

Crime Reduction Programme

Analysis of costs and benefits: guidance for evaluators

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Research, Development and Statistics Directorate
Home Office

The Research, Development and Statistics Directorate



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Aim of the series

The purpose of this series is to provide guidance on the monitoring and evaluation of Government-funded crime reduction initiatives. The impetus for the series comes from the desire of HM Treasury and the Home Office to ensure adequate assessment of the effectiveness and cost-effectiveness of new initiatives funded from the 1998 Comprehensive Spending Review. A major element of the newly funded initiatives is the evidence-based Crime Reduction Programme, for which the Government has committed £250 million over the period 1999-2002. Although much of the material in this series will meet the specific needs of that programme, the series as a whole is intended to have a wider application. It should be of use to evaluators and those planning new initiatives.

The Crime Reduction Programme

The Crime Reduction Programme will invest resources in projects which offer a significant and sustained impact on crime. The programme is intended to contribute to reversing the long-term growth rate in crime by ensuring that we are achieving the greatest impact for the money spent and that this impact increases progressively. It will do so by promoting innovation, generating a significant improvement in knowledge about effectiveness and cost-effectiveness and fostering progressive mainstreaming of emerging knowledge about good practice. Projects will be carefully selected to ensure that they contribute to achieving these objectives.

The Programme will cover five broad themes:

- working with families, children and schools to prevent young people becoming the offenders of the future;
- tackling crime in communities, particularly high volume crime such as domestic burglary;
- developing products and systems which are more resistant to crime
- more effective sentencing practices
- working with offenders to ensure that they do not reoffend.

All the parts of the Crime Reduction Programme will be independently evaluated to assess their effectiveness and cost-effectiveness in reducing crime and improving the impact of the criminal justice system. Those parts which are successful will form the basis of future mainstream programmes and those which are not will be dropped. Equally, where the Crime Reduction Programme shows that existing work carried out by the criminal justice system is ineffective or less cost-effective than other realistic alternatives, that too will be dropped.

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The economic aspects of the evaluation strategy for crime reduction measures were discussed at a meeting organised by RDS in December 1998 to inform potential independent evaluators about the Crime Reduction Programme. We would like to thank all those who participated in the workshop on economic issues for their extremely useful insights into the key issues in this challenging area.

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In this section:

- Background
- Objectives of the guidance document
- How to use the guidance document
- Further support for evaluators

Background

The Crime Reduction Programme (CRP) is the largest single investment in an evidence-based approach to crime reduction that has ever taken place. Through a comprehensive range of initiatives, it aims to contribute to the reversal of the long term growth rate in crime. This will be achieved by ensuring the greatest impact for the money spent on crime reduction initiatives and by ensuring that this impact increases progressively. A key measurement of this impact will be an analysis of the costs and benefits of all CRP projects.

CRP initiatives will be independently evaluated to assess both their effectiveness and cost-effectiveness in reducing crime and in improving the impact of the criminal justice system. Improving knowledge about which initiatives represent the best value for money will help guide the decision to modify, mainstream or drop projects, as part of an evidence-based strategy.

The CRP covers a broad range of initiatives. Some are designed to tackle the risk factors for criminal behaviour (e.g. through early interventions with children and families), while others target specific geographical locations (e.g. burglary prevention and targeted policing initiatives), specific types of crimes (e.g. domestic violence and design against crime) and categories of offenders (e.g. corrections programmes). This makes designing a consistent evaluation methodology a challenging task, not least for the analysis of costs and benefits.

Each CRP intervention will be subject to a cost-effectiveness analysis. Their evaluations need to be conducted to a sufficient standard to ensure that the cost-effectiveness information they produce can support strategic decisions. Projects must make a significant contribution to the evidence base that will enable comparative cost-effectiveness to be calculated and/or strategies to be adopted for improving cost-effectiveness¹.

1 *'What do we mean by an evidence-based programme?'*, supporting documentation for the Crime Reduction Programme, Home Office.

Few previous evaluations of crime reduction initiatives have included a detailed cost-effectiveness analysis (Goldblatt and Lewis, 1998; Welsh and Farrington, 1999). Where attempts have been made to assess the cost-effectiveness of initiatives, they have typically been hampered by incomplete data on the cost of inputs and the lack of clear specification of outputs and outcomes (Stockdale, Whitehead and Gresham, forthcoming - 1999). A failure to capture the full costs of intervention has partly been the result of a tendency to estimate the cost of inputs retrospectively (Schweinhart, Barnes and Weikart, 1993; Greenwood et al., 1996), rather than by routinely collecting data during the implementation period. This has made it difficult to compare the cost-effectiveness of different interventions.

Learning from this experience, inputs, outputs and expected outcomes will be identified at an early stage and systematic and consistent methods of data collection, collation and analysis will be established. Generating information on a common basis will enable a comparative analysis of costs and benefits to be undertaken.

Objectives of the guidance document

Evidence will be gathered on the costs and benefits of all CRP interventions. The analysis of this evidence will be undertaken at two levels:

- evaluators will carry out a cost-effectiveness analysis of the projects that they are evaluating
- the Home Office (Research, Development and Statistics Directorate - RDS) will carry out a comparative cost-benefit analysis.

This document is designed to give practical guidance to evaluators undertaking a cost-effective analysis. It includes the methodological principles, processes and standards that underpin such an analysis and specifies the key tasks and responsibilities of evaluators. It focuses on the practical issues of how to gather and analyse information on the costs of intervention and how to relate this to outputs and outcomes.

The analysis of costs and benefits in monetary terms is, of course, only one aspect of the evaluation of CRP interventions. It relies on information from a broader evaluation of the processes and impact of an intervention, the techniques of which will be familiar to evaluation experts in this field.

In no way does this guidance displace the advice given in a number of guidance documents for undertaking evaluations of different aspects of the Criminal Justice System. It is designed to be consistent with existing advice on evaluation techniques in the field. Evaluators should consult those guidance documents that relate to their area of concern. Although the present document does not attempt to tackle the many complex design issues for impact evaluation methodology, it does stress the need for evaluations to be designed in such a way as to facilitate a cost-effectiveness analysis.

How to use the guidance document

Evaluators are expected to use this guidance as a reference document for devising a methodology for analysing costs and benefits. The guidance is designed as a step-by-step guide to undertaking a cost-effectiveness analysis, from identifying the types of data to collect through to reporting the results of the analysis.

The remaining sections of this guidance document:

- set out methodological principles, including defining and explaining key terms and measures (Section 2)
- highlight the key issues and problems encountered in estimating input costs (Section 3) and outcomes (Section 4)
- outline how to compare costs and benefits in a systematic way and to report the results of the analysis (Section 5).

This guidance is designed to facilitate an evaluation of how cost-effective an intervention has been, rather than a forward-looking economic appraisal. However, many evaluations of CRP interventions will be carried out during, rather than at the end of, the programme as part of a mid-term review, which will also need to include a forward-looking element. Some of the more important techniques used in economic appraisal are therefore included (Annex 2).²

Further support for evaluators

Given the broad range of interventions to be undertaken under the CRP, this document cannot hope to cover all of the issues that will arise for individual projects. Instead it sets out principles and methods that apply to all interventions. More detailed guidance for each category of interventions (e.g. on interventions to tackle burglary) will be made available to evaluators. This will cover issues and tasks that are specific to that particular type of intervention, including a list of resource input and outcome information that it is essential to collect.

The central Home Office team plans to make greater use of the Internet/Websites to disseminate information and to facilitate information exchange between evaluation teams.

2 For more detailed guidance on economic appraisal see HM Treasury, 1997 and Willis and Bower, forthcoming

In this section:

- Purpose of the analysis
- Techniques for analysing costs and benefits
- Steps in the analysis
- Who is responsible for key tasks?

Purpose of the analysis

By systematically recording and comparing the cost of inputs with the outputs and outcomes of an intervention, the analysis allows us to determine the economic efficiency of interventions. This allows more informed decisions on resource allocation between different policy options to be made and enables the following key questions to be answered:

- What was the true cost of an intervention?
- Did the outcome(s) achieved justify the investment of resources?
- Was this the most efficient way of realising the desired outcome(s) or could the same outcome(s) have been achieved at a lower cost through an alternative course of action?
- How should additional resources be spent?

The cost-effectiveness analysis will therefore inform decisions on how to allocate scarce resources both within and between initiatives. It will also make this decision process more transparent by organising information on inputs, outputs, impacts and outcomes in a single comparative framework.

This framework should not, of course, be regarded as providing the final answer since it cannot incorporate all outcomes (nor inputs in most cases) arising from an intervention. There are also likely to be a host of reasons for allocating resources in a particular way which fall outside the analysis. Nevertheless, it does provide a useful tool for assessing the use of scarce resources and comparing the relative cost-effectiveness of different interventions on a common basis.

Figure 2.1: Key definitions³

Inputs are defined as any additional human, physical and financial resources that are used to undertake a project. For example, in an intervention that installs fences across paths at the backs of houses as a target hardening measure to prevent domestic burglary, inputs would include the materials and labour used to install the fences.

Outputs are defined narrowly as the direct products of the process of implementation. They can arise only during the implementation period. Following the above example, the fences installed are outputs and the number of fences installed is an output measure.

Impacts on risk factors are defined as the effects of outputs that *disrupt the causes of criminal events*. Measuring such impacts is therefore a way of monitoring the process through which the intervention is expected to reduce crime. In our fence example, this could be a reduction in non-residents entering the path, thereby reducing the opportunity for burglary.

Outcomes are defined as the consequences of the intervention. These can arise both during and after the implementation period. Key outcomes will relate to the stated objectives of the intervention. In our example, the reduction in burglaries attributable to the installation of fences is the primary outcome. But there are likely to be wider outcomes such as a change in the fear of crime or the reduction in other types of crime. These wider outcomes may or may not be measurable and can be negative as well as positive.

Costs are defined as the monetary value of inputs.

Benefits are defined as the value of outcomes to society that are attributed to the intervention, expressed in monetary terms. Negative outcomes attributed to the CRP intervention will be referred to as disbenefits.

Setting a baseline

As with any impact evaluation, we are interested in *additional* inputs, outputs, impacts and outcomes. Separating out additional elements from those that would have occurred anyway (i.e. in the absence of the intervention) is rarely straightforward. This involves setting a baseline against which the intervention can be evaluated.

One of the key tasks of evaluators is to establish this baseline as early in the process and as accurately as possible. For inputs, this requires distinguishing between existing and planned resource use and demands for additional resources that have arisen as a result of the CRP intervention (see Section 3). For impacts and outcomes, it involves analysing existing conditions and trends to determine what would have happened in the absence of the CRP intervention (see Section 4). This will allow evaluators to measure deviations from these conditions and trends which can then be attributed either to the CRP intervention or other external influences.

3 These definitions have been adapted from Hough and Tilley, (1998). They are, however, for the purpose of the CRP intervention and may not be identical to those used in other programmes. They have been constructed to allow evidence to be gathered not only on the final consequences of an intervention, but also on the mechanism through which an intervention is assumed to achieve stated objectives.

Techniques for analysing costs and benefits

There are several ways in which inputs and outcomes can be analysed. The two main techniques that will be used for CRP interventions will be cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA).

Cost-effectiveness analysis

CEA compares alternative cost streams to produce broadly similar outputs or outcomes.⁴ The least-cost alternative to produce the defined outcome (or set of outcomes) is the most desirable option, subject to account being taken of wider outcomes that cannot be incorporated in the analysis.

For the purposes of the CRP, a CEA will estimate the costs of achieving defined outcomes, typically measured in terms of a reduction in crime or disorder or in reoffending. A CEA indicates whether crime reduction interventions (and combinations of interventions) have been more, or less, costly in achieving crime reduction than existing measures and/or alternative interventions.

Cost-effectiveness is articulated in terms of the *input cost per unit of output or outcome* achieved. For example, we may want to know the cost per offender attending a literacy programme (cost per output) or the cost per burglary prevented (cost per outcome). In order to derive a measure of cost-effectiveness, therefore, we need to know the level of inputs used to implement an intervention, the cost of these inputs and the nature and level of outputs and outcomes.

However defined, though, outcomes will need be *quantified* (i.e. measured numerically) to enable a CEA to be undertaken. Outcomes that relate directly to the stated objectives of the intervention must be quantified.

Figure 2.2: A stylised example of cost-effectiveness analysis

Assume there are two burglary prevention interventions, B₁ and B₂ and let:

Cost B ₁	=	£120,000
Cost B ₂	=	£100,000
Outcome B ₁	=	prevents 100 burglaries
Outcome B ₂	=	prevents 60 burglaries

Therefore:

The average cost per prevented burglary through B₁ is £1,200 (£120,000/100) and the average cost of preventing one burglary through B₂ is £1,667 (£100,000/60).

Per prevented burglary, therefore, B₁ is more cost-effective than B₂.^{5,6}

⁴ HM Treasury Guidance - Appraisal and Evaluation in Central Government "The Green Book", 1997.

⁵ This simplistic example does not take into account the variance of estimates or the relative magnitude of the two interventions B₁ and B₂. Before we can state that one intervention is more cost-effective than another, we need to see whether the difference between the two calculated results is statistically significant.

⁶ The example does not examine marginal costs. Marginal costs describe the additional cost of increasing outcome by an additional unit. In this example, this is the cost of inputs required to prevent one more burglary.

In order to compare the cost-effectiveness of alternative interventions they must share common outputs or outcomes and be measured on a common basis. Examples include the number of (defined) crimes prevented, the unit reduction in probability of a crime occurring, the number of children treated in an early intervention programme or offenders reconvicted.

Cost-benefit analysis

Cost-benefit analysis (CBA) takes cost-effectiveness analysis a stage further by attaching monetary values to the outcomes of an intervention. Once both the costs of inputs and the value of outcomes (benefits) are expressed in monetary terms a direct comparison can be made.

The result is articulated in terms of either a *benefit/cost ratio*, where the value of outcomes (benefits) is divided by input costs, or the *net economic benefit*, which is simply the sum of the value of benefits less the sum of input costs. The decision rule for a given project is to maximise the benefit/cost ratio or the net economic benefit or minimise the net economic cost, taking into account those outcomes that are not included in the calculation.

For many CRP interventions, outcomes will be quantified in terms of a reduction in crime. Since crime has costs to society, including costs to victims, potential victims and the criminal justice system, the value of an intervention can be measured by the avoidance of costs (savings) to society of those crimes that *would otherwise have taken place*.

In order to calculate the savings to society resulting from an intervention, we therefore need to know how much crime has been prevented as a result of the intervention, and how much this (prevented) crime would have cost.

Figure 2.3: A stylised example of cost-benefit analysis

Using the example in Figure 2.2 and assuming that the average cost to society of a single burglary equals £1,500, then for intervention B₁:

Input cost	£120,000	
Outcome quantity	100 burglaries prevented	
Outcome value (benefit)	100 x £1500 =	£150,000

Therefore:

Benefit/cost ratio:	£150,000/£120,000 =	1.25:1
Net economic benefit:	£150,000 - £120,000 =	£30,000

For B₁ benefits outweigh costs by £30,000.

The same calculation for intervention B₂ yields the following results:

Benefit/cost ratio:	£90,000/£100,000 =	0.9:1
Net economic benefit (cost):	£90,000 - £100,000 =	-£10,000

For B₂, costs outweigh benefits and there is a net cost of £10,000.

Not all crimes have the same level or types of costs to society. In a CEA the simple quantification of crimes prevented ignores the difference in the quality of outcomes achieved. By attaching monetary values to different types of crime, CBA can measure this outcome quality. This is done by estimating, as accurately and convincingly as possible, the average cost to society of different types of crime (see Annex 1). The total value of benefits as a result of the intervention can then be estimated by multiplying the number of crimes prevented by the average cost of a crime.

The CBA will help to determine to what extent interventions have been successful in reducing the cost of crimes to society and to identify which interventions, or combinations of interventions, yield the greatest net economic benefit.

In contrast to CEA, different outcome measures do not preclude a comparison under CBA, to the extent that variables can be expressed in common (monetary) terms. For example, the net economic benefit of an offender programme can be compared with that of a local initiative even though they do not share the same resource inputs, outputs or outcomes. In addition, multiple outcomes arising from an intervention will all be expressed in monetary terms and their relative quality will be reflected in their valuation. In reality, CBA cannot capture all of the costs and benefits to society of an intervention. This makes it all the more desirable to base the CBA on common outcome measures as far as is practicable.

Steps in the analysis

CEA involves the following steps:

- i. define the intervention, its objectives and the mechanism through which inputs have led to impacts and outcomes
- ii. identify inputs
- iii. identify outputs and outcomes
- iv. quantify inputs
- v. quantify attributable impacts and outcomes
- vi. value inputs (costs)
- vii. compare input costs with outputs and outcomes.

In a cost benefit analysis two additional steps are required:

- viii. value outcomes (benefits)
- ix. compare costs with benefits.

Who is responsible for key tasks?

Evaluators are required to carry out a CEA of the interventions for which they have responsibility (steps i-vii above). Where they are evaluating more than one intervention within the same initiative, for example a number of offender programmes, the CEA should be carried out in such a way as to facilitate comparison between the different interventions.

The primary task of the evaluators is to identify and quantify inputs, outputs, impacts and outcomes. Attaching monetary values to inputs (step vi) will be carried out by evaluators with guidance from the central Home Office team. For most input costs, this will involve the straightforward monitoring of actual project expenditure, but for some inputs, centrally determined standard costs will be used to ensure consistency between evaluations.

Evaluators will also report detailed information on inputs, outputs, impacts and outcomes to a central cost database at the Home Office. *The central Home Office team will be responsible for attaching monetary values to benefits and carrying out a comparative cost-benefit analysis* (steps viii and ix). Table 2.1 below summarises the division of responsibility for these key tasks.

Table 2.1: Key responsibilities

Tasks:	CEA		CBA	
	Inputs	Outputs/ Outcomes	Inputs	Outputs/ Outcomes
Identify	Evaluators	Evaluators	Evaluators	Evaluators
Quantify	Evaluators	Evaluators	Evaluators	Evaluators
Value	Evaluators/ Home Office	Not Required	Evaluators/ Home Office	Home Office
Final Analysis	Evaluators		Home Office	

In this section:

- Identifying and quantifying inputs
- Valuing inputs
- Key issues
- Data sources

Identifying and quantifying inputs

What to include

Inputs may be in the form of physical, human or financial resources. Physical resources include all materials that are required to undertake the project. This would include any security equipment or premises used. Human resources include both labour used directly to implement a scheme and the time spent organising, co-ordinating and promoting an intervention. This includes any training that is required to implement a project. Financial resources include any grants or loans that have not (yet) been directly tied to the purchase of human or physical resources.⁷

Evaluators need to identify and quantify all resources used in implementing an intervention. The types of inputs required will, of course, vary substantially between interventions, depending on the nature of the intervention. As noted in Section 1, this will be outlined in more detail in further guidance, but some general principles apply.

Expected inputs should be identified as early as possible, so that data on resource use can be collected on an on-going basis rather than retrospectively. Evaluators should regard any project plan as a starting point for the identification of inputs, but it is unlikely to include all the inputs that are required for the cost-effectiveness analysis.

Evaluators should include all start up and recurrent inputs covered by CRP funding (i.e. costs to the Home Office). Start-up inputs refer to all inputs required prior to, or in the initial stages of, implementation. These may include initial staffing and training, equipment, building and other capital items. Recurrent inputs, by contrast, are required on a continuing or periodic basis. Examples include staff, annual maintenance and on-going co-ordination or monitoring.

⁷ Care must be taken to avoid double counting since financial resources are not distinct from human or physical resources. Grants and loans are mechanisms to purchase human or physical resources and where possible should be counted in these categories.

CRP-funded resource inputs should be separately recorded from other inputs. Additional resources may be required to implement an intervention even though these have not been covered in an initial project plan. These “levered-in” resources are likely to include inputs from public sector sources. For example, the intervention may necessitate additional activities by the police, prison, probation or local government staff.

Evaluators should also include any resources funded from outside the public sector, so long as they have been mobilised to support the intervention and contribute to its objectives. These could include inputs by local community or voluntary groups, participants in neighbourhood watch schemes or supporting grants from local businesses. The relationship between CRP interventions and levered-in resources may be complex and will need to be explored in greater depth at the project level.

On the other hand, any parallel interventions that take place within the same target group or area that also has an *indirect* impact on crime, should be noted as part of the context within which the CRP intervention is taking place, *but not included as an input*. An example would be an urban regeneration scheme that takes place in the same area as a CRP-supported burglary prevention intervention. Although not recorded as inputs, some indication of the magnitude of parallel interventions should be recorded, as this will affect the baseline against which the impact of the CRP intervention will be assessed.

Valuing inputs

CRP interventions should be fully costed. The economic cost of an input may differ from its financial cost. The economic, or opportunity, cost of using a resource is the value of its next most valuable alternative use. In most cases the market value of a resource is assumed to reflect its opportunity cost. Even where no cash transaction takes place, resources should be valued accordingly. For example, an office can be used for several purposes. If it is utilised as a CRP co-ordination room, its alternative uses have been foregone. The cost of the room is therefore measured by the value of its next best use. In this case, this would normally be its rental value.⁸

Staff costs

Public servant inputs (e.g. administrators, police, prison and parole officers) will be valued on a common basis. Centrally determined accounting conventions will be applied. Evaluators should provide information on the job description and main responsibilities of each public servant and the nature of and time spent on their CRP activities. A standard cost will then be applied to the time input (e.g. cost per hour for that particular officer).

The central Home Office team will provide evaluators with the accounting conventions to be used that are specific to the type of intervention that is being undertaken. Evaluators also need to take account of any additional overhead costs such as time off ‘in lieu’, additional training, clothing and equipment, supervision costs and pensions.

⁸ Note that even if the room is donated and there is no actual financial transaction to hire or buy it, there is still an economic cost. It is important that this cost is included not only to ensure that the economic costs are fully captured but also to determine the replicability of an intervention.

Non-public servant inputs should, where possible, be valued at the actual salaries of participants. Where this is not appropriate, for example in the case of voluntary inputs, evaluators should consult with the central Home Office team to devise a consistent valuation.

Estimations of costs will often need to be drawn from a range of sources outside the crime-prevention field. For example, the costs of home visits and pre-school education as part of interventions with children and families can be based on estimates from various government departments and specialised non-governmental organisations.

Premises

The valuation of premises will depend on the type of premises, its use and its location. Evaluators should specify the type and size of premises and the nature and duration of its use. They can then attach a rental value to the use of the premises using either the actual rate or estimates based on local rental values from similar premises in the area.

An example of the types of input information required for a burglary intervention is listed in Figure 3.1 overleaf. Although this will be revised for other categories of initiatives, many of the inputs specified will be the same.

Data requirements will be specified in spreadsheets that will be made available to evaluators for completion (see Section 5).

Figure 3.1: Example of input information required for burglary intervention

A Staffing

i. Public servants (e.g. central or local government, police, probation, prison, etc):

- description of role and responsibilities
- role in CRP activity
- time spent on CRP activity
- salary including all employer contributions
- travel and subsistence

ii. Non-public servants

- description of role and responsibilities
- role in CRP activity
- time spent on CRP activity
- salary including all employer contributions
- travel and subsistence

iii. Training

- purpose of training
- type of training (e.g. workshops, guidance documentation, etc.)
- number of people trained
- cost (e.g. per trainee) of training

B Premises

- description of premises used for CRP project (type e.g. office, hall; location; size, square metres)
- description of use for CRP purposes (e.g. management of project, meetings, etc.)
- tenure - i.e. whether rented/owned/free-use
- time spent using premises for CRP activity (i.e. apportioned time to CRP)
- rental value of premises/cost per unit (e.g. per square metre)

C Other running costs

- communications (e.g. telephones, mobile telephone charges)
- utilities (e.g. gas, electricity)
- stationery
- other (specify)

D Equipment for implementation (e.g. security hardware)

- description of type of and need for equipment
- whether bought or rented
- life expectancy of equipment
- number of units
- cost per unit
- maintenance costs

E Commissioned research and data collection

- description and purpose (how supports project implementation)
- survey costs
- analysis costs
- travel and subsistence

F Publicity

- production costs (e.g. printing, hire of equipment)
- dissemination costs (e.g. posting, handing out leaflets, broadcasting)

G Levered-in resources (each source identified separately. i.e. government department, local authority, private sector, police, probation, voluntary organisation, charity, other). These are resources not funded under the CRP, but mobilised in support of the intervention.

- source
- nature of resource
- link with CRP intervention (demonstrate that resource would not have been forthcoming in absence of CRP intervention)
- staff costs (see A above)
- premises costs for CRP (see B above)
- equipment for implementation
- other overheads
- estimated value of resource

Key issues

Additionality of costs

Evaluation is concerned with the inputs which have occurred as a result of the intervention. Resources that would have been mobilised anyway, in the absence of the intervention, should be excluded from the analysis. This is particularly important where the intervention uses an existing input more intensively rather than introducing an entirely new input.

It is essential that a baseline (pre-intervention) level of resources is established to enable evaluators to better identify additional resources. Complementary initiatives, such as interventions by education or social services, that could be expected to have an impact on crime or disorder, should be reported as part of this baseline. The nature of activities and, where possible, the amount of relevant expenditure on these activities should be recorded but expenditure on these complementary initiatives should not be included in the cost-effectiveness calculation.

A distinction needs to be made between genuinely additional resources and resources that have been switched from other uses. For example, a change of approach to policing could involve the hiring of additional police officers, a reallocation of officers from one activity to another or a more effective approach to existing crime reduction tasks. The first constitutes a clear additional resource input for the new (CRP) activity and should therefore be included

as a cost of the intervention. The second is only additional if police officers are being diverted from non-CRP related activities. The third constitutes a different approach to undertaking the existing set of activities and may use no additional resources (or even provide a cost saving and an output/outcome), although any training that is required to effectively implement the approach should be included as an additional input.

Distribution of costs

Costs are incurred by different groups and at different stages of the intervention process. There may be additional costs to various parts of the criminal justice system, health services, education services or individuals. It is important to identify who bears the cost of intervention, not only for an accurate measure of cost-effectiveness, but also to direct future support to those groups whose participation is found to be crucial to the success of an intervention.

Attributing costs to impacts and outcomes

Some interventions will have multiple crime prevention objectives. A division of inputs (and their costs) between objectives may be possible and desirable in exceptional cases, but in general the cost-effectiveness of an intervention should be measured against a *set* of defined outcomes. Where initiatives are run in parallel with, or even as part of, cross-departmental initiatives with much broader objectives than just crime reduction, evaluators will need to separate out the crime reduction element in order to attach a cost to that part of the initiative that targets crime. In practice, evaluators may need to rely on informed assumptions about the division of inputs between impacts and outcomes. These cost allocation assumptions should be spelled out in detail in order to test them in a comparative analysis.

Average and marginal costs

The analysis will allow a calculation of both the average and marginal costs of interventions. These measures will answer two key questions:

- what is the relative value for money of different interventions? (average cost)
- what level of investment in an intervention yields the highest net benefit? (marginal cost).

The average cost per output/outcome provides a measure of the overall return to an intervention, which can be used for comparing the cost-effectiveness of different interventions. The cost of an input can be measured in a number of ways. For instance, in the Safer Cities Study (Ekblom et al., 1996) the measurement used was action intensity, defined as the total investment divided by the number of households targeted in the scheme to give a cost per targeted household. This concept of action intensity might be applied to other types of intervention (e.g. the cost per child treated in an early intervention).

Marginal cost refers to the extra spending required to achieve *one extra unit of output or outcome*. For example, the marginal cost of a burglary intervention would be the amount of extra spending that is required to prevent one more burglary. Only those inputs that are required to achieve that extra outcome are included. Fixed costs (e.g. premises, additional

staff) are excluded, unless they are required to achieve this extra unit of outcome. If the cost of a marginal increase in intervention spending results in a greater reduction in the cost of crime to society (in other words the marginal return exceeds the marginal cost) it is, in principle, worth continuing to increase spending on the intervention. This has important implications for the future mainstreaming and expansion of projects that have proven to be cost-effective (see Section 5).

Data sources

To avoid duplication, maximum use should be made of existing data sources which can yield the input information required or be modified to do so. New monitoring systems should be as consistent as possible with existing practices and should be designed to enable continued data collection after the end of the initial intervention period. For each intervention, evaluators will need to make an early assessment of available data, specify any limitations and suggest alternative sources.

In order to fully capture all the opportunity costs of intervention, it may be necessary to conduct surveys of resource inputs. For example, the time spent by police on implementing an improved approach to policing could be estimated through a time-sheet survey, which would record the nature and size of the resource input, rather than actual costs.

Activity sampling exercises could be employed to estimate the inputs of community or voluntary groups or individuals. There is, of course, a limit to the amount of information that can be gathered in the course of the cost-effectiveness analysis. Evaluators should be sensitive to the resource limitations of participants to avoid 'swamping' them with information demands. Evaluators will therefore have to balance the level of detail needed in costing an intervention against the burden on participants and on the evaluation process, which could prove too high or expensive. This highlights the need for well-designed and targeted requests and clarity in explaining the need for information.

In this section:

- Identifying and quantifying outcomes
- Valuing outcomes
- Key issues

Identifying and quantifying outcomes

Evaluators will need to identify and, where possible, quantify the outcomes arising from the CRP intervention.

CRP interventions may specify a single outcome measure, but in most cases a range of outcomes will need to be measured. Where more than one outcome is defined (e.g. reduction in number of burglaries and local disorder), some form of weighting will need to be applied to arrive at a single cost-effectiveness measure. This weighting will depend on the stated objectives of an intervention. Evaluators should work in conjunction with the central Home Office team to devise a weighting system that reflects the specific package of outcomes arising for each category of initiatives.

The outcomes of CRP interventions need to be carefully defined and a convincing causal link will need to be drawn between the inputs, outputs, impacts on risk factors and outcomes. The robustness of this link will need to be tested by monitoring and measuring outputs and impacts, as well as outcomes. Crime reduction is the central aim of CRP interventions. It is the expected final outcome of the CRP as a whole. For many interventions, outcomes will be measured in terms of a reduction in the number of specified crimes such as the number of burglaries or car thefts, or a reduction in the overall crime rate in a specified area.

In others, the link with an observable reduction in crime is not so direct or immediate. Early interventions with children and families pose particular problems for the measurement of impacts and outcomes since their main benefits are only expected to occur in the medium to long term. The full benefits of such a programme may not be visible for many years and the success of the intervention will need to be measured in the interim period. Intermediate impact measures should therefore be established that partly reflect final outcome measures and partly to pick up any benefits that occur in the short term (Karoly et al. 1998). Examples of such intermediate impact measures include a decline in a child's disruptive behaviour or improved school attendance. An assessment of project effectiveness will be based on these intermediate impacts and a convincing causal link between these impacts and final outcomes.

Offender programmes are aimed at reducing offending combined with a set of wider benefits, such as increasing the employability of participants. A reduction in reconvictions over a specified period (e.g. two years after release) is typically used as a proxy indicator of success (Lloyd, Mair and Hough, 1994).

Alternatively, initiatives may be designed to reduce the cost of crime through, for example, a more efficient use of criminal justice system (CJS) resources. In such cases, outcomes may need to be more narrowly defined in terms of savings to the CJS through improved processes.

In order to undertake a CEA, expected outcomes need to be carefully defined prior to implementation and then monitored and measured through the life of the intervention. Consistent methods of quantifying outcomes will need to be applied to ensure comparability across interventions. The outcome measures used will, of course, depend on the specific objectives of each CRP intervention, but where all or some objectives are shared, a common measure is desirable.

More than one measure may be possible, for example, the impact of situational crime prevention action can be measured in terms of changes in the prevalence or incidence of crime attributable to the intervention per household or per type of crime. When designing the evaluation methodology, evaluators should consult with the central Home Office team to ensure that, where at all possible, common outcome measures are adopted.

Non-quantifiable outcomes

Outcomes which cannot be quantified should not be ignored. Whilst they cannot be incorporated into the cost-effectiveness calculations, they should be identified and recorded in qualitative terms. For example, if a CRP intervention leads to a reduction in the fear of crime, this should be reported even if it has not been quantified. Of course, no comparison of such outcomes from alternative interventions can be made if the outcomes have not been somehow quantified.

A careful distinction between outputs, impacts on risk factors and outcomes needs to be drawn to avoid confusion. For example, a targeted policing initiative designed to reduce violent crime in a town centre may lead to more arrests being made. These additional arrests are an impact of the intervention since they are the process through which the objective (reduced crime) is to be achieved. These distinctions are important when we come to attaching monetary values to outcomes, since a successful intervention would lead to more arrests and therefore higher costs to the criminal justice system. Only by measuring both impacts on risk factors and outcomes can we set this increased CJS cost in the context of reduced crime and the subsequent savings (benefits) to society.

Valuing outcomes

As noted in Section 2, *the valuation of outcomes will primarily be the responsibility of the central Home Office team.*⁹ Evaluators will identify and quantify outputs and outcomes as part of a CEA of the interventions under examination and the central Home Office team will attach monetary values to outcomes as part of a comparative cost-benefit analysis.

As noted above, CRP interventions will be evaluated on the basis of a range of expected outcomes. Since the principle concern is a reduction in crime, a monetary value needs to be attached to this reduction, to measure the benefits of interventions and of the CRP as a whole. Benefits are therefore measured primarily in terms of the *costs of crimes prevented* by a CRP intervention. Two key pieces of information are required; the number of crimes prevented and the gain or saving from each (average) prevented crime. The former will be derived as part of the broader impact evaluation undertaken by evaluators. The latter will be drawn from an ongoing exercise on the costs of crime being carried out in the Home Office.¹⁰

For information, Annex 1 outlines some of the key principles in this exercise. In addition, a document on the costs of crime is being separately produced and will be made available to evaluators. This provides a detailed account of the methods that are being used to estimate the average cost of a range of crimes. It is envisaged that current estimates will be revised on the basis of evidence gathered as part of the CRP evaluations.

Evaluators will not be required to attach monetary values to outcomes but if they wish to undertake a CBA, they should use the standard costs of crime derived by the Home Office. They can also critically assess these average costs of crime and decide whether they represent an adequate measure of the costs of crimes targeted by their particular initiative. Where evaluators believe that the estimates do not accurately reflect the cost of these crimes and where it is possible to collect cost of crime information, they should modify estimates in collaboration with the central Home Office team. Reasons for diverging from the standard estimates and all assumptions should be made explicit so that it is possible to reconstruct the calculations using the data collected by evaluators.

Key issues

Additionality of outcomes

We are interested in outcomes *over and above what would have happened if the intervention were not introduced*. One of the most difficult aspects of an impact evaluation is assessing to what degree outcomes can be attributed to the intervention under scrutiny as opposed to external influences.

9 Although contributions from evaluators on this part of the exercise will be welcomed and evaluators may wish to extend their cost-effectiveness analysis to a cost-benefit analysis.

10 Many of the outcomes of CRP interventions are not easily valued since they have no market value, for example the fear of crime or the pain and suffering of victims. The Home Office may separately commission work to place monetary values on such outcomes by drawing on techniques developed in parallel areas (e.g. transport, health). These techniques focus on people's willingness to pay and to avoid certain outcomes through revealed or stated preferences. (See Annex 1).

Identifying what would have happened anyway is never simple. Studies of crime reduction initiatives have typically measured effectiveness in a target group against a control group, in which no intervention takes place. Depending on the intervention this comparator may be a similar area, group of offenders or even an alternative sentence for the same offence and offender category. This assumes that in the absence of the intervention the two areas or groups would have continued to be similar.

In practice, a multitude of influencing factors will impact on the control and targeted groups in different ways over the evaluation period. Since no two groups or areas are identical, replicating a successful intervention in other areas does not guarantee success. A central part of the exercise is to collect information on what works and in what context. In addition, information on the mechanisms through which an intervention works is also being collected. This will help determine the expected impact of mainstreaming or widening projects.

Displacement of crime

Evaluators will need to take into account the potential displacement of crime or disorder outside the target area or group (Barr and Pease, 1990; Ekblom and Pease, 1995). An intervention may reduce crime in one area but displace it to other areas, or criminals may abandon one type of crime in favour of another. A reduction in one type of (targeted) crime in an area does not, therefore, automatically mean a net reduction in crime. Similarly, the conviction and incarceration of an offender does not necessarily mean a reduction in crime. Gang members and drug dealers are often rapidly replaced. If such negative outcomes can be attributed to the existence of the CRP intervention the effects should be set against positive outcomes in any cost-effectiveness calculation. Evaluators should identify, record and, where significant, quantify these separately before incorporating them into the cost-effectiveness calculations.

Diffusion of benefits

Positive outcomes may be diffused into other areas or groups (Clarke and Weisburd, 1994). These additional positive outcomes should be added to direct outcomes. For example, a targeted policing initiative to tackle drug dealing may have an impact on crime generally.

This implies that evaluators will need to monitor a broader range of crimes, locations and groups than just those specifically targeted by the intervention (e.g. crime rates in neighbouring districts or the criminal behaviour of close associates of offenders).

Onset, longevity and decay of outcomes

The outcomes of an intervention may occur immediately or in the longer term and will, in most cases, occur in both. Some interventions, such as installing CCTVs can be expected to have an immediate impact in deterring crime, but this impact may be short-lived (Brown, 1995). Similarly, the effects of treatment programmes for offenders may eventually wear off. Some early interventions with children and families, on the other hand, may not have any significant crime-reducing impact in the short term.

The expected and actual timing of outcomes is a crucial aspect of the evaluation and has a significant bearing on the results of the cost-effectiveness analysis. As well as the nature and scale of attributable outcomes, evaluators need to record their timing. Evaluators should record the point in the intervention process at which beneficial outcomes begin, how long they last, at what rate they diminish and at what point they disappear. This will allow a measurement of the payback period (i.e. the point at which benefits start exceeding costs - see Section 5) and an identification of the conditions that give rise to sustained benefits.

Standard measures for the longevity of impacts and outcomes, which will need to be applied for each type of intervention, will be built into the cost-effectiveness analysis until further evidence can be gathered from evaluations.¹¹ These will be devised by evaluators, in collaboration with the central Home Office team, drawing on existing evidence.

Unrecorded crime

Not all crimes are reported to, or recorded by, the police. These may tend to be 'less serious' crimes that do not involve great financial loss, but they may also be more likely to fall on repeat victims, involve some form of violence and be prevalent in the crime 'hot spots' that are targeted. The level of unrecorded crime in the British Crime Survey (Mirrlees-Black et al. 1998) demonstrates the need to include such information in any assessment of the success of a crime-reducing intervention.

Household/business level surveys are the only plausible way of gathering comprehensive information on unrecorded crime. Where it is not feasible to conduct surveys for all interventions and evaluators will need to rely on recorded data. The proportion of different types of crimes recorded, as stated in the British Crime Survey, could be used as a broad indicator of the actual level of crimes. Of course, this does not take into account any effect of the intervention on recording and/or reporting levels.

Wider outcomes

CRP interventions may have a range of wider outcomes that are not directly related to the objectives of the intervention. Local situational interventions could promote greater economic activity and inward commercial investment. Offender programmes may promote employability. Improved household security may increase the value of local housing.

If there is evidence to show a plausible relationship with the CRP intervention, evaluators should record these wider outcomes. If they are likely to be significant, evaluators should quantify them. For example, an early intervention with young children may have a significant impact on a child's school attainment and eventually on their employment prospects (Schweinhart, Barnes and Weikart, 1993). This outcome should be recorded and quantified. Where it is not possible to quantify such outcomes, evaluators should at least provide broad indication of their magnitude.

11 Note that measuring decay requires that monitoring of impact continues beyond the end of a project life.

These outcomes should, however, remain outside the cost-effectiveness framework. Their separation from the cost-effectiveness calculations does not preclude later restricted analysis incorporating the valuation of wider social benefits, but in the first instance we are interested in the efficiency of achieving the stated objectives of the intervention.

5. Comparing costs with outcomes and benefits

In this section:

- Measuring cost and outcome streams
- Risk, uncertainty and sensitivity analysis
- Testing replicability
- Reporting results of the analysis

Measuring cost and outcome streams

Input costs will not be incurred uniformly over the intervention period. Greater costs are typically incurred in the initial period because of the need for new capital,¹² the recruitment of additional staff and the training and re-orientation of existing staff. After the initial start-up period, recurrent costs will be incurred until the end of the intervention period.

Evaluators should record inputs, outputs and attributable outcomes on an ongoing basis. These should be reported to the central Home Office team periodically.

Measuring the stream of outcomes that result from an intervention is not straightforward. It involves a series of assumptions that will need to be tested over the course of the evaluation. Assumptions will need to be made about the longevity of the impact of an intervention, the likelihood that the right people/areas were targeted, the link between intermediate and ultimate outcomes, etc.

Table 5.1 depicts the type of summary information that will be recorded for a CEA in the form of a stylised example.

¹² Capital costs, in fact, are often expressed as annual capital charges rather than as lump-sum expenditure on capital items at the start of a project. For example, if a building is constructed for the purposes of the intervention which has a predicted lifetime of say, ten years, then the construction cost is expressed as an annual charge for each of the ten years. Evaluators should consult with the central Home Office team when valuing capital inputs.

Table 5.1: Stylised example of CEA table of results for an intervention tackling car crime

Costs (£) and outcomes	Year 1	Year 2	Year 3	Year 4	Total
Input costs					
A. Start-up costs	55,000	0	0	0	55,000
<i>of which:</i>					
Public Sector	45,000				45,000
Other	10,000				10,000
B. Recurrent costs	10,000	11,000	12,000	0	33,000
<i>of which:</i>					
Public Sector	9,000	9,000	9,000		27,000
Other	1,000	2,000	3,000		6,000
Total costs (A+B)	65,000	11,000	12,000	0	88,000
Outcomes					
(e.g. number of car crimes prevented)	100	150	140	50	440

Table 5.1 depicts an intervention that lasts three years with all start-up inputs in the first year of implementation. The intervention ceases at the end of year 3 but continues to have an impact on the number of burglaries in year 4. The final column shows the total cost of the intervention, separating out start-up and recurrent costs and public sector from non-public sector inputs. The average cost of preventing a car crime through this intervention is £200 (£88,000 / 440).

Table 5.2 below provides a stylised example of calculating the cumulative net economic benefit of the same intervention, in a CBA. This time the outcomes have been valued in monetary terms (arbitrarily fixed at £300 per car crime prevented) so that costs and benefits can be directly compared. The final column shows that total benefits are higher than total cost so that there is a net economic benefit from undertaking the intervention. The final row shows how this net benefit is accumulated over time. By year 3 accumulated benefits have outstripped accumulated costs.

Table 5.2: *Stylised example of the results of a CBA*

Costs (£), outcomes and benefits (£)	Year 1	Year 2	Year 3	Year 4	Total
A. Start-up costs	55,000	0	0	0	55,000
B. Recurrent costs	10,000	11,000	12,000	0	33,000
Total costs (A+B)	65,000	11,000	12,000	0	88,000
Outcomes	100	150	140	50	440
Benefits	30,000	45,000	42,000	15,000	132,000
Cumulative net economic benefit	(35,000)	(1,000)	29,000	44,000	44,000

It is important to note that this is an evaluation of costs and benefits, undertaken after the intervention period (at the end of year 4). The table therefore records actual costs and benefits.

The analysis is not yet complete. All costs and benefits need to be expressed in *real terms*. This means taking into account the effects of inflation over time. A base year needs to be chosen. Any year can be used as a base year as long as all costs and benefits are expressed in the same base year, but the current year (in the example, year 4) is normally used. Costs and benefits that are incurred in each of the previous years should therefore be expressed at the current price level. This is done by dividing the nominal values of costs and benefits by changes in a price index, such as the retail price index (RPI).

Risk, uncertainty and sensitivity analysis

Risk and uncertainty are concepts more usually associated with appraisal than with evaluation and refer to the relative probability of one or more of the factors not turning out as expected. But an evaluation of the costs and benefits of crime reduction also needs to take into account the uncertainty associated with the calculation of cost-effectiveness. The costing of certain types of crime is a hazardous task, because it invariably relies on a number of untested assumptions. The measurement of input costs may also involve uncertainty. One of the most uncertain aspects of the present analysis will be the assumption underlying the causal link drawn between inputs and outcomes. There may be a number of alternative explanations that cannot be ruled out by the quantitative logic of the research design.

Where appropriate, a *sensitivity analysis* should be undertaken, which involves varying key parameters in the analysis to test the robustness of results (see HM Treasury, 1997 - Appendix to Annex B, and Willis and Bower, forthcoming). One such parameter is the assumption of how much of the observed outcomes can be attributed to the intervention. Varying assumptions about this level of attribution will yield a range of estimates of outcomes and benefits, rather than a point estimate (see Figure 5.1 below). The level of flexibility of the results provides a guide to the robustness of findings. The range of variation of parameters used in a sensitivity analysis should take account of known statistical variation.

Figure 5.1: Simple example: Sensitivity analysis

Consider an intervention that costs £10,000 and suppose outcomes are valued at £50,000

Total Benefit (£)	Percentage of impact attributed to CRP intervention	Benefit of CRP intervention (£)	Benefit/Cost ratio
50,000	100%	50,000	5:1
50,000	60%	30,000	3:1
50,000	10%	5,000	0.5:1

The net economic benefit varies between £40,000 (with all observed benefit attributed to intervention) and -£5,000 (with 10 per cent of observed benefit attributed to intervention).

Testing replicability

A number of development projects are to be undertaken as part of the CRP, with a view to replicating and mainstreaming them if they are found to be effective and cost-effective. Evaluators will need to include in their cost-effectiveness analysis an assessment of the replicability of the intervention, specifying the conditions under which the intervention would be expected to be cost-effective. Evaluators will specify whether an expanded programme would be likely to be as cost-effective as the development project, and how and why this might not be the case. They will need to set out the elements and conditions under which mainstreaming would prove cost-effective. As far as possible, this should be done in terms that are measurable.

The expected cost implications of replicating and/or mainstreaming interventions will need to be included in a full economic appraisal which would draw on, but be distinct from, the economic evaluation.

The evaluators' main task is to prepare a cost-effectiveness analysis as part of an evaluation of CRP interventions. It is likely, however, that many evaluations will be undertaken during, rather than at the end of, an intervention period. Since the intervention will continue after the evaluation, evaluators may be required to prepare an appraisal of the future inputs and outcomes of the intervention. This would include an economic appraisal of costs and benefits. For reference a few key techniques used in economic appraisal are outlined in Annex 2. This is by no means an exhaustive list of issues in appraisal. Evaluators who are required to prepare an economic appraisal should refer to Willis and Bower 1999, (forthcoming).

A full description of the elements of an economic appraisal is not presented here but it is worth noting that any appraisal of CRP interventions would typically include an estimate of:

- the probability of resources being diverted to outside the target group/area (leakage or net-widening)
- the likely dilution of the quality of intervention through implementation that is more routine and less intensive, focused or charismatically led

- the consequences of linkages with related non-crime-reducing initiatives which may give a simple additive boost to impact, or comprise a necessary component of an interactive package
- the likely economies of scale of expansion (unit overhead costs are likely to be lower than in the development project).

The implications of programme expansion will be discussed in more detail for each set of initiatives.

Reporting results of the analysis

For each category of CRP intervention (i.e. local initiatives, early interventions, corrections, etc.), the central Home Office team will make available to evaluators a standard spreadsheet indicating data requirements on input resources. It will include variables covering all start-up, recurrent and levered-in resources. This standard format will ensure the consistency of data recording across interventions. It is essential that evaluators provide well-defined and disaggregated data on inputs, outputs and outcomes. Evaluators will be required to explain any omitted information. The data required will be as disaggregated as is practicable so as to allow a reconstruction of the calculations made by evaluators from raw data. This will be a key element of the comparative analysis undertaken by the central team.

Spreadsheets will be made available to evaluators in electronic form to facilitate their incorporation into a central cost database. Evaluators will be expected to complete the spreadsheet for each intervention periodically. The reporting period (monthly, quarterly, annually) is likely to vary by category of intervention. This will be specified in the more detailed guidance for each set of initiatives.

Evaluators should critically assess the variables included in the spreadsheet to ensure that they can fulfil their requirement to complete the table. Where the spreadsheet does not include variables that evaluators have identified as being significant, they should inform the central Home Office team who will then be responsible for its incorporation into the relevant table.

As well as reporting data to the Home Office, evaluators are also required to produce a report on cost effectiveness. Evaluators should, as far as possible, structure their reports on the results of the cost-effectiveness analysis to reflect the steps in undertaking the analysis:

- context
- project description, mechanisms and objectives
- identifying resource inputs, outputs, impacts and outcomes
- quantifying resource inputs, outputs and outcomes
- valuing resource inputs (costs)
- results of cost-effectiveness analysis
- conclusions.

The results of the CEA calculations should be presented in a standard table format. This will be designed by the central Home Office team for each category of intervention, reflecting the different nature of the interventions. This format will also be consistent with the proposed format for the spreadsheets which evaluators should complete and return to the Home Office for the central cost-benefit analysis.

Evaluators should include details of all assumptions underpinning calculations of input costs in an annex to the cost-effectiveness report. This should be in sufficient detail to allow reconstruction of the calculations from raw data.

The methods used and all assumptions underlying the cost-effectiveness analysis should as far as possible accord with those outlined in this document. Accounting conventions to be used will be made available to evaluators. These are still under development but are likely to include standard costings for public servant inputs and the use of premises. Any additional assumptions or modifications should be clearly stated and agreed in advance with the central Home Office team.

A1.1 Introduction

The central Home Office team has responsibility for attaching monetary values to outcomes. This annex is provided for information, so that evaluators can see what methods are being developed to attach monetary values to the primary expected outcome - reduced crime. Analyses of indirect benefits will also be undertaken by the central team.

A document on the costs of crime is being separately produced and will be made available to evaluators for information. This will provide a more detailed account of the methods used to estimate the average cost of crimes for use in the analysis of the costs and benefits of CRP interventions.

The costs of crime to society can never be estimated comprehensively, since there are so many direct, indirect and knock-on effects of crime to consider, some of which might be identified but which can never be quantified or valued. Nevertheless, it has been possible in a relatively short space of time to draw information on costs of crime from a wide range of sources, from both within and outside the Home Office. These include the:

- British Crime Survey
- Home Office Police Funding Formula
- Home Office Flows and Costs model of the CJS
- Commercial Victimization Survey
- Association of British Insurers
- Transport Research Laboratory (research for DETR)
- National Association of Victim Support Services
- Annual Abstract of Statistics.

The following paragraphs briefly describe methodological issues arising in the costing of crime.

A1.2 Who bears the costs of crime?

An operationally useful way of categorising the costs of crime is by those who bear the costs; victims, potential victims, the criminal justice system and others.

Victims

For the individual victim there are two main sets of costs; the direct monetary costs and the pain and suffering caused by a crime incident. In addition to the monetary value of stolen, destroyed and damaged property, victims may incur medical costs and unpaid time off work caused by any injury or psychological damage resulting from violent crime.

Pain and suffering refers to the decrease in the quality of life experienced by the victim over and above any monetary costs. There are a number of techniques available for estimating such costs. In the United States, for example, the most common basis for estimation is average jury awards to victims¹³.

The same crime may not necessarily have the same cost to all victims. A more sophisticated mapping of crime costs to take into account individual circumstances may be required. An assault on an elderly person may have a greater impact on that individual and on the community than a similar assault on a young adult. Crimes committed against young children and elderly people, the more vulnerable members of society, also tend to have a disproportionate impact on perceptions of the risk of crime.

Potential victims

Part of the cost of crime falls on society as a whole, or more precisely on potential victims. Potential victims take preventative action (e.g. driving children to school or not going out after dark) and/or defensive measures (e.g. fitting burglar alarms) to reduce the risk of victimisation. They also pay insurance premiums in order to reduce the consequences of victimisation.

A proportion of insurance payments to victims of crime represents a *transfer* from non-victim policyholders to victims, which involves no resource costs. The true resource cost of crime is the cost of insurance administration, which is also paid for by insurance policyholders (potential victims).

Neither expenditure to reduce the risk of victimisation nor expenditure to reduce the consequences of victimisation will eliminate the reduced quality of life caused by crime. Reduced quality of life is manifested through increased fear of crime, distrust, loss of enjoyment in employment or leisure activities, reduced freedom of movement and in many other ways.

The burden of reduced quality of life, of course, also falls on victims themselves, disproportionately so. A victim's fear of future victimisation is likely to increase after an incident and can lead to greater preventative measures and defensive expenditure, as well as a decreased overall quality of life (e.g. not feeling safe at home). Potential victims in direct contact or close proximity will also experience a heightened awareness and fear of becoming victims themselves.

¹³ See Miller et al. (1996).

Criminal Justice System

Crime imposes costs on taxpayers, through the criminal justice system. This includes crime prevention activity, pre-conviction costs including all police investigation costs, offender processing¹⁴, Crown Prosecution Service costs (trial costs) and post-conviction costs for the prison and probation services, young offenders institutions, etc.

Others

Costs of crime are also incurred to varying degrees by the exchequer through lost tax revenue, by the employers of victims through paid time off work for employees that have been victimised, by victim support services and by health and education services.

Table A1 below provides illustrative examples of average cost estimates (in 1996 prices) for three crime categories. These should be regarded as first estimates, as they are incomplete and are based on some speculative assumptions.

Table A1: Summary table of average cost estimates for selected crimes

Type of crime	Average cost to:				Average cost per offence (£)
	Victim (£)	Potential victim (£)	Criminal Justice System (£)	Other (£)	
Burglary					
Residential	1,000	800	500	30	2,300
Commercial	500	2,700	500	0	3,800
Car crime	500	300	200	30	1,100

Modifying these estimates

Where evaluators wish to undertake a cost-benefit analysis of their interventions, they should critically assess these average costs of crime and decide whether they represent an adequate measure of the costs of crimes targeted by their particular initiative. Where evaluators believe that the estimates do not accurately reflect the cost of crimes targeted by their particular interventions and where it is possible to collect cost of crime information, they will modify or construct new 'cost of crime' estimates in collaboration with the central Home Office team. Reasons for diverging from the standard estimates should be made explicit and all assumptions and calculations made should be as explicit as possible.

¹⁴ Including the cost of (and to) suspected/accused innocent people in the investigation.

A1.3 Measurement issues

Measuring benefits that are not easily valued

Economists generally value resources or activities undertaken at their opportunity cost. The opportunity cost of using a resource is the value of its next most valuable alternative use. Some of the opportunity costs of crime can be valued at observable market prices. For example, the cost of a broken window can be estimated by finding the market value of a replacement. It is less easy, however, to value impacts such as reduced quality of life or the emotional impact on victims arising from crimes.

A variety of techniques for measuring non-marketed goods and services have been developed. They focus on how much people are willing to pay (WTP) for certain non-marketed services and outputs or their willingness to avoid (WTA) defined outcomes. WTP and WTA are estimated using either 'revealed' or 'stated' preferences. Using revealed preference involves analysing actual expenditure patterns to estimate the amount people are prepared to spend to reduce the risk of an undesired outcome. For example, an economic assessment of the cost of injury on public transport would assess how much more travellers are prepared to pay in fares for improvements in safety standards that reduce the risk of injury by a given proportion. This provides an estimate of the value placed on avoiding the risk of injury and, by extension, the injury itself.

Using stated preferences involves the direct questioning of sample populations to discover how much they claim they would be prepared to pay to reduce the risk of an outcome by a given proportion. Open-ended discussions with victim and potential victim focus groups might provide valuable information on the indirect costs of crime, including the fear of crime.

Problems with the use of average costs

Average costs are extremely useful in enabling an evaluation of the value for money of many CRP interventions. However, they need to be treated with some caution, because:

- some impacts of crime cannot be adequately valued. It may be misleading to compare the average costs of residential and commercial burglary, for example, if the fear of crime cannot be estimated, since a residential burglary may lead to a much greater fear of crime impact than a commercial burglary
- they may mask differences in the costs of the same crime to different social, economic or geographic groups. If an intervention is targeting crimes against a particular group, the average cost may need to be refined
- interventions may not be targeted at an 'average' crime. Within the car crime category, for instance, thefts of vehicles are included with thefts from vehicles. An intervention focusing largely or exclusively on thefts of vehicles may be generating greater benefits per crime prevented than an intervention focusing on thefts from vehicles.

Transfer payments

When estimating the cost of crime, a distinction must be made between resources which are lost to society and those which have simply been transferred from one member of society to another. When a transfer is unwanted by one party (for example the victim of a theft or burglary) the property stolen can be said to be lost from 'legal society' - the property is transferred to the illegal economy and hence treated as a cost of crime.

Insurance payments as reimbursements to victims are another example of a transfer of value, in this case from non-victim policyholders to victims, redistributing the costs of crime but not reducing them. The resources used in the administration of insurance policies and claims, on the other hand, represent an opportunity cost to society, equal to the next best alternative use of those resources.

Link between reduced crime and reduced costs of crime

Does reduced crime mean real savings? For instance, a reduction in the crime rate may reduce the aggregate costs to victims but does not automatically translate into an actual reduction in spending on the criminal justice system. Given a large pool of supply of offenders, the number of convicted offenders going through the system can remain unchanged even with a relatively large reduction in crime. Even here real economic savings have been realised. A reduction in crime enables a *potential* scaling down of expenditure on the criminal justice system, or a redeployment of resources elsewhere, which would otherwise not have been possible.

A distinction does, however, need to be made between monetary and non-monetary benefits. Attaching monetary values to aspects of crime like pain and suffering is part of a full estimation of costs and benefits but does not involve direct payments to people who *would otherwise have been victimised* by crime. Again, although these people do not receive a direct monetary gain, they have avoided the financial and non-financial costs of crime, to which they attach a value.

A2.1 Discounting

If future costs and benefits are to be compared over time they need to be discounted. Discounting accounts for the preference for having a resource today rather than at some point in the future and the preference for incurring a cost later rather than now. This preference stems from the existence of a positive rate of interest, which means that £1 now is worth more than £1 in the future. Discounting, therefore, translates future costs and benefits into their present value.

The standard real discount rate currently used in central government is 6 per cent. Discounting involves multiplying future costs and benefits by a discount factor (D_n) so that the present value in year 0 of a payment of £1 at the middle of year n , assuming discount rate (r) is given by:

$$D_n = 1 / (1 + r)^n$$

For example, the present value (say in year 0) of a cost of £10,000 incurred in year 3 is:

$$£10,000 / (1.06)^3 = £8,396$$

Using the example in Table 5.2 of the main text, where the evaluation is undertaken at the end of year 4, but now including an appraisal of future expected costs and benefits for the next four years, we need to calculate the net present value of costs and benefits that are expected to occur.

Expected costs and benefits (£)	Year 5	Year 6	Year 7	Year 8	Total
Costs (actual)	15,000	11,000	12,000	0	38,000
Costs (present value)	14,151	9,790	10,075	0	34,016
Benefits (actual)	20,000	25,000	15,000	5,000	65,000
Benefits (present value)	18,870	22,250	12,590	3,960	57,670

The present (Year 4) value of total costs is £34,016 and the present value of total benefits is £57,670. The *net present economic benefit* (benefits-costs) is therefore £23,654. Note that, since benefits follow costs in the intervention process, they will be discounted more.

Expected costs and benefits should be expressed in a base (start of intervention) year. This is especially important where a comparison is being made between alternative intervention options with different start dates and/or duration. Expected costs and benefits for both interventions should normally be discounted to the beginning of the earliest intervention.

A2.2 Risk analysis and sensitivity analysis

Risk describes the possibility of more than one outcome arising. The extent of risk and uncertainty should be noted, and where feasible, quantified and valued. In appraising the viability of interventions, there are risks in projecting future costs, expenditures and outputs, as well as in assuming that all other influencing factors will remain the same or change in some foreseeable way.

The most useful technique for portraying risk is *sensitivity analysis*. This considers alternative outcomes in a systematic way by varying assumptions and external influencing factors and sometimes assigning each alternative a probability of occurrence. Treasury Guidance - Green book, suggests using a risk matrix to list the various risks and uncertainties to which particular project options are exposed. Significant risks should be quantified, others expressed qualitatively.

For a more detailed discussion of risk and sensitivity analysis for appraisal see Treasury Guidance, (1997) *'Appraisal and Evaluation in Central Government: The Green Book'* and *'Guidance on policy development in the Criminal Justice System: Economic appraisal and evaluation'* RDS, Home Office (under development).

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