.g. reducing recidivism) might be comparable in both instances. In other words, a cost-effectiveness study looks for technical efficiency, e.g., holding the non-monetary outcomes constant, and calculating which alternative is less expensive. By comparison, benefit-cost analyses incorporate both the monetary costs of the intervention and an estimation of the monetary value of the benefits, so allowing for calculation of a benefit-cost ratio which provides a means of comparison across different kinds of interventions and different types of policy outcomes. This method of analysis may measure effectiveness in terms of, for example, a reduction in reconvictions, but can additionally take account of the severity of the offences prevented in terms of cost to the police, the courts and the victim. Such victim costs may include monetary calculation of the victim's pain and suffering. Thus, benefit-cost analysis looks for allocative efficiency and allows researchers to compare across various programs and outcomes. Cohen (2008) has a thorough discussion of benefit-cost and cost-effectiveness studies in the criminal justice context.

The current systematic review was commissioned to review benefit-cost studies as the main source of information on sentencing, in order to take account of the full costs to the State and to victims in developing policy on sentencing. Since it was recognised that benefit-cost studies might be few in number, conclusions from cost-effectiveness studies were retained to examine the supporting evidence that such studies might provide.

It is recognized that such a 'value for money' approach may raise questions of principle and ethics in the minds of readers. It can however be argued that a good benefit-cost analysis is more comprehensive in taking account of principles and ethics than a non-economic evaluation, by attempting to capture the total benefits and costs to society of implementing a particular intervention or sentencing option (Cohen,

2000), and taking full account of the impact of offences on victims. The benefit-cost analysis has as its foundation the research evidence of what is effective in changing offending behavior; however it goes beyond a simple numerical count of reconvictions, incorporating the nature of the offending and degree of seriousness, as well as its impact on victims and on society. A benefit-cost analysis highlights, not only where numbers of reconvictions have been reduced by a particular sentence, but also whether the severity of the re-offending has been reduced and the type of offence changed. A benefit-cost analysis therefore gives a more complete assessment of the impact of an intervention by including a victim and societal perspective.

There are however inherent problems in trying to provide appropriate estimates for a complete financial picture of the cost of a crime and the criminal justice responses to it. It is a fairly simple task to estimate the costs and benefits of imprisonment by calculating savings from crimes avoided, less the costs of the incapacitation and other associated criminal justice expenditures. However, relatively little is known about how to calculate the costs and benefits associated with deterrence and retribution, hence estimates of these are frequently omitted even though all three elements (punishment, deterrence and retribution) are regarded as social benefits of imprisonment (Piehl and DiIulio, 1995). Given such difficulties, it is not surprising that for many years there have been conflicting views about the efficacy and efficiency of various sentencing options. In the United States for instance, some researchers (e.g. Marvell, 1994) suggest that imprisonment is unlikely to be cost-effective due to the high costs, whilst other researchers view imprisonment as an effective strategy (e.g. Zedlewski, 1989). The dearth of rigorous scientific research in the criminal justice field, as highlighted by Sherman, Farrington, Welsh and Mackenzie (2002), has exacerbated the problem of trying to reach definitive conclusions overall about the costs and benefits of alternative sentences.

In a review of correctional interventions, Welsh and Farrington (2000) found only seven studies (all carried out in the USA) which presented information on monetary costs and benefits. All seven studies had omitted indirect/intangible costs to victims (cf. Cohen, 1998) and three of them had utilized a less rigorous method of investigation than was desirable. The studies enabled certain conclusions to be drawn about correctional interventions, chiefly that benefits outweighed costs, but several important questions remained unanswered. For instance, there was no clarification as to whether community treatment was more cost-beneficial than institutional treatment or vice versa or whether treatment per se was more economically efficient than punishment.

Conclusions from the Welsh and Farrington (2000) study highlight the need for continued efforts to evaluate the sentencing of offenders and correctional interventions, so that policy development and decision-making may become as effective as possible.

Objectives of the systematic review

The primary objective of the review was to identify and assess research studies of the benefit-cost of different sentencing options in relation to the prevention of offending. Supporting information was drawn from a subsidiary examination of cost-effectiveness studies.

A further objective of the review was to provide evidence-based research information to those working in the criminal justice field and to identify future research needs.

Method

Search strategy

Both published and unpublished work, including 'grey' literature, conducted between 1980 and 2001, were considered eligible for the review. Studies prior to 1980

were not included as it was considered that the earlier sentencing framework and administration of penalties would not be comparable with more recent sentencing processes and penalties. Attempts were made to identify unpublished material and publications in languages other than English, based on internet search and experience of the researchers. The search was conducted on the following databases and publications:

1. Criminal Justice Periodicals Index
2. Criminal Justice Abstracts
3. Social Science Citation Index (Social SciSearch)
4. Applied Social Science Indexes and Abstracts (ASSIA)
5. Public Administration Information Service International (PAIS)
6. Psychological Abstracts (PsycINFO)
7. Educational Resources Information Clearinghouse (ERIC)
8. Social, Psychological, Education and Criminological trials register (SPECTR, currently being developed by the UK Cochrane Centre and the University of Pennsylvania)
9. HMSO Publications (especially Home Office Research Studies)

The following search terms were used singly and/or in appropriate combinations: Sentencing; Crime; Corrections; Penalty; Punishment; Offending; Custodial; Penal; Sanction; Reparation; Prevention; Reduction; Court; Prison; Program; Disposal; Probation; Diversion; Community; Alternative; Public safety; Evaluation; Cost; Benefit; Efficiency; Estimate; Model; Effective; Economic; Analysis; Meta-analysis.

A search was also made of bibliographies for references to the benefit-cost of court sentences and to major reviews of research on crime interventions, including, but not limited to, the Report to the US Congress, (Sherman et al., 1997) ‘What

works, what doesn't, what's promising in reducing crime', and 'Evidence–based Crime Prevention' (Sherman et al., 2002).

Two independent reviewers carried out pre-screening of titles and abstracts identified from the database searches. One reviewer was an economist, and the other a psychologist. Where there were differences in assessment, the studies were discussed by the two reviewers. If agreement was not reached, a third reviewer was invited to assess the study. A second screening of selected articles was conducted before any hard copies of the final selection were obtained. A reliability analysis of reviewers selection was not conducted.

Selection criteria for studies included in the review

Types of studies

Studies which specified the benefit-cost of sentencing were included in the review. Ideally, the benefit-cost studies would have an experimental or quasi-experimental design, scoring 3 or more on the Maryland Scientific Methods Scale (Sherman, Farrington, Welsh & Mackenzie, 2002), although it has been necessary to include less rigorous studies (i.e. scoring 1 or 2 on the scale), due to the paucity of available cost and benefits studies. Again, due to the small number of benefit-cost studies, cost-effectiveness studies were retained, from which supporting evidence has been drawn. Excluded studies have been listed together with a summary of reasons for exclusion (Table 3). Studies whose main focus was a comparison of privately versus publicly run institutions were not included since it was the sentencing option per se which was the concern of this review, though studies were included where privately and/or publicly run institutions were compared with other sentencing options, e.g., community penalties.

Types of participants

Male and female, juvenile and adult offenders who had committed any type or

number of offences were included in the review.

Types of sentence

The sentencing options included in the review covered pre-trial diversions, community orders, fines, probation, participation in drug treatment programs, victim-awareness and anger-management programs, boot camps, jail and imprisonment. The various options could aim to incapacitate, rehabilitate, restrain or punish the offender, or deter him/her and other potential offenders from future criminal behavior. Sentencing options could aim to achieve a combination of these objectives. No specific sentencing options were excluded.

Types of costs and benefits

The type of costs in the review included, but were not limited to: police and courts time; the costs of supervision, imprisonment and treatment; private and social costs such as welfare payments to offenders' families, indirect/intangible costs such as the suffering incurred by victims; and any other relevant costs. Associated benefits included the monetary savings of crimes prevented or deterred as well as savings to public health and welfare and savings to the criminal justice system of reduced recidivism and any other additional benefits. A detailed list of the costs of crime and justice can be found in Cohen (2008).

Types of outcome measure

The outcome measures were the economic costs and benefits of sentencing options, supported by cost-effectiveness information.

Assessment of methodological quality

For each study an assessment of methodological quality was made firstly, on the basis of the economic information presented. If costs and benefits of a sentencing option were not contained in the selected article then the article was excluded from the main review. If costs and effectiveness information were available, the study was

retained as supporting information for the main review. When economic criteria were satisfied on both the benefit-cost and cost-effectiveness study groups, then an assessment was made of the scientific method employed. Both sets of criteria are described below:

Benefit-cost studies

A particular court sentence is economically efficient if its monetized benefits exceed its monetized costs. The most succinct measure of economic efficiency is a benefit-cost ratio which is a measure of the benefit derived from the investment of a single monetary unit (1 dollar; 1 pound Sterling). The review selected studies which either reported this ratio or which enabled the ratio to be calculated.

Cost-effectiveness studies

Cost-effectiveness studies provide cost information of an option, and outcomes in non-monetary terms. The most usual outcome measures used in cost-effectiveness studies are a reduction in recidivism/offending or the prevention of a specific type of crime. In the current systematic review, these studies were used to provide supporting information to the benefit-cost studies.

Rating of economic information

The current review has sought to identify studies that incorporate a comprehensive benefit-cost analysis, attempting to capture the total benefits and costs to society of implementing specific sentencing options.

In fact, few studies of criminal justice policies transcend a simple cost analysis, that attempts to answer questions like ‘what is the cost of punishing, treating or rehabilitating an offender?’ It is here proposed that a benefit-cost study, in addition to these criminal justice costs, should measure the outcomes of sentencing options in relation to crimes prevented, such as welfare payments reduced, employment opportunities generated, income tax revenue increased, and victim costs, both tangible

and intangible, reduced. Our interest is in studies that assess the economic costs and benefits of sentencing.

Papers were selected for the systematic review based on the inclusion of benefit-cost information and rated on the completeness of this benefit-cost information, as follows:

Benefit-Cost Validity Scale - Revised (Cohen & McDougall, 2008 – Appendix 1).

1. 'Partial' Benefit-Cost Analysis

   Costs + benefits in monetary terms, but where some important costs and/or benefits are missing; hence there is a lack of confidence in the direction of the ratio.

2. 'Valid' Benefit-Cost Analysis

   Costs + benefits in monetary terms + some indication that even without full information on costs and/or benefits, the existing data are sufficient to give confidence in the direction of the ratio.

3. 'Comprehensive' Benefit-Cost Analysis

   Costs + benefits in monetary terms + adequate accounting of both costs and benefits to provide some confidence in both the direction and the size of the ratio.

Rating of scientific method

Since benefit-cost analyses are best restricted to those studies that employ an experimental or quasi-experimental design (Weimer and Friedman, 1979; Welsh and Farrington, 2000), the review rated studies on the investigative method employed. The Maryland Scientific Methods Scale (Sherman et al., 2002), also employed by Welsh and Farrington (2000), was used to categorize the study designs. The scale is scored from 1, low, to 5, high, and its core criteria are as follows:

Maryland Scientific Methods Scale

1 Reporting of a correlation coefficient denoting the strength of the relationship between, for example, a particular intervention and its effectiveness in preventing re-offending at a given point in time.

2 Reporting of a comparison group present but which lacks comparability to the target group, or where no comparison group is present, reporting only before and after measures for the target group.

3 Reporting of a controlled experimental design with comparable target and control groups present, for example, one group of offenders sentenced to imprisonment with a particular treatment intervention and a comparable group of offenders sentenced to imprisonment only, with pre-post comparisons being made and experimental-control comparisons on (a) specific variable/s.

4 Reporting of a controlled experimental design, as in 3 above, but with additional controlling for other variables that might pose a threat to the interpretation of results. Examples of controlling extraneous variables may include, but are not limited to, the use of statistical procedures or matching of individuals.

5 Reporting of a fully randomized experimental design in which target and control groups consist of randomly assigned individuals and appropriate measures are taken to test for the effects of the intervention.

Coding of studies

The two independent reviewers extracted information from hard copies of the selected articles using a specially designed data extraction sheet, and rated and coded the data (Appendix 2). If the reviewers agreed on their ratings of the papers and the coding of the data extracted, the data was entered into Microsoft Access for compilation and analysis. Any disagreements between the reviewers were resolved

through meetings and discussion. Where resolution could not be reached, a third, qualified independent reviewer was called upon to arbitrate. The final report included details of the studies selected for inclusion in the review, as well as a narrative summary of the overall findings. No historical record of agreement between reviewers is available.

Description of studies

From the searches 1608 articles were obtained for the period ranging from 1980 to 2001. Two independent reviewers, one an economist and the other a psychologist, carried out a pre-screening of these articles before hard copies were obtained. From the original 1608 articles identified, 339 were selected for final review. Following a second rigorous screening a further 110 were eliminated, a substantial proportion of which were one or two page comments and not full research studies. The final number of articles reviewed was 112.

Nine benefit-cost studies were identified; these studies were conducted in either America or Australia. One set of researchers conducted two studies (Pearson, 1988; Pearson & Harper, 1990). Eight studies were found in academic journals; one paper presented key aspects of a larger ongoing study being conducted at the Australian Institute of Criminology. The nine benefit-cost studies, and 11 cost-effectiveness studies used in supporting discussion, are summarised below, with detail provided in Tables 1 and II.

Benefit-cost studies

The following studies included benefit-cost data.

EARLY RELEASE TO RELIEVE PRISON OVERCROWDING, USA, (Austin, 1986). This paper studied the use of early release as a mechanism to relieve prison overcrowding. The author compared a sample of offenders who were released early with a sample who served their full prison term. The cost of processing re-offenders

through the criminal justice system was the main component of costs examined in this case, along with out-of-pocket losses to victims. Benefits estimated were the reduced cost of incarceration. The author concluded that early release did reduce prison crowding and resulted in benefits that exceeded costs. However, significant victim costs such as pain and suffering due to the crimes committed during the period when the offender should have been in prison were not included in the benefit-cost ratio. Hence, the benefit-cost ratio did not take account of full economic costs, raising questions about the direction of the benefit-cost ratio.

HOUSE ARREST WITH ELECTRONIC MONITORING FOR DRUNK DRIVERS, USA, (Courtright, Berg, & Mutchnick,1997). This paper describes a house arrest programme with electronic monitoring in a county in Pennsylvania which was developed to relieve jails of excessive overcrowding. This particular intermediate sentence required offenders to take part in alcohol/drug treatment and pay a daily fee (US$ 8) for the electronic monitoring equipment and a monthly fee for regular supervision (US$ 25). In this study the sample of offenders sentenced to this programme was not compared to a control group. It was noted that only two out of the 57 offenders sentenced committed any technical violations during their term of sentence, but follow-up data on recidivism was not reported. The authors concluded that the substantial savings from this programme were largely due to the strict selection criteria; the fact that the programme was an alternative to incarceration rather than a cheaper sentence and that the same number of days was served under the house arrest programme as would have been served in jail. However, it should be noted that the costs and benefits included in the calculation of the benefit-cost ratio were limited, e.g. the costs of subsequent re-offences were not included. Therefore the direction of the benefit-cost ratio can be questioned.

INTENSIVE IN-PRISON SEX OFFENDER TREATMENT PROGRAMS, AUSTRALIA, (Donato & Shanahan, 1999). This paper provides an overview of key aspects of a large study investigating the economic costs and benefits of implementing in-prison sex-offender treatment programs for male sex offenders against children. The study is based on ongoing research at the Australian Institute of Criminology on benefit-cost analyses in criminal justice. Though the Scientific Methods Scale rating of the study was low, being a review of existing studies, this was a classic economic evaluation. Donato and Shanahan did not have one comprehensive program evaluation for which a benefit-cost analysis had been conducted. Instead, they essentially pieced together pieces of various studies to arrive at an estimate of average costs and benefits for in-prison cognitive-behavioral sex offender treatment programs. The benefit-cost analysis in this study included intangible and tangible benefits, and social and health costs, allowing classification as a 'comprehensive' benefit-cost analysis. From this study Donato and Shanahan concluded that sex offender treatment programs in prison are cost-beneficial – since the benefits of reduced victim costs from lower recidivism exceed the costs of the treatment programs. Because the benefits included both tangible and intangible costs to victims as well as the criminal justice costs associated with recidivists, and costs appeared to be comprehensively estimated, the Donato and Shanahan study has been rated a 'comprehensive' benefit-cost study.

SENTENCING DECISIONS FOR BURGLARS, USA, (Gray & Olson, 1989). This study provides a detailed description of the steps involved in carrying out a benefit-cost analysis of a sentencing option, calculating the social benefits and social costs of sentencing burglars to imprisonment or probation. The authors used self-report and official arrest data published in a previous study by Haynes and Larsen (1984) to estimate the number and type of crimes committed by burglars after a sentence to

prison, jail or probation, and concluded that a sentence of probation was cost-beneficial compared to a prison or jail sentence. However, offenders had not been randomly sentenced to probation, jail or prison, and Gray and Olson did note that the less serious offenders were sentenced to probation. Benefits were estimated to be the monetary value of reduced recidivism from each sentencing alternative, however, except in the case of murder these benefits excluded intangible costs of pain and suffering to victims. If intangible costs of crime were included, the benefit-cost ratio might indeed switch signs and the incarceration alternatives might be found to be beneficial. Thus, we have rated this a 'partial' benefit-cost study.

DRUG TREATMENT (PRE-TRIAL DIVERSION), USA, (Mauser, Van Stelle, & Moberg, 1994). This study evaluated the economic impact of treatment alternative programs (TAP) by examining the benefit-cost of diverting offenders from the criminal justice system into substance abuse treatment. A total of 259 offenders were admitted to the TAP program during a one-year period. Of these, TAP data was successfully collected from 76 people. The program calculated the benefits and costs associated with running the program in order to evaluate whether the resources allocated for treatment yielded benefits that outweighed the costs. The study concluded that pre-trial diversion to drug treatment was cost-beneficial, but the main outcome measure was in savings to the criminal justice system by averting prison costs. Since Mauser et al. (1994) found that the program actually resulted in fewer crimes, there were no additional victim costs to estimate. However, because victim costs were not estimated, the benefits of the program were understated. Thus, while one could conclude that the benefits of this pre-trial drug treatment diversion program exceed its costs, the study under-estimates the benefit-cost ratio; hence we rate this as a 'valid' but not 'comprehensive' benefit-cost study. (However, note that the study itself only received a score of 1 on the Scientific Methods Scale)

INTENSIVE SUPERVISION PROGRAM, USA. (Pearson, 1988; Pearson & Harper,1990). This paper examined the costs and benefits of an Intensive Supervision Program (ISP) in New Jersey. This intermediate sentence incorporated a short period of 'shock' incarceration followed by intensive supervision that included frequent face-to-face contacts, curfew checks and drug tests. The program excluded violent offenders and required its participants to be employed (if fit for employment) and provide a minimum of 16 hours/month of community service. The experimental and control groups were matched on the basis of socio-demographic factors and prior criminal records. They found that ISP cost less than prison and yielded lower levels of recidivism than the control group that was sentenced to prison. Hence, even if we incorporated the intangible benefits of reduced crime into the equation, the basic result - that the benefits of the intensive supervision program exceeded its costs - would still hold (even more so). Thus, this is a 'valid' (but not 'comprehensive') benefit-cost study. In addition to the validity of the Pearson and Harper (1990) benefit-cost ratio, the study was also one of the better research designs.

IMPRISONMENT, USA, (Piehl & DiIulio,1995). This paper evaluated the costs and benefits of incapacitation based on the results of a prisoner 'self-report of offending' survey, conducted in New Jersey, USA, in 1993 of a random sample of 4 percent of recent male entrants to the State's prison population. Piehl and DiIulio studied the costs and benefits of incapacitation and compared the costs of an additional year in prison to the value of reduced crimes. They found that prison was cost-beneficial for most offenders except for drug offenders who cost more to keep in prison than the benefits of their imprisonment. They did however point out that the incapacitation of criminals is subject to the law of diminishing returns, and were clear that in the case of less prolific offenders, or for example drug offenders, prison was not cost-beneficial. Although this study did not receive a high rating on the Scientific Methods

Scale, it was a classic economic evaluation. Piehl and DiIulio, used known costs of incarceration, assessments of re-offending rates from a prisoner self-report survey of 711,000 adults, and savings in crimes averted by incapacitation (including both tangible and intangible victim costs). Thus this study was rated as a 'comprehensive' benefit-cost analysis.

CHILD SEX OFFENDER TREATMENT, USA, (Prentky & Burgess, 1990). This study presented a 'valid' benefit-cost analysis of treatment for child molesters in a maximum-security residential facility. The Scientific Methods Scale rating was low, as there was no control group, with recidivism rates being based only on treated residents on release. Data for untreated offenders was drawn from a study by Marshall and Barbaree conducted in 1988. The program evaluated the costs of incarceration against the benefits, including averted criminal justice costs and tangible victim costs, so providing a 'valid' benefit-cost analysis. The authors concluded that in-prison sex offender treatment programs were cost-beneficial. Because intangible victim costs were not included in the benefits, this is not a 'comprehensive' benefit-cost study; hence the benefits are likely to be higher than estimated.

FAMILY AND JUVENILE OFFENDER TREATMENT PROGRAMMES, USA, (Roberts & Camasso, 1991). The authors first presented a comprehensive discussion of benefit-cost analysis and its application to the assessment of public services. A detailed benefit-cost analysis was then performed to assess two treatment programs targeting juvenile offenders. In the first study of a family treatment program, no control group was present. In the second study of a youth wilderness program, follow-up data were obtained for 60 youths who had completed the treatment and 60 who were placed on parole instead. Recidivism was much less for the youth wilderness program group than the parole group. The costs of running the family treatment program and the youth wilderness program were compared to the program

benefits, which included averted criminal justice, victim and welfare costs, as well as increased earnings. Both the family treatment program and the youth wilderness program were considered by the authors to be cost-beneficial, though only the youth wilderness program had an acceptable rating on the Scientific Methods Scale. Both were assessed as providing a 'valid' benefit-cost analysis, as they did not include intangible victim costs and thus benefits are likely to be higher.

Cost-effectiveness studies

HOUSE ARREST WITH ELECTRONIC MONITORING, USA, (Glaser, & Watts, 1992). This paper examined the cost-effectiveness of electronic monitoring devices with non-violent drug offenders. It presented a comparison of the post-release records of 126 drug offenders sentenced to probation by house arrest with electronic monitoring and the records of 200 drug offenders on probation without electronic monitoring in Los Angeles. The authors concluded that house arrest and electronic monitoring was more cost-effective than probation alone.

INTENSIVE SUPERVISION, USA, (Latessa, 1986). This article reviewed what is known about the cost-effectiveness of providing intensive supervision to offenders who would otherwise be incarcerated. Included in this study is a review of a paper (Fallen et al., 1981) which evaluated intensive supervision with low risk parolees who were granted early release compared to prisoners who were not granted early release. Whilst the authors concluded that intensive supervision was cost-effective, they did not include the cost of imprisonment and re-parole following revocation of intensive supervision.

INTENSIVE SUPERVISION, WITH JUVENILE OFFENDERS USA, (Wiebush, 1993). This paper examined Juvenile Intensive Supervision (ISP) programs in terms of cost-effectiveness and reducing recidivism. The authors used a quasi-experimental design with comparison groups consisting of three groups: young offenders on ISP;

juvenile felons on institutional placement with the Department of Youth Services (DYS) + parole (DYS); and young offenders on probation. Several different measures of recidivism were used during an 18-month follow-up. The authors concluded that ISP could be cost-effective with large-scale diversion, but not cost-effective with small numbers due to the on-going costs of providing the ISP structure regardless of numbers.

INTENSIVE SUPERVISION PROGRAM, USA, 1993, (US General Accounting Office, 1993). This paper outlines the main findings of a report that evaluated the effectiveness of intensive supervision (ISP) in Arizona State, USA, in relation to controlling crime and its value as a cost saving alternative to incarceration. The authors compared a sample of offenders on ISP with those imprisoned and on probation. The authors were unable to conclude that the intensive supervision was cost-effective, though did nevertheless consider that ISP programs have a role in corrections policy.

INTENSIVE SUPERVISION PROGRAM, USA, (Turner & Petersilia, 1992). This paper presents the results of a randomised controlled experiment into the cost-effectiveness of intensive supervision parole programs in Texas State, USA. Intensive supervision was compared with parole. The authors concluded that ISP was not more cost-effective than parole.

JUVENILE COURT INTERVENTIONS, AUSTRALIA, (Coumarelos, 1994). This report studied the persistence of juvenile offending and the cost-effectiveness of interventions used to divert juvenile offenders from re-offending. The study was conducted in two parts: firstly it investigated whether it was possible to identify in advance those offenders who were likely to re-appear in court numerous times; and secondly it identified the most cost-effective point in a juvenile's criminal career to introduce strategies designed to decrease the likelihood of recidivism. The

effectiveness of the intervention was measured by reduction in recidivism among juvenile offenders. The author concluded that early juvenile interventions were cost-effective, but cost-effectiveness increased the later in the court appearance chain intervention occurred.

IN-PRISON THERAPEUTIC COMMUNITY TREATMENT, USA, (Griffith, Hiller, Knight, & Simpson, 1999). This paper assessed the cost-effectiveness of a prison-based therapeutic community (TC) using three-year outcome data for 291 treated and 103 untreated parolees in Kyle, Texas. Data was also available on a matched untreated comparison group of 103 parolees from the general prison population. The authors calculated daily treatment TC costs, facility costs, parole, and aftercare costs. It was concluded that in-prison therapeutic community treatment was more cost-effective than incarceration without treatment.

IN-PRISON THERAPEUTIC DRUG COMMUNITY, USA, (Fabelo, 1997). This paper examined an in-prison therapeutic community (IPTC) program vs. probationers taking part in a substance abuse felony diversion programme (SAFP) in Texas. The IPTC was not found to be more cost-effective than traditional incarceration, though SAFP was found to be more cost-effective.

CORRECTIONAL EDUCATIONAL PROGRAM, USA, (Taylor, 1992). This article reviewed the cost-effectiveness of post-secondary correctional education (PSCE) programs compared to incarceration alone in terms of the cost of crimes committed post-release. It was noted that the availability of various funding structures meant that institutions could support a PSCE at little or no direct cost to their budget. The author concluded that PSCE programs were cost-effective.

BOOT CAMPS, USA, (Burns & Vito, 1995). This paper evaluated the Alabama Boot Camp (ABC) Program in terms of its key outcomes of recidivism and cost-effectiveness. The program targeted first time young offenders by exposing them to a

tough military style disciplinary regime for a period of 90 days. The authors concluded that the boot camp was more cost-effective than incarceration due to the lower implementation costs of boot camps, though there was no difference in subsequent recidivism between the groups.

DRUG TREATMENT (PRE-TRIAL DIVERSION) USA (Van Stelle, Mauser, & Moberg, (1994). This paper described a community-based treatment alternative program (TAP) for repetitive drug offenders as a diversion from imprisonment. The authors concluded that diversion to TAP was more cost-effective than incarceration. This evaluation is also reported in a separate benefit-cost report, described earlier (Mauser et al, 1994).

Methodological quality

Benefit-cost studies

Overall, the scientific quality of the design used in the studies was poor. Only three studies (Austin 1986; Pearson & Harper, 1990; Roberts & Camasso, 1991) had control groups with pre- and post-measures. Of these, the Pearson and Harper (1990) and Roberts and Camasso (1991) studies had 'valid' benefit-cost ratios. Six of the studies were rated as having either 'valid' or 'comprehensive' benefit-cost ratios (level 2 or 3 on the Benefit-Cost Validity Rating Scale - Revised) however confidence must be diminished where the research design was poor.

The range of benefits and costs reported in the benefit-cost studies, Table 1, varied greatly. The range of costs included costs of parole supervision, sex and drug treatment, property loss, foregone earnings and social costs, and benefits included averted prison costs, criminal justice costs, costs of rehabilitation, incapacitation and jail days saved). All nine of the studies reported the tangible benefits and costs of the sentencing option. Only two studies (Donato and Shanahan 1999; Piehl and DiIulio 1995) attempted to place monetary value on the intangible costs of pain and suffering.

The benefit-cost ratios shown in Table 1 were reported from a number of different sources. For example in two of the nine papers (Mauser et al. 1994; Piehl & DiIulio 1995) the ratios were simply reported as stated in the papers. In four of the nine papers (Austin 1986; Gray & Olson 1989; Pearson & Harper 1990; Prentky & Burgess 1990) the benefit-cost ratios were reported as stated in the Welsh and Farrington (2000) review. In the remaining three papers (Courtwright et al., 1997; Donato & Shanahan 1999; Roberts & Camasso 1991) the benefit-cost ratios were calculated by Swaray (co-author), dividing the benefits by costs using total or average measures provided by the study authors. Although one cannot draw any conclusions about whether these differences are “large” or “small” given the lack of comparable data on the variance of their estimates, we note that there was a wide variation in the benefit-cost ratios presented in the nine studies (ranging from 0.16 to 4.02) suggesting savings of between $0.16 to $4.02 per dollar spent on the sentencing option.

Cost-effectiveness studies

The scientific rigour and methodology used in many of the cost-effectiveness studies was also poor. Only one study was conducted as a randomised controlled trial (RCT), five were controlled trials, one was a quasi-experimental design, one was a cohort study and three were review articles. The lack of emphasis on appropriate outcome measures such as reduction in crime and/or re-offences that are the ultimate goal of most interventions, was common in many studies in this section. There was often confusion between sentencing intervention outputs, such as programme completion, and their outcomes, i.e. re-offending, thus making it difficult to assess the full impact of the sentencing intervention on crime and re-offending levels.

The costs incurred were often in the form of direct costs of the sentence. These included but were not restricted to costs of monitoring equipment, supervision,

custody, courts, and cost savings that resulted from implementation of a particular sentencing alternative.

Overall eight of the eleven studies claimed the target sentencing option to be more cost-effective than the alternative sentencing option; two studies were inconclusive and in one study (interestingly with the most rigorous design – an RCT) the target sentence was found not to be cost-effective. Whilst the majority of the studies identified in this review were concluded by the authors to be cost-effective, the results should be interpreted with caution. All of the sentencing option categories contained a small number of studies comparing slightly different sentencing options (e.g. intensive supervision vs. parole and intensive supervision vs. incarceration) with different sample groups, and differing degrees of rigor. Therefore only limited conclusions can be drawn about the overall cost-effectiveness of different sentencing options.

Results

The following results are based on the conclusions of their authors in terms of the benefit-cost of sentencing, but should be read taking account of the methodological weaknesses described above.

Benefit-cost studies

Studies found to have either ‘comprehensive’ or ‘valid’ benefit-cost analyses from the systematic review were:

‘Comprehensive’ benefit-cost analyses

SEX OFFENDER TREATMENT PROGRAMS IN PRISON. Donato and Shanahan (1999) concluded that sex offender treatment programs in prison are cost-beneficial when compared to imprisonment alone. The estimated benefit-cost ratio of sex offender treatment programmes in prison was in the range of 0.60:1 to 3.98:1, depending on the level of cost assigned to providing the program, based on the

assumption that a person who re-offends is caught and re-convicted after attacking only one victim. The authors concluded that the sex offender programmes were likely to have higher benefits than costs. Of course, that is a judgment of the authors, even though their estimated benefit-cost ratio might be below one in some cases.

IMPRISONMENT FOR HIGH RISK REPEAT OFFENDERS was found by Piehl and DiIulio (1995) to be cost-beneficial when assessed by calculation of the impact of sentencing to an extra year in prison, but with diminishing returns as length of sentence increases. For the offender who commits 12 crimes per year, the benefit-cost ratio is 2.80:1, falling to 0.36:1 when drug offenders are also included. They conclude that 'prison pays' for violent prisoners who pose a real danger to the physical safety of communities, but it does not pay for all prisoners, and specifically it does not pay for convicted drug offenders.

'Valid' benefit-cost analyses

SEX OFFENDER TREATMENT PROGRAMMES IN PRISON (Prentky & Burgess, 1990) are cost-beneficial compared to imprisonment alone. The authors estimate a benefit-cost ratio of 1.16:1.

DRUG TREATMENT PRE-TRIAL DIVERSION FROM IMPRISONMENT (Mauser et al, 1994) is cost-beneficial compared to imprisonment. The authors estimate a benefit-cost ratio ranging from 1.80:1 to 3.82:1, depending on the assumption made about the cost of incarceration.

INTENSIVE SUPERVISION FOLLOWING SHOCK INCARCERATION (Pearson, 1988; and Pearson & Harper, 1990) is cost-beneficial when compared to imprisonment. The authors estimate the benefit-cost ratio at 1.48:1.

YOUTH WILDERNESS TRAINING and FAMILY TREATMENT PROGRAMS (Roberts & Camasso, 1991) are cost-beneficial when compared to sentencing

offenders to parole, on the basis of reduced re-offending. The authors estimate the benefit-cost ratios respectively at 125:1 and 270:1.

Caution is advised in drawing conclusions from these results, however, as, although the benefit-cost analyses of these studies were assessed to be either 'comprehensive' or 'valid', the quality of the research design of these studies, as rated by the Scientific Methods Scale, was variable.

Three of the nine studies identified were only rated as 'partial' cost benefit studies i.e. because of some missing cost or benefits information, one could not be confident in the direction of the benefit-cost ratio. All three studies recorded the experimental intervention as being cost-beneficial, but there should be caution about the direction of the benefit-cost ratio.

THE EFFECTIVENESS OF PROBATION vs. PRISON (Gray & Olson, 1989). The authors concluded that probation was more cost-beneficial than prison. The benefit-cost ratios were 1.70:1 for probation, 0.24:1 for prison, and 0.17.1 for jail.

PRISONERS RELEASED EARLY FROM PRISON vs. THOSE SERVING A FULL PRISON TERM (Austin, 1986). The author concluded that early release from prison was cost-beneficial. The estimated benefit-cost ratio was 2.82:1.

USE OF HOUSE-ARREST WITH ELECTRONIC MONITORING vs.PRISON (Courtright et al, 1997). The authors concluded that house arrest with electronic monitoring was cost-beneficial when compared to prison. The estimated benefit-cost ratio was 4.02:1.

Cost-effectiveness studies

Eleven cost-effectiveness studies were identified, having cost information but non-monetized benefits.

Studies found by their authors to be cost-effective were:

- drug treatment diversion from prison compared to imprisonment (Van Stelle, 1994).

- post secondary correctional education programs (PSCE) while imprisoned, compared with imprisonment alone (Taylor, 1992).
- diversion from incarceration to a community-based substance abuse felony punishment program (SAFP), (Fabelo, 1997).
- an in-prison therapeutic community + residential and supervised after-care (Griffiths et al., 1999) compared with traditional imprisonment
- a traditional boot camp, compared with imprisonment (Burns & Vito, 1995)
- use of house arrest and electronic monitoring for non-violent drug offenders (Glaser & Watts , 1992) compared with probation without electronic monitoring;
- early juvenile interventions to divert juvenile offenders from re-offending (Coumarelos, 1994).

Caution should be taken in accepting these conclusions due to the variable quality of research designs.

Four studies reported contradictory results for the cost-effectiveness of intensive supervision; one study (Latessa, 1986) showed intensive supervision to be more cost-effective than imprisonment; one study was inconclusive regarding the cost-effectiveness of intensive supervision when compared with an institutional placement or traditional probation (Wiebush, 1993); one study reported mixed results (US General Accounting Office, 1993) comparing intensive supervision with offenders imprisoned, or on probation; and one study found intensive parole supervision not to be cost-effective when compared with traditional parole (Turner et al., 1992).

Discussion

As demonstrated by this systematic review, only a small number of benefit-cost studies of sentencing were published between 1980 and 2001. Of the nine studies identified, only six were rated as ‘comprehensive’ or ‘valid’ benefit-cost analyses,

and of these only two studies scored 3 or above on the Maryland Scientific Methods Scale. Three of the nine benefit-cost studies were rated as 'partial' benefit-cost studies, therefore no firm benefit-cost conclusions can be drawn from them. There were 11 cost-effectiveness studies where costs, but not benefits, were monetized, which were used as supporting evidence.

Perhaps the strongest conclusions come from the studies of in-prison sex offender treatment programs. Two of the benefit-cost studies we identified assessed in-prison sex offender programs – and both found them to be cost-beneficial. One of these studies (Donato and Shanahan 1999) was not in itself a program evaluation, but instead estimated costs and benefits based on numerous program effectiveness studies. While this particular study would thus rate low on the Maryland Scientific Methods Scale, (Sherman et al., 2002) it is of considerable value as a benefit-cost study, especially once it is coupled with the fact that Sherman et al. (2002) found these programs generally to work. The two studies (Donato & Shanahan, 1999; Prentky & Burgess, 1990) both found that sex offender treatment program benefits exceeded their costs, lending some degree of confidence to this finding.

'Comprehensive' or 'valid' benefit-cost studies were also found for drug treatment diversion, intensive supervision, imprisonment for high risk offenders, and Youth Wilderness Training programs. Findings from two of these studies run contrary to other research. Pearson and Harper (1990) found that an intensive supervision program (ISP) was more effective in reducing recidivism than a control group, and was cost beneficial. This finding is interesting since, as well as having a 'valid' benefit-cost ratio, the study also warranted a level 3 rating on the Scientific Scale for research design, having a control group matched on socio-demographic details, prior offence details and current offence. The result is however contrary to other findings on effectiveness of intensive supervision programs (Sherman et al.,

2002), and there is little support from the ISP programs assessed for cost-effectiveness in this review, since only one of the four ISP cost-effectiveness studies (Latessa, 1986) concluded that ISP was cost-effective. The Pearson and Harper (1990) program did however combine punishment and intensive supervision, which has not been widely studied (Sherman et al., 1997). This suggests that this combination intervention may be worthy of further research.

Similarly, Roberts & Camasso (1991) found Youth Wilderness Training to be cost-beneficial when compared to a comparison group of offenders subject to parole. This finding was again contrary to other research evidence as presented by Sherman et al., (2002) who stated that there was no evidence that programs of the type described as Youth Wilderness Training were effective in reducing reconvictions. The Roberts and Camasso (1991) study was however well designed (Rated 3 on the Scientific Methods Scale) and was judged to have a 'valid' benefit-cost analysis. Caution should however be taken in accepting results from one study, which is contrary to most of the other research evidence.

The cost-effectiveness study of boot camps (Burns & Vito, 1995) similarly appeared to go against previous research evidence in finding that a boot camp sentence was more cost-effective than incarceration. Burns and Vito did however lend support to the Sherman et al (2002) conclusions on boot camps, as they agreed that there was no difference between incarceration and boot camps in reducing recidivism, but the costs for the boot camp were less than for imprisonment. Again, caution is advised in accepting results from one study.

In the case of imprisonment, Piehl and DiIulio (1995) concluded that 'prison pays for most state prisoners' who comprise either violent or repeat offenders and/or who present a real danger to the physical safety or property of their community. However Piehl and DiIulio also concluded that for 25% of the sample group,

essentially made up of offenders committing auto thefts at a rate of 3 a year, burglaries at a rate of 6 a year, and petty thefts at a rate of 24 a year, costs of imprisonment outweighed the social benefits of imprisonment. This was particularly true of drug offenders. Piehl and DiIulio concluded that there could be savings of 25% if the prison sample under study were given a non-custodial sentence. A second study (Gray & Olson 1989) compared the costs and benefits of incarceration vs. probation with respect to burglars and found that the greatest benefit-costs were derived from probation. There were however reservations about this latter study as the benefit-cost analysis was incomplete, i.e. it excluded the benefits from offences saved during a period of imprisonment, and the probation group was made up of less serious offenders.

Similar problems of omission applied to the Austin (1986) study of early release from prison. Although Austin (1986) claimed the early release program was cost-beneficial, not all of the costs of offences following early release were included in the benefit-cost analysis, therefore raising questions about the conclusions. In particular, while Austin (1986) included the criminal justice costs associated with reprocessing repeat offenders as well as the out-of-pocket costs to victims of crime, he did not account for the intangible losses to victims. A re-analysis of the Austin study (Cohen, 1988) noted that the cost of a rape was assumed to be only about $350 in his study – compared to about $51,000 that Cohen (1988) estimated as the true cost of a rape when including the intangible victim costs. Using these figures, Cohen (1988) reached the opposite conclusion – that Illinois would have benefited from keeping those prisoners incarcerated and building more prisons rather than incur the additional costs associated with crimes committed by recidivists. While the government may have saved taxpayer dollars, that saving was more than offset by the burden borne by crime victims.

Both the Piehl and DiIulio (1995) and the Gray and Olson (1989) studies however argue that the benefits to society derived from incarcerating offenders depends on the type of crimes that offenders commit, and (Piehl & DiIulio, 1995) on the costs of their crimes to society. These studies point to the value of further research on costs and benefits of imprisonment for different types of offender.

There was evidence (Mauser et al, 1994) that pre-trial diversion of drug abusing offenders to treatment programs (Treatment Alternative Programme – TAP) was cost-beneficial, this study having a 'valid' benefit-cost analysis, though the Scientific Methods Scale rating was low. The authors reported a reduction in criminal activity after treatment and in turn savings to the criminal justice system. These savings were mainly due to the treated offenders spending fewer days in prison and committing fewer crimes.

The conclusions from the pre-trial diversion study (Mauser et al., 1994) were supplemented by a cost-effectiveness study by Van Stelle, Mauser and Moberg (1994) who examined recidivism following the TAP programme. The authors concluded that diversion to TAP was more cost effective than incarceration, however again there were problems in design as the control group was made up of program non-completers, who are likely to be inherently different from program completers.

Though Courtright et al (1997) claimed that house arrest with electronic monitoring was cost beneficial, the reviewers were unsure that the benefit-cost ratio might not change when the full costs of further offending during electronic monitoring were included. Also the Scientific Methods Scale rating was low. There was support from one cost-effectiveness study (Glaser & Watts, 1992) that concluded that house arrest and electronic monitoring of offenders on probation was more cost-effective than probation alone, though it was also rated low on the Scientific Methods Scale. Much of the effectiveness research on electronic monitoring does not support

the view that electronic monitoring has any impact on re-offending; Dodgson, Goodwin and Howard, (2001) found electronic monitoring to be 'neutral' in terms of re-offending, and Bonta, Wallace-Capretta and Rooney (2000) that electronic monitoring had no impact on re-offending. The results from the house arrest and electronic monitoring study should therefore be treated with caution.

The remaining cost-effectiveness studies were on different sentencing options than the benefit-cost studies. Two studies (Griffith et al, 1999, Fabelo, 1997) examining in-prison therapeutic community treatment programmes produced contradictory results, with one concluding cost-effectiveness of the program, and the other concluding that the program was not cost-effective. Post-secondary correctional education (PSCE) (Taylor, 1992), and juvenile court interventions (Coumarelos, 1994), were found by their authors to be cost-effective interventions. Both of these were review papers with cost analyses; Coumarelos analysed patterns of offending using a mathematical model. In the literature there is little similar research on PSCE and timing of juvenile court interventions, to support these findings, therefore these research topics should be considered worthy of follow-up.

In conclusion, it should be emphasised that passing a benefit-cost test does not mean that a study was well designed in the first place. Few of the benefit-cost and cost-effectiveness studies had Scientific Methods Scale ratings of an acceptable level, and only one study was a randomized controlled trial. Thus, an important lesson to be learned from this exercise is that it is not sufficient to rely upon one or two benefit-cost studies to draw any policy inferences, where research design is weak. Instead, one must look for supporting evidence of effectiveness in other well-designed studies, before any reliance can be placed on the benefit-cost information obtained. It should be noted however that a number of the studies included in this review used classic economics methods of extracting information from existing datasets and previous

effectiveness studies, and these approaches should be explored further in developing appropriate benefit-cost methodologies in criminal justice settings. As demonstrated by the studies in this review, where sufficient information is available, it should be possible to apply cost and benefits calculations retrospectively to well-designed effectiveness studies.

Reviewers' conclusions

Implications for practice

The value of research evidence in development of government policy internationally is increasingly being recognised, and in the UK it is evident that research has had an influence on proposals for sentencing reform (Halliday, 2001). Indeed the current systematic review of the costs and benefits of sentencing was commissioned with a view to informing the development of sentencing policy in the UK, and demonstrates the growing interest in the costs and benefits of the policies that are being developed.

The original guiding principles for the initiative on UK sentencing reform were clearly based on earlier research evidence on effectiveness in reducing reconvictions, which recommended a combination of rehabilitation within a 'punitive' envelope (Halliday, 2001). This approach is broadly based on the research evidence (Goldblatt, Nuttall & Lewis, 1998; Sherman et al, 1997) and takes into account the potential impact of educational and rehabilitative interventions, and the recognition that punitive options alone have been found to be ineffective in reducing reconvictions.

Evidence from the small number of studies in this review of the costs and benefits of sentencing would suggest that combining rehabilitation with structure may be cost-beneficial, for example incorporating sex offender treatment programs into custodial sentences (Donato & Shanahan, 1999; Prentky & Burgess, 1990). These

were found to be cost-beneficial, as were alternatives to prison such as pre-trial diversion to drug treatment, (Mauser et al., 1994). Two studies (Gray & Olson, 1989; Piehl & DiIulio, 1995) in the systematic review may contribute to public discussion about the use of imprisonment for particular offences, e.g., burglary. These studies give an economic assessment which may not always fit comfortably with a political perspective. However, it is evident that consideration should be given in policy development to determining at which point imprisonment ceases (or begins) to be cost-beneficial and a non-custodial alternative becomes appropriate in economic terms. To date there is no specific research guidance on this, nor evidence on the types of offender for which a custodial sentence is or is not cost-beneficial. This is an appropriate question for further research.

Implications for research

As has become evident in the current systematic review, there are no standardized methods of calculating costs and benefits in order to produce a 'comprehensive' and 'valid' basis for calculating benefit-cost ratios, that can be used to directly compare different sentencing options (for example imprisonment vs. a community penalty). In agreement with the findings of Welsh and Farrington (2000), future research should focus upon developing a standardized methodology for calculating the relative benefit-cost of criminal justice programs. This would allow direct comparison to be made about the benefit-cost of different sentencing options.

Future direction requires that any intervention being used as the basis for benefit-cost analysis should first have a rigorous research design, preferably a randomized controlled trial, and that sufficient costs and benefits information should be available to conduct a 'comprehensive' benefit-cost analysis, leading to confidence in both the size and direction of the benefit-cost ratio. An alternative approach beyond the scope of this systematic review would be to review studies of sentencing

effectiveness and carry out meta-analyses if appropriate. In cases where there was sufficient detail about the research design and outcome data, then calculation of costs and benefits could be possible.

Since there is so little research on the benefit-cost and cost-effectiveness of sentencing, there is a clear direction for future research. An update of this review of the costs and benefits of sentencing is urgent, since in recent years there has been a recognition of the need for higher quality research, due to Campbell Collaboration initiatives, and it is anticipated that more recent research on sentencing will have been influenced by this message. In addition, strategies for implementation of new sentencing policies should incorporate a planned evaluation, designed to be rigorously conducted to quality research standards, as a basis for 'comprehensive' benefit-cost analyses. Simultaneously there is a need for routine application of benefit-cost analyses in research studies on sentencing and for development and standardisation of benefit-cost analysis techniques, as highlighted by Welsh and Farrington (2000). Only in this way will our store of knowledge on sentences be improved so that we can know *What Works*, *With Whom*, at *What Cost* and with *What Benefits.*

Acknowledgements

We would like to thank Dr. Carol Ostell, Dr. Rania Marandos, Hédinn Björnsson and Judith Jackson for their contributions to the preparation of an earlier report to the Home Office in the U.K. (McDougall, Swaray & Perry, 2002) and to the Centre for Reviews and Dissemination at the University of York for their invaluable assistance with the database searches and staff training

Potential conflict of interest

The authors published an article in the Annals of the Academy of Political and Social Science based on preliminary analyses of the benefit-cost studies presented in this review (McDougall, et al., 2003), and a chapter on 'Policy choices for a safer society: costs and benefits of sentencing' in the Welsh and Farrington edited book on 'Preventing crime: What works for children, offenders, victims and places', (McDougall, C., Cohen, M., Swaray, R., & Perry A., 2006).

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Appendix 1

Benefit-Cost Validity Scale - Revised[1]

As noted above, benefit-cost analysis is relatively new to the criminal justice policy arena. Few criminal justice policy analysts have extensive economic training, and even if they do, only recently have researchers begun to fully assess the impact of crime by estimating the monetary value of the intangible costs of crime. Studies that include extensive cost information might include little if any 'effectiveness' information, thus precluding any benefit-cost comparison. Others might have extensive cost and benefit information but ignore one important component of costs or benefits that would preclude researchers from drawing valid conclusions about the benefit-cost ratio. With these limitations in mind, we have developed a "Benefit-Cost Validity Scale" designed to rate each study by the extent to which benefit-cost methodologies have been employed and a valid benefit-cost conclusion can be drawn.

Our approach is similar to that used by Sherman et al. (1997) who develop a "Scientific Methods Scale" (shown above) to measure the strength of the cause-effect evidence in studies examining the effectiveness of intervention programs. The Scientific Methods Scale is increasing in the level of sophistication designed into the study in question. Thus, the highest rating, 5, is given to studies that have a fully randomised experimental design involving both target and control groups, while a rating of 3 or 4 is given to studies involving control groups (but not randomised designs), with the higher rating being given to studies that use more sophisticated statistical or matching procedures to design the control group. Below 3, studies

[1] Note that an earlier version of the Benefit-Cost Validity Scale had included two earlier stages in the hierarchy to allow for studies that only estimate costs (not benefits) and those that examine cost-effectiveness. Since the focus of this study is benefit-cost analysis, we have revised the scale accordingly.

generally do not have a control group and thus their scientific validity is often questioned.

The proposed “Benefit-Cost Validity Scale” was developed using a similar approach. The purpose of the scale is to measure the extent to which the methodology being employed in a benefit-cost study is sufficiently developed so that conclusions can be drawn about a program’s costs and benefits. Thus, a higher number on the Benefit-Cost Validity Scale indicates that the cost and benefit information is generally more complete and can be used for more policy analysis purposes than a lower number.

While it is useful to distinguish between “costs” and “benefits,” whether or not a particular item is a cost or a benefit may ultimately be a semantic issue. For example, consider an early release program that is designed to save the government money by reducing the cost of operating a prison. Is the reduced operating expense a “cost” or a “benefit?” While it is ostensibly a “benefit” of the early release program, it might also be considered a “cost” of keeping the offenders in prison. Similarly, is the fact that early release results in higher crime (through recidivism) a “cost” of early release or a “benefit” of keeping offenders in prison? As this example shows, one can flip the question around and turn a cost into a benefit. While largely semantic and of no consequences when drawing policy conclusions, this is actually an important issue when deciding on how to construct a Benefit-Cost Validity Scale. In order to avoid confusion in constructing our scale, we have defined “costs” to be program expenses - such as prisons, courts, treatment programs, etc. as well as “averted costs.” Thus, for example, the cost avoided by not building a new prison and instead letting offenders out early would be included in assessing whether or not costs have been estimated. Similarly, “benefits” are generally defined to be monetary valuations of program effectiveness measures - even if the study in question considers these to be costs. For

example, while an early release program that results in a higher recidivism rate might call the additional crime a "cost" of early release, for purposes of determining the Benefit-Cost Validity Scale, we categorize those additional crimes as being a "benefit" of longer prison sentences.

Figure A-1 lists numerous cost and benefit categories that one might expect to find in a benefit-cost analysis of a criminal justice program. Not all of these cost and benefit categories will necessarily apply to each criminal justice program. However, a complete benefit-cost analysis will quantify - and monetize - those that do apply.

We distinguish three levels of benefit-cost studies by the extent to which costs and benefits have been comprehensively estimated, the validity of the reported benefit-cost ratio, and the extent to which inferences can be reasonably drawn. To illustrate the distinction between levels 1, 2 and 3, consider the following hypothetical example. Suppose program evaluators are studying a mandatory drug treatment program that requires offenders to undergo a drug treatment program while in prison. A study that costs these two alternatives (e.g., examines the cost of drug treatment, monitoring and supervision of participants) would be considered a 'cost study.' Similarly, if the study went on to measure re-arrest rates over a 12-month period following release, and were able to determine the "cost per reduced recidivist," the study would be considered a cost-effectiveness study, not a benefit-cost study. Neither of these studies would be included in the Benefit-Cost Validity Scale as they are not attempting to estimate a benefit-cost ratio.

Now, suppose that program evaluators not only estimate this reduced recidivism, but they quantify the <u>tangible</u> benefits to victims of reduced crimes - including reduced medical costs and productivity losses. In this case, a "benefit-cost ratio" might be estimated and the study would be considered at least a "level 1" benefit-cost study. Suppose the study finds that the cost of the drug treatment program

is greater than the tangible benefits of crime reductions. In that case, even though on its face this drug treatment program fails to pass a benefit-cost test, the program evaluation excludes an important component - the *intangible* benefits from reduced criminal victimization. If we were to include those intangible benefits, the benefit-cost ratio might switch signs. Thus, we cannot determine whether or not this program passes a benefit-cost test. We call this study a "partial" benefit-cost study, and assign it a level 1. Despite the attempt to place monetary values on program effectiveness, studies at this level are incomplete and they do not allow the researcher to make any valid benefit-cost comparisons. In reality, without adding additional monetary valuations to effectiveness measures beyond what the study reports, a study at this level is not much better than a cost-effectiveness study in terms of its ability to address serious policy questions.

Studies that are rated 2 are similar to level 1 studies since they monetize some - but not all - benefits. However, the distinguishing feature of a level 2 study is that for purposes of determining whether costs exceed benefits or benefits exceed costs, it does not matter whether the missing information is added to the equation. Thus, a study that rates level 2 will tell us whether or not the benefits of a program exceed its costs. In other words, it will tell us the "direction" of the ratio – do benefits exceed costs? What it will not tell us, however, is the magnitude of the benefit-cost ratio. Since at least some benefit-cost inferences can be drawn from such studies, we call these "valid"benefit-cost studies. Returning to our hypothetical drug treatment program, suppose that even though the researchers did not calculate the intangible benefits of reduced criminal victimization, the *tangible* benefits of reduced criminal victimization more than offset the cost of the drug treatment program. In that case, we could reasonably infer that the treatment program passes a benefit-cost test even though it is not entirely complete. The reason is that even if we knew the intangible

benefits of reduced criminal victimization, we would still conclude that benefits exceed costs, thus we don't need that information to determine the sign of the benefit-cost ratio.

Finally, the highest score, 3, is reserved for studies that allow for a "comprehensive" benefit-cost study. All relevant (and economically significant) costs and benefits are both quantified and put in monetary terms so that benefit-cost ratios can be calculated. By "relevant" and "economically significant," we do not require that every possible cost and benefit be estimated. Researchers must make reasonable judgments about which costs or benefits are likely to be so small that inclusion of them would not significantly affect the findings. This is our "gold standard" that few studies have met at this stage However, as discussed above, studies that score lower on this scale may still be useful for policy analysis purposes.

While this Benefit-Cost Validity Scale is a useful first step in categorizing studies, it is not appropriate to utilize the scale by itself in determining whether a program is worthwhile adopting. First, one must determine whether the underlying effectiveness measures are considered valid according to the Sherman et al. (1997) criteria. Thus, for example, Sherman et al. (1997: 2-19) ultimately decided that in order to classify a program as being known to "work," it "must have at least two level 3 evaluations [on the Maryland Scientific Methods Scale] with statistical significance tests showing effectiveness and the preponderance of all available evidence supporting the same conclusion." Thus, one must generally ask both whether there is good evidence that a program "works" and if so, whether it passes a benefit-cost test.

Just as Sherman et al. called for the inclusion of additional evidence to support individual studies, we would note that simply having two studies that pass benefit-cost tests and are shown to "work" might not be sufficient to conclude that a program has definitively been found to be cost-beneficial. Instead, additional evidence should

include a more in-depth analysis of the benefit-cost studies being used to support this finding. For example, one might look at the quality of the cost and benefit data used in the study, whether these costs and benefits are able to be replicated outside the context of the study, whether the authors have conducted a sensitivity analysis, and what the confidence level is on the estimates.

Finally, we note that we have not combined the two scales or required that a benefit-cost analysis have a minimum level on the Maryland Scientific Methods Scale in order to be considered a "valid" or "comprehensive" benefit-cost analysis. While it might seem counter-intuitive, it is possible that studies that have been shown to "not work" under the Sherman et al. criteria still pass a benefit-cost test. For example, according to Sherman et al. (1997, p.9), "home detention with electronic monitoring for low-risk offenders fails to reduce offending compared to the placement of similar offenders under standard community supervision without electronic monitoring." While there might be no observable difference in offending rates, if electronic monitoring at home is less expensive than standard community supervision, it might indeed pass a benefit-cost test.

Figure A1 - Costs and Benefits of Criminal Justice Programs*

Costs (Program Spending) or Averted Costs	**Benefits (Program Effectiveness)**
Police investigation Prosecution Legal Defence Jail or Prison Costs Probation Community Supervision Treatment Program (e.g. drug treatment) Supplies/equipment (e.g. urine testing, electronic monitoring equipment)	Reduced Medical costs to victims** Reduced Wage losses to victims** Reduced Property losses to victims** Reduced Intangible victim losses (e.g. pain, suffering, lost quality of life)** Other significant social costs that have been reduced (e.g. residents of neighbourhood afraid of going out at night)** Offender productivity (e.g. drug treatment program that increases employment as well as reduces crime)

* Note: The terms “costs” and “benefits” can be used interchangeably and thus which category an item belongs in is somewhat arbitrary. For example, one could evaluate an early release program by quantifying the “benefits” of reduced prison costs or the prison “costs” averted. For consistency of comparing programs, we identify “program” spending or averted program spending to be “costs,” and “program effectiveness” measures to be benefits. See text.

** Instead of estimating the value of individual components of reduced crime costs, an alternative method might take a “top down” approach and identify a more comprehensive measure of the ‘cost of crime’ as the benefit of a program. See, for example, Cohen et al. (2004) and Cohen (2008).

Appendix 2

REVIEW OF BENEFIT/COST ANALYSES OF SENTENCING

Data Extraction Sheet

Name of Reviewer:	
Title of Paper:	
Author(s):	
Date of Publication:	
Source of Publication:	
Country/Language:	
Sentencing Intervention: (e.g. imprisonment, community order, pre-trial diversion)	
Duration of Intervention: (e.g. probation period of 1 year, imprisonment for 6 months)	
Sample size and Characteristics:	

(e.g. age, sex, ethnicity/racial, number of individuals, prior convictions, etc.)	
Study Design and Statistical Analyses: (e.g. before and after measures, use of comparison group, control group, correlation coefficients, regression analysis etc.)	
Specification of Benefit/Cost information: (e.g. Criminal Justice Costs, costs of imprisonment, community orders/supervision, private and social costs, victims' costs monetary benefits of reduced crime, costs avoided by the Criminal Justice System, savings to public health and welfare etc.)	
Benefit-Cost Ratio:	
Specification of Benefits Other than Monetary: (e.g. reduced recidivism etc)	
Observed Strength of Effect and Statistical Significance	
Threats to Interpretation of results:	

Details of Follow-up:		
Reviewers' Rating of Paper	Scientific Method Scale Score (i.e. 1-5):	Cost-Benefit Scale Score (i.e. 1-5):
Summary of key points/findings.		

COVER SHEET

Title Benefit-Cost Analyses of sentencing: A systematic review of the literature.

Reviewer(s)

McDougall, C., Cohen, M., Swaray, R. and Perry A.

Contribution of reviewer (s)

Cynthia McDougall:	Review design, project management, quality control, final report.
Mark Cohen:	Development of the Benefit-Cost Validity Scale – Revised, review of conclusions and peer reviewers comments, review and contribution to final report.
Raymond Swaray	Screening of studies, extracting data, contribution to drafting of earlier report.
Amanda Perry	Screening of studies, extracting data, contribution to drafting of report.

Issue protocol first published

2004

Issue review first published

Date of most recent amendment

Date of most substantive amendment

Most recent changes

Date new studies sought but none found

Date new studies found but not yet included/excluded

Date new studies found and included/excluded

Date reviewers' conclusions section amended

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SOURCES OF SUPPORT

Centre for Reviews and Dissemination at the University of York, UK.

Ministry of Justice, UK.

INDEX TERMS

Benefit-Cost, Sentencing, Crime, Review, Cost-Effectiveness.

Tables

Table 1: Characteristics of Benefit-Cost Studies

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Austin J. (1986) USA	1,557 adults and youths, Treatment= 1,202; Control= 355 (Scientific Scale 3)	Early Release Length N/A	Parole supervision Criminal justice processing. Property loss and medical services for victims.	Averted prison costs.	2.82:1	1

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Courtright, K. E., Berg, B.L. and Mutchnick, R. J. (1997) USA	57 adult offenders driving under the influence of alcohol (Scientific Scale - 1 descriptive).	House Arrest with electronic monitoring 1 year	Lease of electronic monitoring technology. Miscellaneous equipment. One-half salary plus benefits for probation officers.	Electronic monitoring fees. Jail days saved. Monthly supervision fees.	4.02:1	1

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Donato R. and Shanahan M. (1999) AUSTRALIA	Recidivism rates from previous sex offender treatment studies (Scientific Scale 1)	Sex Offender Treatment (generic)	Implementation of in-prison sex offender treatment.	Avoided offence costs due to reduction in recidivism rates (including tangible and intangible victim costs and criminal justice costs)	0.69:1 to 3.98:1, depending on the assumed reduction in recidivism and the cost assigned to an offence.	3

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Gray T. and Olson K.W. (1989) USA	111 burglars (Scientific Scale 2)	Probation, Prison[1] & Jail[2] Length of sentence not stated	Corrections. Foregone Earnings.	Rehabilitation. Incapacitation. Deterrence.	Probation=1.70:1 Prison=0.24:1 [1] Jail=0.17:1 [2]	1

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Mauser E., Van Stelle K. R. and Moberg D. P. (1994) USA	76 adults (Scientific Scale 2)	Drug Treatment (pre-trial diversion) 1 year	Tangible costs of the drug treatment	Savings to the criminal justice system.	1.80:1 to 3.82:1, depending on the assumption made about the cost of incarceration.	2

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Pearson, F. S. (1988) Pearson F.S. and Harper A.G. (1990) USA	Treatment=55 Control=132 (Scientific Score 3)	Intensive Supervision 18 months (average)	Shock Incarceration for a min. of 2 months. Intensive Supervision. Probation.	Averted prison costs due to a shorter prison sentence and a reduction in recidivism after ISP. Increased earnings	1.48:1	2

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Piehl, A. M. and DiIulio, J. J. (1995) USA	419 adults (Male) (Scientific Score 1)	Imprisonment 1 year (all calculations performed on basis of this time period)	Social costs of selected crimes: Rape, Robbery, Assault, Burglary, Auto theft, Fraud, Forgery, Petty theft. Incarceration.	Incapacitation leading to averted tangible and intangible victim costs.	For the offender who commits 12 crimes/year 2.80:1 falling to 0.36:1 when drug offenders are also included.	3

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Prentky, R. and Burgess, A. W. (1990) USA	129 adults (Male child sex offenders) (Scientific Score 2)	Sex offender Treatment 5.1 years	Providing sex-offender treatment in secure treatment center for 5.1 years	Averted tangible costs due to a reduction in re-offending	1.16:1	2

Author, Date and Country	Sample	Sentencing and intervention	Costs (used in calculating the benefit-cost ratio)	Benefits (used in calculating the benefit-cost ratio)	Benefit-Cost Ratios	Benefit Validity Score (1 – 3)
Roberts, A.R. and Camasso M. J. (1991) USA	203[3] families 120[4] juveniles (Scientific Score 2[3] 3 [4])	Family and Juvenile offender treatment programs. Minimum of 8 therapy sessions Length not stated	Program Costs.	Averted criminal justice costs. Averted tangible victim costs. Averted welfare costs. Increased earnings.	270:1[3] 125:1[4]	2

Notes: Benefit- Cost Ratio: where the number is greater than 1, the benefits exceed the costs; where 1:1 the benefits=costs; where lower than 1 the costs exceed the benefits.

1.‘prison’: A place for the longer term confinement of persons in lawful detention, especially persons who have been convicted of crimes and sentenced in the USA.

2. .‘jail’- A place for the confinement of persons in lawful detention, especially persons awaiting trial under local jurisdiction. Primarily used for short-term incarceration (USA)

3. Family treatment program

4. Youth wilderness program

Table 2: Characteristics of Cost-Effectiveness Studies

Author, Date, Country	Characteristics of Study Design & Rating	Sentencing Intervention	Costs Incurred	Effectiveness Outcome	Cost Effectiveness
Burns, J. C. & Vito, G. F. (1995) USA	153 vs. 50 vs 123 vs 49 subjects (Comparison group rating)	Boot Camp Graduates vs Boot Camp Failures vs. probation vs. split sentence incarceration/probation	Direct costs of prisoner maintenance in Boot Camp vs. Costs of incarceration	Recidivism over 1 year period. Revocation of supervision	Yes (Though no difference in recidivism across the groups, the authors concluded that the boot camp was more cost-effective than incarceration, as boot

					camp costs were less).
Coumarelos C. (1994) Australia	33,900 (no control) Juvenile offenders 81% Male (Review article with analysis of pattern of offending)	Various Juvenile Court interventions and their usage, e.g. Community Aid Panels and Family Group Conferences	Cost of court appearance Savings in overall number of criminal appearances (non-monetized). Cost of intervention (non-monetized) Data presented as mathematical model	Recidivism. Average number of court appearances per juvenile	Yes (The authors concluded that early juvenile interventions were cost effective but cost-effectiveness increased the later in the court appearance chain intervention occurred).

Author, Date, Country	Characteristics of Study Design & Rating	Sentencing Intervention	Costs Incurred	Effectiveness Outcome	Cost Effectiveness
Fabelo, T. (1997) USA	Adult offenders (No detail of numbers – Years 92/93/94 – IPTC beds-2000 SAFP beds-12,000 (Controlled Trial)	In-prison therapeutic drug community (IPTC) vs substance abuse felony punishment (SAFP) diversion from incarceration.	Program costs Incarceration costs	Recidivism rates Drop-out rates	IPTC =No SAFP =Yes (The authors found the programs, respectively, not to be cost-effective and cost-effective in comparison to traditional incarceration)

Glaser, D. & Watts, R. (1992) USA	126 vs. 200 Adult Drug Offenders Male (80%) (Scientific rating 2)	Probation and House Arrest with Electronic Monitoring vs. Probation alone.	Monitoring equipment between $3 and $8 per day, Night-response Officer. Prison and Jail costs.	Arrest for new offence; Probation revoked for rule violation; Rule violation, but not revoked; No reported rule violations. Weekday and weekend rise and retire time. Drug test results, and employment.	Yes (The authors note that electronic monitoring more cost-effective than probation alone)
Griffith, J. D., et al (1999) USA	291 vs. 103 Adult Offenders 100% Male	In-Prison Therapeutic Community Treatment, residential aftercare and supervised out-patient care vs. untreated prison	Operational Program costs Including treatment, aftercare and supervision costs. Incarceration costs.	Recidivism rates against Predictive risk classification.	Yes (The authors concluded that in-prison therapeutic community treatment was cost-effective vs.

	(Scientific rating 3)	comparison group.			incarceration without treatment).
Author, Date, Country	Characteristics of Study Design & Rating	Sentencing Intervention	Costs Incurred	Effectiveness Outcome	Cost Effectiveness
Latessa, E. J. (1986) USA	Not applicable (Review paper only)	Intensive Supervision (ISP) vs. Incarceration	Parole & probation supervision, community resources. Costs of running the ISP including administration support, public transfer payments, and community resources.	Recidivism rates Reduced prison overcrowding .	Yes (Whilst the authors noted that intensive supervision was cost-effective they did not include the cost of imprisonment and re-parole subsequent to revocation of intensive

			Cost of imprisonment		parole)
Taylor, J. M. (1992) USA	Adult Offenders (Review paper and cost analysis)	Post-Secondary Correction Education Program (PSCE)	Costs of post-secondary correction education program in prisons, (PSCE) Costs of incarceration Cost of crimes committed by 'recidivating offenders' National savings from PSCE	Recidivism rates	Yes (The authors concluded that post-secondary correctional education programs were cost-effective).
Turner, S. , & Petersilia, J. (1992) USA	369 vs. 310 Adult Offenders Male 92% (Scientific rating 5)	Intensive Supervision vs. Parole	Cost of program Court costs Custody costs Costs of supervising the offender	Technical violations, arrests, Convictions, Jail time. Drug testing	No (The authors concluded that intensive supervision was not more cost effective than parole).

Author, Date, Country	Characteristics of Study Design & Rating	Sentencing Intervention	Costs Incurred	Effectiveness Outcome	Cost Effectiveness
US General Accounting Office Washington D.C. (1993) USA	109 vs. 82 vs. 144 subjects Adult Offenders Sex not stated (Scientific rating 2)	Intensive Supervision Program (ISP) vs. Probation vs. Incarceration	Direct costs of programs Cost of probation Cost of incarceration	Subsequent Arrests	Inconclusive (However, the authors concluded that, despite mixed results, ISP programs have a role in corrections policy)
Van Stelle, K. R., et al	259 subjects (Non-completers	Community-based treatment for repetitive	Cost of treatment program. Cost of jail days saved due to	Program completion rate. Recidivism: arrests, convictions,	Yes

(1994) USA	as comparison group) Adult Offenders 100% Male (Review & analysis of jail days saved)	drug offenders as a diversion from imprisonment.	diversion into the Treatment Alternative Program (TAP).	sentences. Traffic Offences	(The authors concluded that diversion to TAP was more cost-effective than incarceration).
Wiebush, R. G. (1993) USA	81 vs. 76 vs. 87 Juv. offenders % Male 88.9 vs.92.1 vs.81.6 Scientific rating 3)	Intensive Supervision Program (ISP) vs. Incarceration + Parole Supervision (DYS) vs. Traditional Probation Supervision	Annual cost of ISP placement Incarceration costs Parole Supervision Costs	Recidivism at 18 Months Most serious subsequent offence. Subsequent incarceration. Time spent in all types of lockups were recorded.	Inconclusive (ISP could be cost-effective with large-scale diversion, but not cost-effective with small numbers).

TABLE 3: EXCLUDED STUDIES

The following studies were reviewed but excluded from the final study selection as they did not meet the inclusion criteria. Reasons for exclusion included but were not restricted to: no provision of costs and benefits information; study not related to sentencing; theoretical model with no specific costs and benefits; covered costs of crime to victims but did not address sentencing; examined costs of an intervention only; examined costs of a death sentence trial only; discussion or review paper only; economic analysis of offender behavior but not related to sentencing; demographic simulation model to mandatory sentencing policy, rather than a real-life examination of the costs and benefits of mandatory sentencing; published outside the specified time period. Cost-effectiveness studies which were retained to examine supporting information for benefit-cost studies, are not included in this Table.

Authors	**Date**
Bagley, C., & Pritchard, C.	1998
Barloon, J.L.	1996
Beres, L.S., & Griffith, T.D.	1998
Berkowitz, G., et al.	1996
Brantingham, P., & Easton, S.T.	1996
Brookes, D.R.	2000
Buddress, L.A.N.	1997
Burnovski, M., & Safra, Z.	1994

Authors	Date
Byrne, J.M.	1990
Camp, D.A, & Sandhu, S.H.	1995
Caulkins, J.P.	1997
Caulkins, J.P., et al.	1997
Chappell, D.	1988
Chu, C.Y., et al.	2000
Cohen, M.A.	1988
Cohen, M.A.	1998
Cohen, M.A.	2000
Cohen, S..A.	1981
Crisp, D., & Moxon, D.	1994
Crisp, D., et al.	1995
Culbertson, R.G.	1986
Cullen, F.T., et al.	1998
Daniel, K., & Lott, J.R.	1995
Dau-Schmidt, K.G.	1983
Davis, M.L.	1988
Donohue, J.J., & Siegelman, P.	1998
Elder, H.W.	1989
Fabelo, T., & Meier, V.	1999
Fields, L.L.	1994
Finckenauer, J.O.	1988

Authors	Date
Fors, S. W., & Rojek, D.G.	1999
Friedman, D.	1999
Friedman, D., & Sjostrom, W.	1993
Gerstein, et al.	1994
Gray, T., et al.	1991
Greenwood, P.W., et al.	1998
Heard, C. A.	1990
Hermann, D.H.J, & Wilcox, M.A.	1982
Irwin, J., et al.	1998
Kim, I., et al.	1993
King, J.	1995
Klaus, P.A.	1994
Knapp, M., et al.	1992
Kopel, D.B.	1994
Latessa, E. J., & Allen, H.E.	1982
Levitt, S.D.	1996
Lindesmith Centre for Drug Policy.	1999
Lloyd, C., et al.	1994
Loewen, L., et al.	1993
Lovell, D., & Jemelka, R.	1996
Mainprize, S.	1992
Mair, G., et al.	1994

Authors	Date
Mandel, M., et al.	1993
Marvell, T. B.	1994
McGahey, R.	1984
McGinnis, K.	1998
Meade, J., & Waldfogel, J.	1998
Menzies, K., & Vass, A.A.	1989
Mui, H.W., & Ali, M.M.	1997
Myers, M.A.	1991
Myers, S.L.	1985
Nelson, C.W.	1975
New York State Defenders Association, Inc.	1982
Newton, A.	1979
Nieto, M.	1996
Parks, S.	2000
Posner, R.A.	1985
Quinlan, J.M.	1993
Rajkumar, A.S. & French, M.T.	1997
RAND publication	1998
Rasmusen, E.	1995
Saffer, H.C.F., & Chaloupka, F.	1999
Samuel, L., & Myers, J.	1983

Authors	Date
Schertmann, C.P, et al.	1998
Shavell, S.	1990
Slot, N.W., et al.	1992
Spelman, W.	1995
Spiegel, U., & Templeman, J.	1989
Tonry, M.	1999
Umbreit, M.S.	1982
Waldfogel, J.	1994
Walker, J.	1997
Waller, I., & Welsh, B.C.	1998
Zedlewski, E.W	1989
Zimring, F.E, & Hawkins, G.	1988