June 2013

Hands-on Guide to Cost-Benefit-Analysis of Crime Prevention Efforts

Rasmus Højbjerg Jacobsen

CEBR
CENTRE FOR ECONOMIC AND BUSINESS RESEARCH
PART OF COPENHAGEN BUSINESS SCHOOL

Contents

1 Introduction

When a policy maker or an administrator decides on how many and which of a number of proposed policy measures to implement an important piece of information is whether the effort is “worthwhile”. The precise meaning of the word “worthwhile” will depend on the context. In some cases, the question of whether a policy measure is worthwhile will be decided on a purely qualitative basis given the results of the policy measure. In other – and perhaps most – cases some sort of money evaluation will be attached to the results, and a total effect in money terms will be used to evaluate the results. This manual is concerned with the latter case.

Given the large degree of competition between various projects for public funds, a compelling case for a specific project can be made if a well carried out cost-benefit-analysis shows a resulting surplus. While this criterion is obviously not the only one used, it could be an important factor when preparing policy makers to make decisions about a specific project.

The basic idea behind cost-benefit-analysis is simple: calculate all benefits and all the costs associated with a specific effort, subtract the costs from the benefits while carefully addressing the time profile, and use the resulting number as an indicator for the economic profitability of the project. If the result is positive, the project produces an economic surplus, and if it is negative the project leads to an economic loss.

Although this principle is simple the actual calculation is, however, in most cases somewhat more cumbersome, since the costs and benefits of a given effort can be difficult to determine. This is true for a number of reasons. First, it can be hard to decide whether the outcome for a group of participants is in fact a consequence of program participation or whether part of the outcome would have occurred anyway, in which case the resulting outcome cannot be fully attributed to the program. Second, although outcome is perhaps only measured in terms of relatively few variables, the outcomes of other, not measured, variables can also be expected to be influenced by the policy measure. In order to fully capture the program effect the outcome of these unmeasured variables also needs to be assessed.

Third, there may be a selection of specific types of individuals into the projects looked at, such that the results obtained are only a good predictor of the program's profitability for this specific group and not for a more general population. Fourth, the cost measure used should only include the extra costs incurred to run this project and not costs that would have been incurred in any case – a distinction that in some cases can be hard to make. Given these difficulties it is clear that the basis for any good cost-benefit-analysis is the available data for the costs and benefits.

This manual is not a comprehensive guide to cost-benefit analysis, nor does it include a theoretical background for the analysis. For such detailed descriptions the reader is referred elsewhere. The present manual is rather a hands-on guide to administrators or external consultants who want to carry out a cost-benefit-analysis of crime prevention programs in Europe. Hopefully, this rather brief manual will also serve as an inspiration such that more cost-benefit-analyses will be carried out in the future.

The remainder of the manual is structured as follows: Chapter 2 describes a number of ways to construct measures for the effects of a given project. Chapter 3 in a similar fashion shows how to calculate the costs of a project. Chapter 4 collects the information from the two previous chapters and describes the details the calculations involved in the cost-benefit-analysis. Chapter 5 concludes and discusses some of the pitfalls of the method. The appendices contain a number of tables with an overview of (i) the elements to be included in the cost-benefit analysis, and (ii) cost-benefit analyses already carried out which can serve as inspiration.

2 How to measure effects

As outlined in the introduction any cost-benefit-analysis must take its starting point a measurement of the effect of the program under consideration. This measurement can come in various forms, and in this chapter we present possible sources for such measurements when studying crime prevention programs. The chapter concludes with a check list which can be utilized by administrators when carrying out a cost-benefit-analysis.

In the case of crime preventions programs the economic effects come mainly through savings in a number of public expenditure areas and from the cost of running the program. A drop in recidivism may, for example, lead to savings on

- direct crime related costs such as incarceration, prosecution services and the police force.
- payment of public transfers as criminals are more likely to receive public transfers.
- health costs. Costs of treating both criminals and their victims are avoided.

However, there may also be effects that lead to extra public revenue:

- higher labour income for the persons who avoid criminal behaviour and return to more normal behaviour.
- related to this: higher public revenue on income taxes as earned income is generally higher than the transfer income it replaces.

In general there are three possible channels through which information can be obtained about the effect of a given program: evaluation, individual data and relevant literature. Each of these three areas will be presented in turn below.

2.1 Program evaluation

In a sense it is almost self-evident that we need to evaluate the effect of a particular program before we can assign monetary value to its outcomes. Indeed, any program should be evaluated in order to assess whether the program has fulfilled the goal(s) assigned to it.

However, in a cost-benefit setting there are also several limitations to using program evaluations. Such limitations must be taken into account when designing the analysis. Both the advantages and the limitations will be discussed here.

Quantitative rather than qualitative evaluations

There is a large literature on evaluations, in particular in political science and sociology. This literature includes underlying theories and emphasizes among other things that evaluations should be carried out with respect to the goals of the program being evaluated. Also, the literature overlaps with the survey-literature with respect to the design, timing and statistical validity of evaluation surveys[1].

When using program evaluations for cost-benefit purposes qualitative evaluations[2] are not the most obvious choice. In some cases, it may be possible to attach valuations to some of the qualitative conclusions from such a study, but in most cases this is not a possibility. With quantitative evaluations[3] the picture is different. Such evaluations may serve directly as a data basis for cost-benefit analyses since the quantitative measurement of outcomes can directly be used and set up against the costs of the program.

In order to make full use of the results of quantitative evaluations it may in many cases be necessary to "translate" the effects obtained in one area into the relevant effects for other areas. For instance, while a study may only provide a quantitative measure of the effects on recidivism, it seems fair to assume that a fall in the rate of recidivism is associated with similar increases in employment rates, shares of persons receiving public transfers etc.[4]

---

[1] The interested reader is referred to (Omura, 2004), (Wolcher) or (Cowen, 1998) for overviews of the evaluation literature in political science.

[2] The interested reader is referred to (Ms. Kaye Stevens, Ass. Prof. Patricia Rogers, Dr. Jonathan Boymal, 2008) or (J. Cox, R. Cook) for overviews of qualitative evaluation and cost benefit analysis.

[3] More information about quantitative evaluation and cost benefit analysis can be found in (B. Gharaibeh, H. Rajan, J. M. Chang, 2009) or (McMahon) articles.

[4] There is plenty of empirical evidence for this assumption. While the different outcomes may not be perfectly correlated with the change in recidivism, the different variables exhibit a large degree of co-variation with recidivism, for example a drop in recidivism is likely to increase the share of individuals employed.

If, for example, a 10 percentage point drop in recidivism has been observed as a consequence of a crime prevention program, then this 10 per cent estimate may serve as a reasonable guess for the estimates covering other areas. That is, if individuals, who have continued the criminal behaviour rather than discontinued it, have a 20 percentage point higher risk of receiving a certain public transfer, then the effect of the program, may be translated into a 2 percentage point (= 0.1 * 0.2) drop in the likelihood of receiving the public transfer. A similar translation can be applied in other areas if the relevant data are available.

2.2 Relevant literature

If an actual quantitative evaluation of a program has not been carried out then it is in some cases still possible to use survey data. There is a quite large literature based on survey data for cost-benefit analysis[5]. The survey analysis is useful as it helps to find out for instance how much the target (particular) group is prepared to pay for a qualified product or service (e.g., for ecological resource quality), or what amount of compensation they would want for the loss of the goods or services (e.g., environmental resources). This kind of data is widely used to analyze air and water quality, improve the education system, pollution, health effects of monetary costs and benefits. In this case, there could be some inaccuracy using the survey data, as surveys are subjective and time-varying opinions, are not precise, and do not always capture all elements. Finally, answering surveys is time-consuming.

A literature search can also be used to find evaluations of similar programs elsewhere or even meta-studies of evaluations that supplies an estimated effect for a range of programs. In many cases such an estimate can be of better quality than local evaluations, if the local evaluation has not been particularly meticulous.

[5] More information could be found in the appendices section 7.2.

2.3 Individualized data

Data for individuals will be beneficial for cost-benefit purposes in so far as the effects of the program in all possible areas cannot be measured directly. In this case combining knowledge of program effect with register based or census based data will allow a calculation of costs and benefit for a range of other areas, for example social benefits, medical costs or similar.

For example, it is often possible from register or census data to construct two groups of persons: One group is the target group for the crime prevention program, and the other group is a group which is similar to the target group in, say, age and sex composition, but has progressed further on the criminal path. The first group can then be thought of as being the persons being helped by the program, while the second group can be thought of as the group with recidivism – and the difference in outcome between the two groups is the effect from preventing recidivism. Combining the register or census information on the two groups allows the cost-benefit-evaluator to extend the cost-benefit-analysis to cover many areas beyond the simple program evaluation measure.

Of course, estimates from program evaluations can only be used to measure the program effect in other areas if the effect can be translated in a meaningful way. For example, if the program goal is to lower recidivism, then maybe the outcome for labour market attachment, self-dependency etc. may not be affected to a similar extent. Whether the effects from program evaluations can be transferred to also cover other areas is a matter of statistical testing and subjective judgment on the part of the cost-benefit-evaluator.

Check list

This check list contains some points to remember for the administrator who wants to carry out a cost-benefit-analysis for a specific crime prevention program:

I. Has the program been evaluated? Does a quantitative measure of the program's effect exist? – or is it purely qualitative?

II. Have the quantitative evaluations been carried out using a proper control group? Is the difference in outcome statistically significant? If yes, then the outcome difference may serve as the basis for a cost-benefit-analysis.

III. If no quantitative evaluations exist, then it could be possible to find an evaluation or a meta-study of evaluations of programs of a similar kind.

IV. If none of the above sources provide a reasonable estimate for the effect of the program, then a cost-benefit analysis cannot be carried out on the basis of the available information.

3 How to measure costs?

As was the case for effects in the previous chapter, it is also true for costs that these should be measured carefully in order to make the correct assessment of whether a program or a project is economically worthwhile. Fortunately, measuring costs is usually somewhat easier than measuring effects, because the costs are more directly connected to the program in question, but it is important to remember to include all costs when designing a cost-benefit study, since otherwise the cost-benefit analysis may result in a too optimistic assessment of the program.

In general the costs of a program can be divided into direct and indirect cost. The definitions and measurement of these two types of costs are described in the following two subsections.

In order to avoid confusion it should be made clear that when referring to "costs" in this section we mean program-related costs i.e. the costs of offering and running a crime prevention program, and *not* the costs to society of crime. The crime related costs to society are exactly the ones that any program of crime prevention seeks to avoid, and therefore, the changes in these costs are included in the previous chapter on "How to measure effect".

Direct costs

The direct costs of a program are simply the costs that can be directly attributed to program.

Included in the direct costs are

- Personnel.
- Facilities.
- Equipment and materials.
- Other costs that are directly connected to the program.

Personnel costs refer to all of the human resources required for the programs such as salaries and other benefits for specialists, managers and other staff. Facilities costs include the physical space required for the program. Equipment and materials refer to furnishings, instructional equipment and materials that are used for the program.

Other costs include all other items that do not readily fit into the above categories (e.g., travel, cost of training sessions, etc.) (M. Lambur, R. Rajgopal, E. Lewis, R. H. Cox, M. Ellerbrock).

Indirect costs

Indirect costs are costs that are not directly connected to the program, but may be incurred by others. This could be:

- The cost of other government agencies for administrating the program.
- Also indirect costs are often referred to as overhead costs. Typical overhead items are indirect labour, indirect material, and fixed costs such as rent, depreciation, advertising, taxes, utilities, and insurance, but it depends on the project.

In some cases indirect overhead costs may be small and can be disregarded – this is particularly true if the program looked at is small relative to the overall administration etc. of similar programs. Some parts of the indirect costs are almost fixed in nature, and expanding the crime prevention programs by a small number of participants will not alter these costs significantly. However, if the programs are large scale programs, the overhead costs can be expected to change by an amount which is big enough to warrant its' inclusion.

Only incremental costs

In some cases a program can be seen as a supplement to an already existing program. In this case it is important to use only the incremental cost of the supplement for the calculations.

That is, if a particular crime prevention program costs €100,000 for 10 individuals, and if the program that would otherwise have been offered costs, say, €70,000 for 14 individuals, then the *incremental* cost is €5,000 per person (a unit cost increase from €5,000 to €10,000).

If the alternative is to give the persons in question no offer of a crime prevention program, then the incremental costs equals the total cost of the program.

What should (not) be included in the CB-analysis?

Before turning to the actual calculation in the cost-benefit analysis, it is important to consider which variables should be included in the CB-analysis and which variables are sufficiently insignificant to be left out. Since data cannot be expected to be available for all possible effects and costs for a program, it is important to have an idea of whether the ones that are missing are insignificant enough that they can be left out whithout invalidating the analysis.

Before starting out the analysis it is of course difficult to decide which variables are worth including in the CB-analysis. Therefore, it is recommended taking two important questions into account: (1) *Is this cost/benefit important and relevant?* The cost or benefit should be regarded as important if it can lead to a conclusion regarding the choice among a list of alternative offers. Also, if its omission or inclusion can change the conclusion of the analysis, it should obviously be included. It should not be included if it is not relevant or insignificant. (2) *Is the cost/benefit measured reliably and efficiently?* If the combined efforts and resources that are needed in order to calculate costs and benefits for a particular area are bigger than the results of the process benefits, then it is not appropriate to do quantitative evaluation of these costs/benefits. In such a case it is recommended to do a qualitative evaluation.[6]

[6] More information could be found in the 7.1 Appendices section.

4 How to carry out the CB-analysis

This chapter contains a practical guideline on how to make cost-benefit calculations given the costs and the effects found in the previous chapters. The chapter – as the rest of the manual – has a "hands-on"-approach to cost-benefit analysis and so it will go through the necessary calculations in some detail.

We first show the relevant formulas for calculating costs and benefits of a program, and we show that – depending on the level of detail in the available data – the calculations involved may be more or less simple. After presenting these formulas the rest of the chapter is devoted to presenting a few examples of how to use the formulas.

The math behind cost-benefit calculations

The basic formula for calculating the net present value (NPV) of a program is

$$NPV(a,s) = \sum_{t=0}^{T} \left(\frac{1}{1+r}\right)^{t} \sum_{i=1}^{n} [P(i,a,s,t)Q(i,a,s,t) - C(i,a,s,t)]$$

The equation shows that the net present value of a program for a person of age *a* and sex *s* can be calculated by summing over all years *t* and all possible areas of effect *i*. *P(i,a,s,t)* is the unit cost of effect area *i* for a person of age *a* and sex *s*, and *Q(i,a,s,t)* is the incremental measured effect for such a person. Finally, *C(a,s,t)* is the incremental cost of the program for an individual of age *a* and sex *s* at time *t*.

The data demand to calculate the net present value according to the formula above is quite heavy, as we need data for unit costs of effect areas, the size of the effect and the cost of the program broken down by age, sex and time. While the calculation involved therefore may be a bit cumbersome, in most cases it may not be an effect decomposed into age-sex-groups that we are looking for, but rather an overall program effect.

In cases, where we just want to calculate the overall (average) effect of a program, the formula simplifies to

$$NPV = \sum_{t=0}^{T} \left(\frac{1}{1+r}\right)^{t} \sum_{i=1}^{n} [P(i,t)Q(i,t) - C(t)]$$

In this case all that is needed is the effect and unit cost of the different effect areas. The above formula is explained in more detail in *Example 1* below.

Suppose furthermore that the unit cost of the effect areas can be assumed to be constant over time[7]. Finally, let us also assume that all program costs are incurred before the effects of the program start to show. Then the formula simplifies even further to

$$NPV(a,s) = \sum_{t=0}^{T} \left(\frac{1}{1+r}\right)^{t} \sum_{i=1}^{n} P(i)Q(i,t) - C$$

Now, all we need information about is the overall program cost per individual, the unit benefit of the effect areas and the size of the effect in each area. The above formula is explained more detail in *Example 2* below.

Example 1

In order to use the formula above, data from the (i,t)-dimension is needed, where i is a number of different effect areas and t is a time variable.

For instance, let us say that our interest is a Crime Prevention program with different effect areas such as *public transfers*, *prisons* and *health care*. In order to introduce the numbers in tables below, two groups should be presented: 1) treatment group of people which have been through a crime prevention program, and 2) control group

[7] This is for example the case if the average cost of a prison day or the average cost of medical treatment can be said to be constant over time.

of people that have not been through a crime prevention program.[8] The unit costs for different areas and across the different time periods are introduced in TABLE 4.1. Time period in this context means years after the initiation of the crime prevention program, that is year 0 is the initial year, year 1 the following year and so on. While the program in principle may have long lasting effects, data availability often restricts the numbers of years that can be analyzed.

Turning to TABLE 4.1, the numbers in the table should be thought of as "unit costs" for each of the areas. For "public transfers" this could equal the average amount paid out to transfer recipients, while the unit cost related to prison could be the average cost of a year in prison.

TABLE 4.1 THE UNIT COSTS OF DIFFERENT EFFECT AREA FOR AN INDIVIDUAL (€)

P(i,t)	0	1	2	3	4
Public transfer	1000	1500	1300	1200	1700
Prisons	100	200	300	300	300
Health	500	400	400	300	200

Note: Numbers are only illustrative examples and do not refer to a particular program.

Source: Example provided by CEBR.

To measure the effect, *Q(i,t),* we take the difference in value of 1) the average in the treatment group and 2) the average in the control group. For instance, the effect for public transfers at time 1 in TABLE 4.2 below is 0.02. This would for instance be the case if individuals from the treatment group have an 8 percent likelihood of receiving public transfers, and individuals from the control group have a 10 percent likelihood of receiving public transfers. The effect of the crime prevention program is then a drop of 0.02 (that is 2 percentage points) in the likelihood of receiving public transfers.

The measured effect for an effect area and different time is represented in the TABLE 4.2.

[8] In a real life application of the formula, many other variables may be included. The three presented variables should only be thought of as illustrative examples.

TABLE 4.2 THE MEASURED EFFECT FOR AN EFFECT AREA AND DIFFERENT TIME FOR AN INDIVIDUAL

Q(i,t)	0	1	2	3	4
Probability of receiving public transfers	0	0.02	0.05	0.1	0.1
Prison day	0	2	5	6	7
Medical treatment	1	2	2	3	4

Note: Numbers are only illustrative examples and do not refer to a particular program.
Source: Example provided by CEBR.

The final part needed to calculate the net present value of the program is the cost profile of the program. This is illustrated in TABLE 4.3.

TABLE 4.3 THE COST OF THE PROGRAM FOR AN EFFECT AREA AND DIFFERENT TIME (€)

C(t)	0	1	2	3	4
Program cost	5 000	2 000	1 000	0	0

Anm.: Number are only illustrative examples and do not refer to a particular program.
Kilde: Example provided by CEBR.

Moreover, for our present example, let us assume that the interest rate (*r*) is equal to 3 per cent per annum.

The result of the cost-benefit calculation for *public transfers* should then be calculated by, firstly, multiplying *P("public transfer",0)* and *Q("public transfer",0)* and subtracting *C("public transfer",0)* and, secondly, summing for all periods while including the discounted rate $\frac{1}{(1+0.03)^t}$, where $t=0,1,2,3,4$.

Doing this calculation for all three areas yields the total net present value for each as shown in TABLE 4.4 below (after rounding to whole numbers):

TABLE 4.4 THE COST BENEFIT RESULTS FOR EACH EFFECT AREA AND NPV (TOTAL) (€)

Area	Amount
Public transfers	351
Prisons	5,315
Health	3,565
- Program cost	-7,884
TOTAL	**1,347**

Anm.: Number are only illustrative examples and do not refer to a particular program.
Kilde: Example provided by CEBR.

In this case the calculation results in a positive net present value of 1,347 € with a positive effect for all the three included areas.

Example 2

In order to give an example based on the most simple formula introduced above, we still need data of the same dimension for the effect variables, i.e. the (i,t)-dimension, where i is an indicator for the specific effect areas and t is a time variable. For the sake of simplicity let us assume that these effects are the same as the ones given in TABLE 4.2 above.

In this case, however, the unit cost for each effect area is assumed to be constant over time, i.e. only a single value for this is needed. This means for example that overall numbers for public transfers can be used. If, say, there is a legal amount of public transfer to be paid out to each recipient, then the calculation can use this number rather than having to calculate averages over different populations. Also, an overall value of the cost of a prison year could be used a unit cost measure for prisons.

An example of these numbers is shown in TABLE 4.5.

TABLE 4.5 THE UNIT COSTS OF DIFFERENT EFFECT AREA FOR AN INDIVIDUAL (€)

	P(i)
Public transfers	1400
Prisons	250
Health	350

Anm.: Number are only illustrative examples and do not refer to a particular program.
Kilde: Example provided by CEBR.

In the formula used for this example the cost of the program is also assumed to be incurred initially and can thus be simplified in a single

number. In this case, let us assume that the incremental cost of the program equals 8,000 € per participant.

Using the formula above we arrive at the following result for the cost-benefit calculation in this case. Here, the total surplus equals 831 € per person.

TABLE 4.6 THE COST BENEFIT RESULTS FOR EACH EFFECT AREA AND NPV (TOTAL) (€)

Area	Amount
Public transportation	346
Prisons	4,591
Health	3,894
- Program cost	-8,000
TOTAL	**831**

Anm.: Number are only illustrative examples and do not refer to a particular program.

Kilde: Example provided by CEBR.

Summing up, the formulas and examples in this chapter have shown how to carry out a cost-benefit-analysis, what types of data are needed as well as two different approaches to the calculations. The examples also show how to calculate the effect for each area separately as emphasized by Aos et al. (2004): “The effect sizes is the degree to which a program has been shown to change an outcome of program participants relative to a comparison group – are calculated, where possible, for each program” (S. Aos, R. Lieb, J. Mayfield, M. Miller, A. Pennucci, 2004). Section 7.2 in the appendices contains an overview of actual cost-benefit-analysis of crime prevention programs.

5 Conclusion and discussion

This note has described in detail how to find the relevant data for the effects and costs of a program and how to use these data to carry out a cost-benefit analysis.

Advantages of using cost-benefit analyses

The main advantage of using cost-benefit analysis is that it results in a single number that answers the question of whether the program is economically worthwhile. This single number has an intuitive appeal and may be used as an important argument when deciding which specific programs to implement.

There are also other advantages of using CB-analysis, for instance it can be carried out at many different levels such as local, regional, national or even international level. It also provides a clear indication of the net cost-benefit of a specific area or regulation by helping to justify decisions at different levels. A CB-analysis simplifies complex concepts and processes and it is more readily accepted by society than any other economic evaluation methods.[9]

Limitations and pitfalls

There are some disadvantages of using CB-analysis as well. For instance, it can be difficult to find out the exact discount rate of future costs and benefits, as well as indirect impacts. Also the analysis could take more time to complete than expected and become a time-consuming and expensive process. Moreover, the CB-analysis does not usually consider questions of justice with respect to how costs and benefits are distributed across various groups, as well as the source of the costs and benefits.[10]

More specifically, regarding the all crime-costing studies, especially in the (K. E. McCollister, M. T. French, H. Fang, 2010)-article, it is mentioned that there also could be some limitations in quantifying the actual number of offenses for crimes (i.e. drug law violations and

[9] Source: http://www.hd.gov/HDdotGov/detail.jsp?ContentID=297

[10] Source: http://www.hd.gov/HDdotGov/detail.jsp?ContentID=297

prostitution, etc.) and their consequent exclusion from the CB-analysis. One more limitation is the exclusion of some important variables from the estimates presented in their article such as the costs of psychological injury.

6 Bibliography

A. S. Rajkumar, M. T. French. (1997). Drug Abuse, Crime Costs, and the Economic Benefits of Treatment.

B. Gharaibeh, H. Rajan, J. M. Chang. (2009). A Quantitative Cost/Benefit Analysis for Dynamic Updating. *ICSE*. Hentet fra http://archives.cs.iastate.edu/documents/disk0/00/00/06/23/00000623-00/Gharaibeh-Rajan-Chang09.pdf

Chisholm, J. (2000). Benefit-Cost Analysis and Crime Prevention. Hentet fra http://www.aic.gov.au/documents/9/D/4/%7B9D4E07CA-74FF-4F35-9C31-71504330BD00%7Dti147.pdf

Cowen, T. (1998). Using Cost-Benefit Analysis to Review Regulation. *Department of Economics, George Mason University, Fairfax, VA 22030, Draft*. Hentet fra http://www.gmu.edu/centers/publicchoice/faculty%20pages/Tyler/Cowen%20on%20cost%20benefit.pdf

D. L. Olds, J. Eckenrode, Ch. R. Henderson, H. Kitzman, J. Powers, R. Cole, K. Sidora, P. Morris, L. M. Pettitt, D. Luckey. (u.d.). Long-Term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect: Fifteen-Year Follow-Up of a Randomized Trial. Hentet fra http://www.columbia.edu/cu/psychology/courses/3615/Readings/JAMA_1997_Olds.pdf

J. Cox, R. Cook. (u.d.). Intensive Alternative to Custody Employment Mentoring service – Cost Benefit Analysis and Qualitative Evaluation. *New Economy*.

K. E. McCollister, M. T. French, H. Fang. (2010). The Cost of Crime to Society: New Crime-Specific Estimates for Policy and Program Evaluation. Hentet fra http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2835847/

L. N. Masse, W. S. Barnett. (u.d.). A Benefit Cost Analysis of the Abecedarian Early Childhood Intervention. Hentet fra http://nieer.org/resources/research/AbecedarianStudy.pdf

M. Lambur, R. Rajgopal, E. Lewis, R. H. Cox, M. Ellerbrock. (u.d.). Applying Cost Benefit Analysis to Nutrition Education Programs: Focus on the Virginia Expanded Food and Nutrition Education Program. *Virginia Tech*, 490-403. Hentet fra http://pubs.ext.vt.edu/490/490-403/490-403.html

M. T. Frencha, K. E McCollister, S. Sacks, K. McKendrick, G. D. Leon. (2002). Benefit–cost analysis of a modified therapeutic community for mentally ill chemical abusers. Hentet fra http://www.sciencedirect.com/science/article/pii/S014971890200006X#

M.A. Cohen, R.T. Rust, S. Steen, S.T. Tidd. (2004). Willingness-to-pay for crime control programs. Criminology. Hentet fra http://onlinelibrary.wiley.com/store/10.1111/j.1745-9125.2004.tb00514.x/asset/j.1745-9125.2004.tb00514.x.pdf?v=1&t=h9rk6ac0&s=b681b33f4d4476eb6454028d73ce26458b87fb28

McMahon, B. (u.d.). Cost justification strategies for an EMIS implementation. Part II: quantitative elements of a cost benefit analysis for an EMIS implementation. *KNOWLEDGE MANAGEMENT INNOVATIONS, LTD*. Hentet fra http://www.kminnovations.com/whitepapers/ehs-software-cost-justification-2/page-1.aspx

Ms. Kaye Stevens, Ass. Prof. Patricia Rogers, Dr. Jonathan Boymal. (2008). Evaluation of the stronger families and communities strategy. Qualitative cost benefit analysis. *RMI University Circle*.

Omura, M. (2004). Cost-benefit analysis revisited: is it a usefull tool for sustainable development? *Kobe University Economic Review 50*. Hentet fra http://www.econ.kobe-u.ac.jp/doc/seminar/ER/files/445.pdf

R. Donato, M. Shanahan. (1999). The Economics of Implementing Intensive In-prison Sex-offender Treatment Programs. Hentet fra http://www.hawaii.edu/hivandaids/Economics%20of%20Imple

menting%20Intensive%20In%20Prison%20Sex-Offender%20Treatment%20Programs.pdf

R. Donato, M. Shanahan, R. Higgins. (1999). A cost-benefit analysis of child sex-offender treatment programs for male offenders in correctional services. Hentet fra http://www.criminologyresearchcouncil.gov.au/reports/23-96-7.pdf

Reh, F. J. (u.d.). *Cost Benefit Analysis*. Hentet fra About.com Guide: http://management.about.com/cs/money/a/CostBenefit.htm

S. Aos, P. Phipps, R. Barnoski, R. Lieb. (2001). The comparative costs and benefits of programs to reduce crime. Hentet fra http://www.wsipp.wa.gov/rptfiles/costbenefit.pdf

S. Aos, R. Lieb, J. Mayfield, M. Miller, A. Pennucci. (2004). Benefits and Costs of Prevention and Early Intervention Programs for Youth. Technical Appendix. *Washington State Institute for Public Policy*.

T. R. Miller, M. A. Cohen, S. B. Rossman. (1993). Victim Costs Of Violent Crime And Resulting Injuries. Hentet fra http://www.npaihb.org/images/epicenter_docs/injurypreventio n/Motor/VictimCostsOfViolentCrimeAndResultingInjuries.pdf

T.R. Miller, M.A. Cohen, B. Wiersema. (1996). Victim Costs and Consequences: A new Look, National Institute of Justice Research Report. Hentet fra https://www.ncjrs.gov/pdffiles/victcost.pdf

Wolcher, L. E. (u.d.). Senseless Kindness:The Politics of Cost Benefit Analysis. *Charles I. Stone Professor of Law, University of Washington School of Law*. Hentet fra http://depts.washington.edu/econlaw/pdf/Wolcher.pdf

7 Appendices

7.1 What should (not) be included in the CB-analysis?

The cost / benefit	Comments for inclusion / non-inclusion in the analysis
Sunk costs	Sunk costs - costs that have already been incurred and cannot be recovered. These costs *should not be included* in the analysis because they are the results of past decisions and these decisions of different (alternative) funding should not be accepted and included into the CB-analyses
Capital and operating costs	All costs associated with the decision flow *should be included* in the cost-benefit analysis, and it does not matter whether it is capital or operating costs, or operating or non-recurring costs.
Amortization/ depreciation	Amortization/depreciation is the accounting term which refers to the real value of annual losses on the physical assets used in the programs. Depreciation has no direct economic effect (i.e., does not result in cash settlement/flow) and therefore *should not be included* in the cost-benefit analysis.
Financial transactions	Financial transaction costs, such as interest rates, *are usually not included* in the cost-benefit analysis. This is because the cost-benefit analysis is not concerned with the reallocation of funds, but rather with the increase/decrease in the supply of resources (decision outcome) for the whole economy.
Unforeseen costs	In cases where the uncertain costs/benefits are part of the expected decision costs or benefits, they *should be included* in the cost benefit analysis.
Taxes	Values net of taxes, e.g. excluding the value added tax (VAT), and other indirect taxes *should be used* in the Cost-benefit analysis.
Deadweight loss	Deadweight loss (sometimes called Excess Burden) is a public social welfare loss (expense) resulting from policies or other actions that do not generate the benefits. This is primarily

	due to a tax or a regulatory input. In order to include this variable into CB-analysis, deadweight loss (expense) should be evaluated in each case.
Externalities	A decision may have positive or negative effects for those people who are not directly linked to it (this is especially true for environmental and health-related decisions). External impacts in a cost-benefit analysis should be considered in each individual case. As a general rule, the external effects should be included in the analysis if it can be quantified and is significant enough to influence the decision on the optimal alternative. All external exposure assessment assumptions must be well explained and justified. External effects, which may not be quantifiable, must at least be identified and explained.
Transfer payments	Transfer payments are "unidirectional" payments that are not in exchange for goods or services. These “unidirectional” payments include social security benefits, retirement and disability pensions, student grants, unemployment benefits, etc. These payments *should not be included* in the cost-benefit analysis, since they only affect the public welfare redistribution, but do not affect the cost/benefit calculation for the whole economy. In an overall overview of costs and benefits these may be included to show the separate effect on the private and the public sector. However, when calculating the total effect to society of a particular program, the gain for the public sector in terms of decreased expenditures on public transfers will be exactly outweighed by the loss for the private sector, thus resulting in a zero total effect.

7.2 Literature overview

The relevant literature is listed in this section.

1. “The comparative costs and benefits of programs to reduce crime”

Written by Steve Aos, Polly Phipps, Robert Barnoski, Roxanne Lieb in May 2001.

Link to the article: http://www.wsipp.wa.gov/rptfiles/costbenefit.pdf

They analyze basic four areas:

• Early Childhood Programs;

• Middle Childhood and Adolescent (Non-Juvenile Offender) Programs;

• Juvenile Offender Programs; and

• Adult Offender Programs

Areas	**Programs**	**Data**	**Findings**
Early Childhood Programs	For their cost-benefit analysis, the Institute identified two types of prevention programs for early childhood: 1) Nurse Home Visitation 2) Early Childhood Education for Disadvantaged Youth	Washington State Auditor's Office	1) The evaluation research studies that have examined the nurse home visitation program show that it can be expected to reduce the subsequent criminal activity of participants. Both the mothers that received the program and their youth had lower criminal outcomes than those not receiving the program in a fifteen-year follow-up evaluation. 2) The early childhood education does not break even with taxpayers when only the taxpayer savings associated with lower future criminality are considered: the net present value is -$4,754. Adding the benefits that accrue to crime victims with reduced future criminality, however, increases the expected net present value to a positive $6,972 per participant, which is equivalent

			to a benefit-to-cost ratio of $1.78 for every dollar spent.
Middle Childhood and Adolescent (Non-Juvenile Offender) Programs	1) Seattle Social Development Project (SSDP) 2) Quantum Opportunities Program (QOP) 3) Mentoring 4) National Job Corps 5) The Job Training Partnership Act (JTPA)	Washington State Auditor's Office	1) An average effect size of about -.13 for basic crime outcomes. Based on the Institute's estimates, a typical average cost per SSDP participant is about $4,355. Overall, taxpayers roughly break-even for this investment: the taxpayer-only net present value is -$456 2) An effect size of about -.31 for basic crime outcomes. The program is expensive. Overall, from the taxpayer's perspective, the substantial up-front program costs are not recovered by the reduction in criminal justice system costs stemming from the lower crime rates: the taxpayer-only net present value is -$8,855. 3) An effect size of about -.04 for basic crime outcomes. Based on the Institute's estimates, a typical average cost per mentoring participant is about $1,054, although this figure apparently does not include the often-substantial costs of volunteer time on the part of the mentor—a defect in the evaluation evidence on mentoring. Overall, taxpayers just break-even for this

			investment: the taxpayer-only net present value is $225. 4) An average effect size of about -.08 for basic recidivism. Based on the Institute's estimates, a typical average cost per Job Corps participant is about $6,123. Overall, taxpayers do not recover this cost in subsequent criminal justice cost savings for each program participant: the taxpayer net present value is -$3,818. 5) The average effect size was +.10 for basic crime rates, meaning recidivism rates were, on average, higher for the youthful JTPA participants than for a randomly assigned control group.
Juvenile Offender Programs	*Specific "Off the Shelf" Programs:* 1) Multi-Systemic Therapy (MST) 2) Functional Family Therapy (FFT) 3) Aggression Replacement Training (ART) 4) Multidimensional Treatment Foster Care (MTFC)	Washington State Auditor's Office	1) An average effect size of about -.31 for basic recidivism. Based on the Institute's estimates, a typical average cost per MST participant is about $4,743. Overall, taxpayers gain approximately $31,661 in subsequent criminal justice cost savings for each program participant. Adding the benefits that accrue to crime victims increases the expected net present value to $131,918 per participant, which is equivalent to a benefit-cost

	5) The Adolescent Diversion Project (ADP) *General Types of Juvenile Offender Programs:* 6) Diversion with Services (vs. Regular Juvenile Court Processing) 7) Intensive Supervision Programs 8) Coordinated Services 9) Juvenile Boot Camps 10) Scared Straight Type Programs 11) Other Family-Based Therapy Approaches 12) Juvenile Sex Offender Treatment		ratio of $28.33 for every dollar spent. 2) An average effect size of about -.25 for basic recidivism. Based on the Institute's estimates, a typical average cost per FFT participant is about $2,161. Overall, taxpayers gain approx. $14,149 in subsequent criminal justice cost savings for each program participant. Adding the benefits that accrue to crime victims increases the expected net present value to $59,067 per participant, which is equivalent to a benefit-to-cost ratio of $28.81 for every dollar spent. 3) A typical average cost per ART participant for this group-based intervention is about $738. Overall, taxpayers gain approx. $8,287 in subsequent criminal justice cost savings for each program participant. Adding the benefits that accrue to crime victims increases the expected net present value to $33,143 per participant, which is equivalent to a benefit-to-cost ratio of $45.91 for every dollar spent. 4) An effect size of about -.37 for basic recidivism. A typical cost per MTFC participant is $2,052. Overall, taxpayers gain approx. $21,836 in subsequent

			criminal justice cost savings for each program participant. Adding the benefits that accrue to crime victims increases the expected net present value to $87,622 per participant, which is equivalent to a benefit-to-cost ratio of $43.70 for every dollar spent. 5) A typical average cost per ADP participant is about $1,138. Overall, taxpayers gain approx. $5,720 in subsequent criminal justice cost savings for each program participant. Adding the benefits that accrue to crime victims increases the expected net present value to $27,212 per participant, which is equivalent to a benefit-to-cost ratio of $24.91 for every dollar spent. 6) A typical average cost per program participant is a negative $127; that is, the added cost of a diversion service is, on average, cheaper than the cost of normal juvenile court processing. Overall, taxpayers gain approximately $1,470 in subsequent criminal justice cost savings for each program participant. Adding the benefits that accrue to crime victims increases the expected net present value to

			$5,679 per participant. 7) The average effect of the programs was zero; that is, on average there was no difference in recidivism rates between those juveniles incarcerated and those placed on intensive probation. 8) An average effect size of about -.14 for basic recidivism. Based on the Institute's estimates, a typical average cost per participant for this brokerage-advocacy service is about $603. Overall, taxpayers gain approximately $3,131 in subsequent criminal justice cost savings for each program participant. Adding the benefits that accrue to crime victims increases the expected net present value to $14,831 per participant, which is equivalent to a benefit-to-cost ratio of $25.59 for every dollar spent. 9) The average effect size was a positive .10, meaning recidivism rates were, on average, about 10 percent higher for boot camp participants compared to juvenile offenders who went through regular juvenile institutional facilities. 10) An average effect size of +.13 for basic recidivism, meaning that recidivism rates

			were, on average, about 13 percent higher for scared straight type program participants compared to juvenile offenders who went through regular juvenile case processing. Because of the higher expected recidivism, taxpayers lose approximately $6,572 in increased subsequent criminal justice costs for each program participant. Adding the increased costs that accrue to crime victims from the higher recidivism rates increases the negative expected net present value to -$24,531 per participant. 11) A typical average cost per program participant is about $1,537. Adding the benefits that accrue to crime victims increases the expected net present value to $30,936 per participant, which is equivalent to a benefit-to-cost ratio of $21.13 for every dollar spent. 12) A typical average cost per participant is assumed to be about $9,920. At this price, taxpayers lose approximately $3,119 per participant, but, adding the benefits that accrue to crime victims, the bottom line turns positive with an expected net present value of $23,602 per participant, which is equivalent to a benefit-to-

			cost ratio of $3.38 for every dollar spent.
Adult Offender Programs	1) Drug treatment programs 2) Sex-offender treatment programs 3) Two types of intermediate sanctions (intensive supervision and boot camps) 4) Two types of specific cognitive-behavioural programs 5) several other programs including work release, basic education, vocational education, and correctional industries programs	Washington State Auditor's Office	The programs roughly break even from a taxpayer-only perspective and, including the benefits crime victims receive when recidivism rates are reduced; the programs typically produce about three dollars in benefits per dollar of cost.

2. "A Benefit Cost Analysis of the Abecedarian Early Childhood Intervention"

Written by Leonard N. Masse and W. Steven Barnett.

Link to the article:
http://nieer.org/resources/research/AbecedarianStudy.pdf

Variables	**Data**	**Findings**
1) Program Cost 2) Cost of Care - Control	1) The primary data sources are follow-up surveys and official	Including all measured benefits, then the internal rate of return for the Abecedarian intervention

Children 3) Parental Care 4) Marginal Costs 5) Comparative Costs 6) Participant Earnings 7) Earnings of Future Generations 8) Elementary and Secondary Education 9) Smoking and Health 10) Maternal Productivity and Earnings 11) Cost of Higher Education	school records through age 21 2) National Household Education Survey of 1995	appears to be slightly greater than 7 percent. The positive results are not highly sensitive to the presence or exclusion of any one benefit. Confining attention to the benefits that accrue mainly to the children (participant earnings and smoking/health), then the rate of return to the program is between 3 and 5 percent. Overall, the rate of return to the Abecedarian project is no less than 3 percent and is likely higher than 7 percent.

3. "Long-Term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect: Fifteen-Year Follow-Up of a Randomized Trial"

Written by David L. Olds, PhD; John Eckenrode, PhD; Charles R. Henderson, Jr; Harriet Kitzman, RN, PhD; Jane Powers, PhD; Robert Cole, PhD; Kimberly Sidora, MPH; Pamela Morris; Lisa M. Pettitt; Dennis Luckey, PhD

Link to the article:
http://www.columbia.edu/cu/psychology/courses/3615/Readings/JAMA_1997_Olds.pdf

Data	**Findings**
Child Protective Service (CPS).	*Main Results* - During the 15-year period after the birth of their first child, in contrast to women in the

Data Sources and Measures - Women's use of welfare and number of subsequent children were based on self-report; their arrests and convictions were based on self-report and archived data from New York State. Verified reports of child abuse and neglect were abstracted from state records.	comparison group, women who were visited by nurses during pregnancy and infancy were identified as perpetrators of child abuse and neglect in 0.29 vs. 0.54 verified reports (P<.001). Among women who were unmarried and from households of low socioeconomic status at initial enrolment, in contrast to those in the comparison group, nurse-visited women had 1.3 vs. 1.6 subsequent births (P=.02), 65 vs. 37 months between the birth of the first and a second child (P=.001), 60 vs. 90 months' receiving Aid to Families With Dependent Children (P=.005), 0.41 vs. 0.73 behavioural impairments due to use of alcohol and other drugs (P=.03), 0.18 vs. 0.58 arrests by self-report (P<.001), and 0.16 vs. 0.90 arrests disclosed by New York State records (P<.001). *Conclusion* - This program of prenatal and early childhood home visitation by nurses can reduce the number of subsequent pregnancies, the use of welfare, child abuse and neglect, and criminal behaviour on the part of low-income, unmarried mothers for up to 15 years after the birth of the first child.

4. "A cost-benefit analysis of child sex-offender treatment programs for male offenders in correctional services."

Written by Ron Donato, Martin Shanahan, Rosslyn Higgins, in 1999.

Link to the article:
http://www.criminologyresearchcouncil.gov.au/reports/23-96-7.pdf

Variables	**Data**	**Findings**
Both the economic cost of such treatment	Office of Crime Statistics database and	The magnitude of the problem of child sexual abuse generally and

programs and the benefits to be derived from avoiding child sexual abuse are measured.	annual incarceration costs from the Department of Correctional Services in South Australia	offences by recidivists in particular, suggest the range of potential economic costs from child sexual abuse are substantial and the economic benefits to be achieved from appropriate and effective treatment programs high. It is found that even with conservative assumptions, for example a single victim, a sex offender treatment program based upon a cognitive behavioural therapy with relapse prevention was cost-beneficial.

5. "Victim Costs and Consequences: A new Look, National Institute of Justice Research Report"

Written by Miller TR, Cohen MA, Wiersema B., in 1996.

Link to the article: https://www.ncjrs.gov/pdffiles/victcost.pdf

Variables	**Data**	**Findings**
Offense categories included murder/manslaughter, rape/sex offenses, robbery, aggravated assault, felony property crimes, and drug offenses	The National Crime Victimization Survey (NCVS) is the government's main source of information about criminal victimization.	This study's results should be viewed as preliminary; they suggest that violence against children accounts for a significant portion of our nationwide victim costs. Out-of-pocket costs for child victims are estimated to be more than 20 percent of all out-of-pocket crime victim costs and more than 35 percent of all costs (including pain, suffering, and lost quality of life).

6. "Willingness-to-pay for crime control programs. Criminology."

Written by Cohen MA, Rust RT, Steen S, Tidd ST., in 2004.

Link to the article:
http://onlinelibrary.wiley.com/store/10.1111/j.1745-9125.2004.tb00514.x/asset/j.1745-9125.2004.tb00514.x.pdf?v=1&t=h9rk6ac0&s=b681b33f4d4476eb6454028d73ce26458b87fb28

Variables	Data	Findings
Burglary, serious assault, armed robbery, rape/sexual assault, and murder.	The National Crime Victimization Survey (NCVS) is the government's main source of information about criminal victimization.	Based on the amounts respondents were willing to pay to prevent each individual type of crime (first reported in 2000 U.S. dollars), murder was found to be the most costly crime at $11.4 million per offense. Per-offense costs were also estimated for rape/sexual assault ($286,277), armed robbery ($280,237), serious assault ($84,555), and burglary ($30,197).

7. "The Cost of Crime to Society: New Crime-Specific Estimates for Policy and Program Evaluation"

Written by Kathryn E. McCollister, Michael T. French and Hai Fang, in 2010.

Link to the article:
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2835847/

Variables	Data	Findings
Offense categories:	The National Crime	The unit cost estimates for

rape/sexual assault, robbery, aggravated assault, household burglary, motor vehicle theft, and larceny/theft. Murder, rape/sexual assault, robbery, household burglary, and stolen property.	Victimization Survey (NCVS). The FBI's Uniform Crime Reports (UCR) and National Incident-Based Reporting System (NIBRS) were used to obtain count data for additional crime categories.	aggravated assault, motor vehicle theft, and larceny/theft are higher than that of other studies: $107,020 [Range = $21,451 to $105,545] for assault, $10,772 [Range = $1,723 to $6,006] for motor vehicle theft, and $3,532 [$344 to $1,104] for larceny/theft. Overall, the sensitivity analyses (presented in Table 6) suggest that their core estimates for most crimes (excepting motor vehicle theft, household burglary, and larceny theft) are somewhat conservative as all three sensitivity analyses led to per-offense cost estimates that were generally higher (than those in Table 5).

8. "Drug Abuse, Crime Costs, and the Economic Benefits of Treatment"

Written by Andrew S. Rajkumar and Michael T. French, in 1997.

Link to the article: The file is attached

Variables	**Data**	**Findings**
The costs to crime victims; the costs of law enforcement, legal adjudication, incarceration, and property damage; and the economic resources associated with committing	Treatment Outcome Prospective Study TOPS).	They demonstrated the proposed method by applying it to criminal activity profiles before and after a treatment episode for a sample of drug abuse treatment clients. Their figures show that including crime victims' pain and suffering and the full extent of the loss suffered by homicide victims can increase the estimated crime-related benefits of treatment and lead to more

crimes.		informed policy decisions. Although sensitivity analysis leads to some quantitative variation in our results, drug abuse treatment still appears to be substantially more beneficial to society if estimates of crime-related benefits include the value of lost life and crime victims' pain and suffering.

9. "Victim Costs Of Violent Crime And Resulting Injuries"

Written by Ted R. Miller, Mark A. Cohen, and Shelli B. Rossman, in 1993

Link to the article:
http://www.npaihb.org/images/epicenter_docs/injuryprevention/Motor/VictimCostsOfViolentCrimeAndResultingInjuries.pdf

Variables	**Data**	**Findings**
Three categories of costs: (1) Direct losses other than property losses-including costs of medical, mental health, and emergency response services, as well as insurance administration; (2) Productivity losses-wages, fringe benefits, and	The National Crime Survey (NCS); The National Fire Incident Reporting System (NFIRS), which compiles fire department reports; The Federal Bureau of Investigation's (FBI's) Uniform Crime Reports (UCR); National Data –The Detailed Claims	It led to $23 billion in lost productivity and almost $145 billion in reduced quality of life (in 1989 dollars). If associated deaths and cases resulting in psychological injury only arc included, costs average $47,000 for rape, $19,000 for robbery, $15,000 for assault, and $25,000 for arson. Considering only survivors with physical injury, rapes cost $60,000, robberies $25,000, assaults $22,000, and arson $50,000. Costs are almost $2.4 million per murder. Lifetime costs for all intentional injuries totalled $178 billion during 1987-1990.

housework; (3) Nonmonetary losses-pain, suffering, and lost quality of life.	Information (DCI) database of the National Council on Compensation Insurance (NCCI). (for estimating the long-term medical costs)	

10. "Benefit-cost analysis of a modified therapeutic community for mentally ill chemical abusers"

Written by Michael T Frencha, Kathryn E McCollister, Stanley Sacks, Karen McKendrick, George De Leon, in 2002.

Link to the article:
http://www.sciencedirect.com/science/article/pii/S014971890200006X#

Variables	**Data**	**Findings**
Three outcome categories: employment, criminal activity, and utilization of health care services.	Modified Terapeutic Community (modified TC) treatment for homeless Mentally ill Chemical Abusers (MICAs) relative to a 'Treatment-As-Usual' (TAU) comparison group.	The results quantify the potential economic and social advantages of the modified therapeutic community (TC) approach and highlight the policy implications of modified TC programs for homeless MICAs. This study is the first comprehensive economic evaluation of TC treatment for homeless MICAs; future research can draw from the economic analysis methods outlined here to apply to larger samples, longer follow-up periods, and other treatment settings.

11. "The Economics of Implementing Intensive In-prison Sex-offender Treatment Programs"

Written by Ron Donato & Martin Shanahan, in 1999.

Link to the article:
http://www.hawaii.edu/hivandaids/Economics%20of%20Implementing%20Intensive%20In%20Prison%20Sex-Offender%20Treatment%20Programs.pdf

12. "Benefit-Cost Analysis and Crime Prevention"

Written by John Chisholm, in 2000.

Link to the article:
http://www.aic.gov.au/documents/9/D/4/%7B9D4E07CA-74FF-4F35-9C31-71504330BD00%7Dti147.pdf