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A Guide to Calculating Justice-System Marginal Costs

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COST-BENEFIT ANALYSIS UNIT

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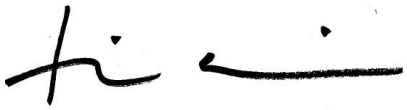
FROM THE PROGRAM DIRECTOR

Why should you read this guide even if you don't plan to calculate marginal costs or conduct a cost-benefit analysis?

Because even though this is a technical document, the subject matter is not esoteric. The costs and benefits of criminal justice policies and activities affect all of us—taxpayers, politicians, people who work in the justice system, and society as a whole. That's why it's important to understand what goes into the costs of operating jails, prisons, supervision, courts, law enforcement agencies, treatment programs, and other criminal justice initiatives.

This document guides both technical users and general readers through the concepts and calculations behind various types of costs, and the consequences for policy and practice of focusing on one type of cost over another. For instance, many commentators have likened the annual cost of keeping a person in prison to the price of tuition, room, and board at Harvard for a year. The implication: reduce the prison population by one person, and the government can save more than $50,000. It's a compelling comparison, but it's inaccurate, as this guide explains in more detail.

Simply doing the math is not enough. A better understanding of what we're spending our money on—and what we could potentially save if we do things differently—depends on looking more closely at a justice system's operations and budgeting.



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Introduction

In recent years, U.S. government agencies have operated with tight budgets and limited resources, and criminal justice systems are no exception. As a result, interest is growing in data-driven strategies to maintain public safety by maximizing justice investments. Cost-benefit analysis (CBA) is a tool that weighs an investment's pros and cons and evaluates a policy's long-run effects on government budgets and society at large.

Criminal justice investments include taxpayer costs for law enforcement, courts, corrections (mainly jail and prison), and community corrections (such as probation and parole). This guide instructs policy analysts how to calculate a particular kind of taxpayer costs called marginal costs for use in CBAs of criminal justice programs and policies. The marginal cost is the amount total costs change when a unit of output (such as an arrest or court case) changes. As cost-benefit analysts and budget officials know, any detailed discussion about government costs requires an understanding of marginal costs because these are the costs that policy changes affect. Although obtaining government budget information might be simple, accurately calculating marginal taxpayer costs is challenging, because the specific type of cost data required for CBA is sometimes not readily available.

As cost-benefit analysts and budget officials know, any detailed discussion about government costs requires an understanding of marginal costs because these are the costs that policy changes affect.

Using marginal costs to measure a program's impact on taxpayers is important, but it is just one step in a CBA. A cost-benefit analysis aims to measure the net benefit to society, but this guide covers only costs to taxpayers and not societal costs of crime, which include fear of crime, avoidance costs, and emotional and physical harm to victims. (For more information on societal costs and other steps of CBA such as conducting a sensitivity analysis, and reporting CBA results, go to cbkb.org/toolkit.)

The first section of this guide is an overview of the marginal costs used in a cost-benefit analysis. Next is a summary of the methods to calculate these costs. The third section provides guidance on how to calculate marginal costs in specific segments of the criminal justice system. The guide ends with recommended steps that cost-benefit analysts and justice agencies can take to improve the quality and relevance of CBAs for policymaking. The glossary on page 7 includes several important terms that are highlighted in bold throughout the guide.

What Are Marginal Costs?

The **marginal cost** is the amount the total cost changes when a unit of output (also referred to as "workload" in this guide) changes. In a CBA, "marginal" does not mean small or insignificant. It means at the margin of an existing level of operations and describes the cost or benefit that will be realized because of changes in units of activity. In the context of the criminal justice system, the

marginal cost is the amount of change in an agency's total operating costs when output (such as arrests, court filings, or jail days) changes because of changes to policies or programs.

It is impossible to overstate the importance of using marginal costs in a CBA. One of the fundamental errors an analyst can make is using average costs, which usually results in overestimating the costs related to the policy change.[1] This is because the average cost includes fixed costs—such as administration and other overhead costs—that policy changes may not affect. (For the purpose of a cost-benefit analysis, in some circumstances the average cost is also the marginal cost. See "Prisons and Jails," page 12, and "Programs," page 20, for more on these scenarios.)

The average and marginal costs of prison illustrate this important distinction. Nationwide, the average annual per-inmate cost of state prison is about $30,000.[2] A common misconception is that reducing the prison population by a small amount will translate into $30,000 per inmate in taxpayer savings. But the average cost includes costs for administration, utilities, and other expenses that will not change when the prison population is slightly reduced. A small change affects expenses such as food, clothing, and medical care: these are the marginal costs associated with a small reduction in the inmate population. The difference between the average and marginal cost of prison is vast. In Massachusetts, for example, the average annual per-inmate cost of incarceration is $46,000, whereas the marginal cost is only $9,000 (see Figure 1).[3]

Figure 1. Annual per-inmate costs of state prison in Massachusetts

Average cost: $46,000
Marginal cost: $9,000

The term "marginal cost" comes from the field of economics, which defines it as the change in total cost when the quantity produced changes by one unit. However, a cost-benefit analysis rarely seeks to measure such a minuscule policy effect; it usually measures a more sizable impact (for example, a change in 100 jail beds or 1,000 arrests). Thus, the marginal cost in a CBA is the change in cost caused by the change in policy.

To assess policies with smaller effects on workload, one must calculate the marginal cost of a small change in workload; assessing policies with larger effects requires the use of the marginal cost of a larger change in workload. Cost-benefit analysts often distinguish between these smaller and larger marginal costs as short-run and long-run marginal costs, respectively (see page 6).

TAXPAYER BENEFITS VERSUS TAXPAYER SAVINGS

Throughout this guide, the economic consequences of a reduction in government workload are called taxpayer benefits rather than taxpayer savings. A decrease in workload—for example, in a prosecutor's caseload—will not necessarily result in more dollars in taxpayers' pockets. It might mean that prosecutors have more time to devote to their remaining cases, and the quality of services may improve—which would be a benefit.* However, reductions in workload, particularly if they are large, may create the opportunity to reduce staffing levels, a result that may generate taxpayer savings. A CBA can assess whether there will be a taxpayer benefit, but only the budget process can determine whether there will be taxpayer savings.

*Billy L. Wayson and Gail S. Funke, *What Price Justice: A Handbook for the Analysis of Criminal Justice Costs* (Washington, DC: National Institute of Justice, 1989), 93.

Marginal costs required to conduct a cost-benefit analysis of a justice policy are rarely available off the shelf.

TYPES OF GOVERNMENT COSTS

The costs of a government agency—or a private firm, for that matter—are said to be variable, fixed, or step-fixed.[4] (See Figure 2 for examples of each type of cost.) Identifying these costs is the first step in calculating marginal costs.

Variable costs are those directly related to workload and change immediately as workload increases or decreases. Examples of variable costs include overtime, supplies, and fuel.

Fixed costs, in contrast, are those that remain fixed over a given period and are not usually affected even if the workload changes. Examples of fixed costs include rent, utilities, and central administration.

Step-fixed costs remain constant for a certain range of workload, but can change if the workload exceeds or falls below that range. The most common examples of step-fixed costs are staff salaries and benefits. These step-fixed costs are sometimes said to be lumpy or tiered, because positions are typically added or subtracted only if the workload reaches a certain threshold. For example, a probation department might not hire a new officer in response to a small increase in its caseload, but is likely to wait until the caseload reaches a point at which the work would fully occupy the time of an additional officer. Similarly, a county corrections department cannot reduce jail staffing if the inmate population decreases slightly, but if the decline is sufficient to close an entire housing area, the corrections department could eliminate the positions related to that unit.

Figure 2. Examples of variable, fixed, and step-fixed costs

VARIABLE	FIXED	STEP-FIXED
• Overtime • Supplies • Contracted services • Client subsidies • Travel • Fuel • Food	• Rent • Utilities • Central administration (human resources, fiscal, legal, etc.) • Debt service • Equipment	• Staff salaries • Fringe benefits, such as health care and pension contributions • Possibly some fixed costs when staffing levels change by a large amount

Because most government spending is for labor, most of its costs are step-fixed and depend on the level of workload. When studying a policy's effect on a government budget, it is important to understand exactly how the policy would affect staffing levels.

SHORT-RUN AND LONG-RUN MARGINAL COSTS

Marginal costs depend on the size of the change in workload and how the government adjusts the budget in response to this change. This means that

more than one marginal cost could potentially be used in justice CBAs. Costs that change immediately with even a small change in workload are often called **short-run marginal costs** (also called variable costs).[5] When a policy has a larger impact on workload, staffing costs need to be considered, yet it may take time for the government to change these step-fixed costs. Thus, **long-run marginal costs** include the short-run marginal cost as well as the staffing costs that change as governments modify staffing levels in future budget cycles.[6]

Cost-benefit studies of criminal justice initiatives should use the long-run marginal cost when the effect of the policy on workload is expected to change staffing needs. Analysts should use the short-run marginal cost when the policy impact is not large enough to affect staffing.

How to Calculate Marginal Costs

The marginal costs required to conduct a cost-benefit analysis of a justice policy are rarely available off the shelf. Therefore, analysts must typically make these calculations from scratch. Even if another source provides a marginal cost, analysts must confirm that it is an accurate marginal cost for the policy being studied. Because the marginal cost is specific to the policy context, it is important to understand how this cost was calculated.

Moreover, a cost-benefit analysis will likely require marginal costs for a variety of justice-system resources. For example, if you are studying an investment shown to reduce burglaries, it would likely lead to fewer arrests, fewer court cases, and fewer days in jail. To consider the effect this change will have on justice-system resources requires knowing how many fewer arrests, cases, and days in jail there will be. Figure 3 provides a list of marginal costs commonly used in a CBA to measure the impact on taxpayers. The change in justice-system workload (for example, arrests), is then multiplied by the marginal cost of that activity or resource. (See *Tracking Costs and Savings through Justice Reinvestment* [Urban Institute, 2012] for more information on how to track policy impacts across the justice system.[7])

Figure 3. Commonly measured taxpayer costs in justice-system cost-benefit analyses

- **Law enforcement (per arrest)**
- **Courts (per case)**
- **Jails and prisons (per inmate)**
- **Probation and parole (per supervisee)**
- **Juvenile detention and commitment (per youth)**
- **Juvenile supervision (per youth)**
- **Criminal justice programs (per participant)**

GLOSSARY

MARGINAL COST: The amount of change in total cost when a unit of output changes

AVERAGE COST: The total cost of all output divided by total output

VARIABLE COST: The cost that changes directly in proportion to output; also called short-run marginal cost

FIXED COST: The cost that remains constant, even when the output changes

STEP-FIXED COST: The cost that remains constant for a certain range of output and changes when output exceeds or falls below a certain threshold

SHORT-RUN MARGINAL COST: The cost affected as soon as the output changes; also called variable cost

LONG-RUN MARGINAL COST: Short-run marginal costs, plus the step-fixed costs that change in the long run as adjustments are made to staffing levels in response to larger changes in output

Once you have determined which justice agencies are affected by the policy change, two general methods can be used to calculate marginal costs: the top-down or bottom-up approaches.[8] The following section describes these methods and provides guidance on how to collect the data necessary to use them.

METHODS

Two general methods can be used to calculate marginal costs: the top-down or bottom-up approaches.

Analysts use either a top-down or bottom-up approach to calculate marginal costs, and each one has pros and cons. In theory, these approaches should generate similar estimates when conducted properly. The top-down approach is most commonly used and produces accurate estimates in fields whose budgetary costs can be easily aligned with workload or output (such as corrections). Regression analysis is sometimes used in justice CBAs and is a type of top-down method that uses aggregate data to measure the marginal cost by examining how changes in workload have influenced changes in cost over time. (See "Regression Analysis" on page 10.) The bottom-up approach is less frequently used and more labor-intensive, but is often necessary when it is difficult to link costs and workload (as is true in courts and law enforcement).

The top-down method. This approach to calculating marginal costs requires the analyst to divide the change in total cost of a given function by the change in total output (see formula in Figure 4). This is a top-down approach because it uses total (aggregate, or top-level) costs and then divides them by the change in output. When using this approach it is critical to include only the costs related to the change in output.

Figure 4. Top-down formula

Change in total cost ÷ Change in total output = Marginal cost

This approach is recommended when information is available on the total change in cost related to the change in workload. For example, this method can calculate the marginal cost of a hypothetical probation case if you have budget information that provides the cost of expanding capacity in a field office to supervise more probationers. Using this example, you would divide the annual costs for new probation officers and their supplies ($550,000) by the average daily total caseload of adult probationers they will supervise (500). Thus, the cost per probation case is $1,100 per year ($550,000 ÷ 500 = $1,100). Then divide this amount by 365 days to calculate the daily cost ($3.01 per probationer, per day). These calculations are also presented in Figure 5. This is a long-run marginal cost because it includes the step-fixed cost of salaries that will change only when governments revise their staffing levels.

Figure 5. Top-down example: hypothetical probation case

Change in total cost ÷ Change in total output = Annual marginal cost
$550,000 ÷ 500 = $1,100

Annual marginal cost ÷ Days per year = Daily marginal cost
$1,100 ÷ 365 = $3.01

When to use the top-down method. Analysts often prefer this method because the calculations are relatively simple if detailed budget data is available. When the government is delivering only one output (for example, jail beds) the top-down method is a convenient approach so long as the analyst can identify which costs the policy will change.[9] For example, if a corrections department reduces the budget by $1 million because it closes one housing unit with 100 beds, the marginal cost—using the top-down method—is $10,000 per bed, per year ($1 million ÷ 100 beds = $10,000).

Considerations when using the top-down method. Two potential mistakes can lead to an erroneously high estimation of marginal costs when using this approach. First, the marginal cost will be overestimated if the total cost includes costs that do not pertain to the type of output the analyst is measuring. For example, if other expenses were commingled with probation expenses (such as if juvenile probation costs were included in the above example of adult probation costs), they would be incorrectly included in the cost of adult probation. A second possible mistake pertains to the erroneous inclusion of fixed costs (such as costs of central management), which do not vary as workload changes. When calculating marginal costs in a top-down analysis, fixed costs must first be removed from the total cost. (The above example includes salary and supply costs and excludes costs for administration and other fixed expenses.)

The bottom-up method. Use the bottom-up approach to investigate all the costs related to a single unit of output. This typically means identifying all the employees who are responsible for a unit of output (for example, all the staff members who work on a court case), identifying how much time each person spends on that unit of output, and then multiplying this time by the cost of the employees' time spent on that activity (see formula in Figure 6).

Figure 6. Bottom-up formula

Time spent on output (hours) × Cost per hour = Marginal cost

REGRESSION ANALYSIS

If you have accurate historical data for costs and workload that has been consistently defined over time, you can run a regression analysis to measure marginal costs. This is a type of top-down analysis, because the calculation begins with the aggregate costs rather than individual costs. The regression examines the relationship between workload (output) and costs by looking at the relationship between these variables over time. This analysis measures how the annual change in cost varies with the change in workload (say, arrests, court cases, or jail capacity) while controlling for factors that have the effect of changing costs without affecting workload (for example, rising salary and benefit costs). This approach is useful when only aggregate data is available and you cannot break down variable, fixed, and step-fixed costs. There are, however, a few potential drawbacks to this approach. First, not many analysts are trained in this methodology—and even trained analysts sometimes find it difficult. Second, some government officials might view the results with skepticism because the costs may not align with actual budget allocations.

This method could also be used to calculate the cost of a hypothetical probation case, as in the previous example: if a probation officer spends 10 minutes (0.16 hour) on each case in an eight-hour day, the cost per case can be calculated by multiplying the time per case (0.16 hour) by the hourly cost for personnel and supplies ($18.84) to get the result of $3.01 per day (0.16 x $18.84 = $3.01).[10] These calculations are also presented in Figure 7. This is the same result calculated using the top-down approach.

Figure 7. Bottom-up example: hypothetical probation case

Time spent on output (hours) × Cost per hour = Marginal cost
0.16 hour × $18.84 = $3.01 per day

When to use the bottom-up method. This is usually the best approach when measuring the cost of an activity funded by several entities. When an activity is one of many being undertaken (for example, if probation services include individual offender management, group work, employment programs, and preventive work) or there are inputs to the activity of interest from other sources (for example, a court case that involves private attorneys as well employees from government agencies), then the bottom-up method provides a more accurate estimate of the resources being used.[11] The bottom-up method is also useful when there is a lot of variation in the type of resources each person uses. For example, the bottom-up method is often used to study drug-court costs because some people use the treatment resources considerably more than others and it is important to know how costs vary among participants.[12]

Considerations when using the bottom-up method. This method requires detailed operational data that is often not readily available and will require intensive data collection. The calculations are also more complex and this increases the possibility of error. This method can also yield underestimates of costs if data collection is not comprehensive for both costs and workload.

DATA COLLECTION

Because detailed data is required to calculate the justice system's marginal costs, you may need to collect information through interviews or surveys rather than from public data sources. Analysts must address two types of issues when collecting data. The first is ensuring that the data collection instrument captures accurate data. The second is developing a working relationship with the government official who is sharing the information.

Accuracy. When calculating marginal costs, it is essential that you collect data from the right sources. Criminal justice systems vary widely, and it is important that costs are specific to the jurisdiction being studied. Moreover, your data-collection methodology must ensure that costs are both comprehensive

and comparable. Costs are comprehensive if they capture all relevant expenses. Costs are comparable if they include all the same components and are adjusted for differences that result because they are incurred at different times.

Measuring costs comprehensively. The first principle when conducting a cost analysis is measuring all costs comprehensively. For example, in some jurisdictions, the costs of pensions and other fringe benefits are budgeted in a central account, and these costs would be erroneously omitted if analysts were to investigate only agency budgets.[13] What's more, the costs of many justice programs extend beyond the budget of a single department, such as when a probation department makes use of employment or housing services that a different department provides. If the analysis were to focus solely on the probation department, these employment and housing costs would be overlooked.[14]

In measuring costs comprehensively, take care not to double-count any costs. One way to prevent undercounting and double-counting is to confirm which costs are included in the figures a respondent provides. For example, when working with a jurisdiction that pays for fringe benefits outside the agency budget, do not add these costs yourself and assume that the survey respondent omitted them. (See the survey in the appendix of *The Price of Prisons: What Incarceration Cost Taxpayers* [www.vera.org/priceofprisons], which was used to collect state prison costs; the questions were designed to avoid undercounting or double-counting any relevant costs.[15])

Criminal justice systems vary widely, and it is important that marginal costs are specific to the jurisdiction being studied.

Measuring costs comparably. The second principle of cost analysis is that costs should be comparable, that is, that analysts liken apples to apples. This is a particularly challenging issue when aggregating data from multiple jurisdictions, because each one may define or administer justice activities differently. For example, two jurisdictions might have different names for the same type of program. One way to address this issue when collecting data is to carefully define all terms clearly and accurately when describing programs and activities.

The principle of comparing apples to apples is also essential when collecting data over a multiyear period. First, you must adjust for the effects of inflation when comparing data from the past, and second, you will need to discount future costs to the current period.[16]

Communication. Because information about budgets, salaries, and workload can be sensitive, interview subjects (or survey respondents) may be concerned about how analysts will use data and the public will interpret it. You can allay these qualms and earn respondents' trust by clarifying the goals of the analysis through two important steps.

First, when collecting data, clearly explain why you are doing so (that is, how costs relate to the cost-benefit analysis), when the analysis will be published, and which data will be published in the CBA. Providing this kind of context can increase respondents' understanding of your methods and goals and help them prepare for questions that might arise if the costs they share (or those you calculate) differ from other published costs.

Second, prior to publication, allow government partners to review any calculations made with their data. This step is useful because it promotes transparency and might uncover potential errors. The government officials who are responsible for cost data know this information best and can help improve the calculations' accuracy. Officials might be reluctant to share data because of concerns that it could be misreported or misinterpreted. By working closely with the respondents, you can often assuage these concerns while improving the quality of data collection.

Examples in the Justice System

Although the guidelines and principles discussed in the section "How to Calculate Marginal Costs" apply to all segments of the justice system, some issues and challenges in each segment merit further discussion. For example, in some fields—such as corrections—data on costs are abundant and the challenge is to obtain the right data. In other segments, such as the courts, the challenge is to piece together all the costs of a court case because it may involve many people and be funded through different budgets. This section provides examples of marginal-cost calculations in each of the criminal justice system's major segments, as well as guidance specific to each area.

PRISONS AND JAILS

An accurate estimate of the marginal cost of jail or prison is essential to the study of policies that either reduce the use of incarceration in the near term (such as through diversion programs or sentencing reform), or in the long term by means of a reduction in future crime (for example, through a reduction in recidivism).

The marginal cost of incarceration to use in a CBA depends on the estimated change in the size of the inmate population.

Calculating the marginal cost of incarceration is clearest when measuring the cost to taxpayers of a change in the inmate population that is paid on a per-diem basis through a contract with either a private facility or another state or local government. For example, if a state corrections department pays $80 per day to house inmates in a contracted facility, and the new policy or program causes a change in the use of this contracted capacity, the marginal cost is the per-diem rate for these inmates ($80 per day). Although the reimbursement rate may in fact be the average cost from the perspective of the contracted agency, it is the marginal cost from the perspective of the purchasing agency.

Calculating the marginal cost of incarceration in government-operated facilities is more complicated. The total cost of prisons and jails includes fixed costs for facility operations and administration; step-fixed costs for security, inmate rehabilitation, and health care; and variable costs for inmate needs such as food and clothing. Most corrections agencies publish clear data on their total costs, populations, and average per-inmate costs. This data represents the cost of the entire agency; the published per-inmate costs are averages that include fixed costs that won't vary as the size of the inmate population changes.

The marginal cost of incarceration to use in a CBA depends on the estimated change in the size of the inmate population. If the population is expected to change modestly, only variable costs—for things such as food, clothing, and medical care—will be affected. These are the short-run marginal costs. If the size of the inmate population is expected to change considerably, analysts must consider the costs of staffing in addition to the short-run costs. These are the long-run marginal costs. Figure 8 illustrates the differences among these costs relative to the average cost of incarceration in Washington State's prisons and jails. Note that short-run marginal costs are lower than long-run marginal costs, which include step-fixed expenses. Long-run marginal costs are lower than average costs, which include fixed expenses.

Figure 8. Annual per-inmate costs in Washington State, 2009

	AVERAGE COST	LONG-RUN MARGINAL COST	SHORT-RUN MARGINAL COST
Prison	$31,446	$13,921	$4,495
Jail	$28,900	$21,469	$3,457

Source: *WSIPP's Benefit-Cost Tool for States: Examining Policy Options in Sentencing and Corrections*, August 2010.

As described earlier, you can accurately calculate the marginal cost of incarceration using either a top-down or bottom-up approach. A 2009 evaluation of an alternative-to-incarceration program in Pierce County, Washington, determined the marginal cost of jail using both approaches and thoroughly documented the calculations in a manner that can aid other researchers.[17] Using both methods is one way to ensure accuracy and in this study both yielded similar estimates. The top-down approach resulted in a marginal cost of $56.75 per inmate, per day, and the bottom-up approach resulted in a marginal cost of $51.51 per inmate, per day. (The average cost is $84.37 per inmate, per day.) These are long-run marginal costs because they include the step-fixed staffing costs that change when the size of the inmate population changes substantially. This section summarizes the top-down and bottom-up methods for calculating the marginal costs of jail and prison. It also provides a few considerations to keep in mind when calculating these costs.

Short-run marginal costs are lower than long-run marginal costs, which include step-fixed expenses. Long-run marginal costs are lower than average costs, which include fixed expenses.

The top-down method. For this approach, you must obtain line-item budget information that is sufficiently detailed to distinguish between the variable, step-fixed, and fixed costs. From the total cost, subtract the fixed costs—that is, those costs that will not change when the inmate population increases or decreases—so that only the variable and step-fixed costs remain. Then divide that number by the average daily population to estimate the long-run marginal cost per inmate. The short-run marginal cost is calculated by dividing the variable costs by the average daily population.

In Pierce County, for example, the total cost of care and custody was $41.5 million, but only $27.9 million was for variable and step-fixed costs. Researchers calculated this figure by subtracting fixed costs such as facilities, legal research, administration, and indirect costs from the total annual cost of $41.5 million.[18] Only the variable costs, such as food, and step-fixed costs, such as staff for care and custody, are included in the $27.9 million. The long-run marginal cost of jail per inmate per day is therefore $56.75 ($27.9 million divided by 1,343 average daily inmates divided by 365 days).[19] The short-run marginal cost is $17.83 per inmate per day and is calculated by dividing the variable costs by the inmate population ($8.7 million divided by 1,343 average daily inmates divided by 365 days).[20] (See calculations in Figure 9.)[21]

Figure 9. Marginal costs of jail in Pierce County, Washington: top-down method

Long-run marginal cost (per day)
Step-fixed costs and Variable costs ÷ Average daily population ÷ 365 days
$27.9 million ÷ 1,343 ÷ 365 days = $56.75

Short-run marginal cost (per day)
Variable costs ÷ Average daily population ÷ 365 days
$8.7 million ÷ 1,343 inmates ÷ 365 days = $17.83

Source: Christopher Murray, *Process Evaluation of Breaking the Cycle*, Pierce County Performance Audit Committee, September 24, 2009.

The bottom-up method. This approach requires that you identify the staffing patterns and compensation levels for corrections officers in order to estimate the step-fixed costs. You then add the variable costs to estimate the long-run marginal cost.

In Pierce County, each housing pod accommodates 84 beds. Every day, staff cover three eight-hour shifts, with 1.75 posts per shift in the general population housing pod, for a total of 5.25 posts in a 24-hour day. Because each post is covered 24 hours a day, 365 days a year, analysts use a relief factor to convert a 40-hour-per-week position to a post that is covered 365 days a year.[22] More than one staff member is required per post because employees are entitled to regular days off. The relief factor in Pierce County is 1.8, meaning that 1.8 full-time equivalent (FTE) staff are required to fill one post. Therefore, 9.45 FTEs (5.25 posts x 1.8 relief factor) are required to staff one pod that has 84 beds.[23]

Each FTE costs an average of $101,456 in salary and benefits. Therefore, the annual personnel cost for the 84-bed pod in Pierce County is $958,759 ($101,456 x 9.45 FTEs), or $31.27 per bed, per day. Adding the direct variable costs of $17.83 per day results in a long-run marginal cost of $49.10.[24] (See calculations in Figure 10.) Because each pod in the jail is staffed differently, analysts calculated a weighted average of $51.51 per bed, per day.

Figure 10. Long-run marginal cost of jail in Pierce County, Washington: bottom-up method

LINE	METRIC/COST	VALUE	CALCULATION
a	Beds per pod	84	--
b	8-hour shifts per day	3	--
c	Posts per shift	1.75	--
d	Posts per day	5.25	b x c
e	Relief factor	1.8	--
f	Full time staff per pod	9.45	d x e
g	Average salary and benefits	$101,456	--
h	Personnel costs, per pod	$958,759	f x g
i	Personnel costs, per inmate	$11,414	h ÷ a
k	Personnel costs, per day	$31.27	i ÷ 365
j	Variable cost, per day	$17.83	--
l	Long-run marginal cost, per day	$49.10	j + k

Source: Christopher Murray, *Process Evaluation of Breaking the Cycle,* Pierce County Performance Audit Committee, September 24, 2009.

Keep in mind. When calculating jail and prison costs, analysts must also consider how the policy will affect certain segments of the inmate population. For example, if you are studying a policy that affects elderly inmates, you need to investigate the costs specific to that population.[25] Costs also depend on the security level of the facility. In North Carolina, for example, the average cost of a maximum-security bed is 45 percent greater than a minimum-security bed ($93.57 per day versus $64.36 per day); in Mississippi, the cost of a maximum-security bed is 100 percent greater than a minimum-security bed ($102.27 per day versus $49.50 per day).[26] Similarly, the first few days in jail are the most expensive of a person's incarceration because of the cost of intake.[27]

Finally, it is important to note that although the costs of jails and prisons are similar in many ways, it may be more difficult for jails to eliminate step-fixed costs by reducing staffing levels because of the differences between the scale of a local jail and a state prison system. For example, a 5 percent reduction in the prison population might present an opportunity to close a small prison, but a 5 percent reduction in a small local jail would likely be insufficient to change staffing levels.

Although the costs of jails and prisons are similar, because of differences in scale it may be more difficult for jails to eliminate step-fixed costs by reducing staffing levels.

PROBATION AND PAROLE

The process of calculating probation and parole costs is similar to the process for prisons and jails because community corrections and correctional facilities both have a structured ratio of people under supervision (or incarcerated) to officers. In probation and parole this ratio is called the caseload, which is the average number of people an officer supervises at a given time. The average

caseload reflects the number of cases a single officer can manage at once.

To measure the long-run marginal costs of probation you can use either the top-down approach—dividing the variable and step-fixed costs by the average daily caseload—or the bottom-up approach, multiplying the average salary and benefits for corrections officers by the ratio of corrections officers to probationers. (See the section "How to Calculate Marginal Costs," page 7, for detailed examples of top-down and bottom-up calculations in the field of community corrections.)

A common approach to calculating marginal costs is to examine changes in the agency budget that are related to changes in workload. By definition, these changes are marginal costs. For example, budget documents in New York indicated that the state will save $3.7 million annually because of a projected reduction of 1,500 in the parole population. Therefore, the marginal cost is $2,467 per parolee, per year ($3.7 million ÷ 1,500 = $2,467).[28]

But this approach, which calculates the marginal cost of the average offender, may potentially be inaccurate if the policy being studied is geared toward people at a particular risk level (high, medium, or low) or a specific population, such as sex offenders. The target population will affect your calculations because different types of offenders have a different frequency and duration of contact with their probation or parole officer. For instance, one officer might be able to supervise 20 high-risk people or 100 low-risk people at the same cost. Thus, the cost of supervising a medium-risk offender is higher than for a low-risk offender and less than for a high-risk offender.

Keep in mind that although measuring the marginal cost of incarceration and community corrections are in many ways similar, one distinction is important: when an inmate population decreases considerably, jurisdictions may be able to close housing units or facilities to convert the taxpayer benefits into budget savings. But when an entire population under probation or parole supervision decreases substantially, jurisdictions might not eliminate officers, but may use the savings to reduce officers' individual caseloads. While this is not a taxpayer savings, it is a taxpayer benefit, because the public will gain enhanced community corrections services.

COURTS

It can be difficult to calculate court costs because cases involve many people and are often funded through a number of agencies. (See Figure 11 for a list of the personnel in the justice system involved in a court case.)[29] But despite the challenges, both top-down and bottom-up methods can be used to calculate the marginal cost of a court case.

Figure 11. Personnel involved in court cases

- Judge
- Defense attorney
- District attorney/Prosecutor
- Presentence investigator
- Court reporter
- Clerk of court
- Jury tipstaff (court officer)
- Secretary
- Law clerk
- Courtroom coordinator
- Sheriff

The top-down method. One challenge of using this approach is that you need detailed budget and staffing data to discern which costs are for the various types of cases (criminal, civil, etc.) and whether the costs are variable, step-fixed, or fixed. If this data is available, you can use a tool developed by the National Center for State Courts that provides a template to calculate the cost per case. (See Figure 12 for an excerpt from the tool.)

This tool was designed to measure average costs. However, you can also use it to calculate long-run marginal costs if you remove the fixed costs from the total costs. To use the tool, you will need information about the cost of court operations (excluding fixed costs), the number of dispositions for each type of case (such as civil, criminal, or traffic), and the number of employees that work on each type of court case.

For example, if the court spends $23.8 million annually to dispose of 99,519 cases (see Figure 12), the cost per type of case can be calculated by using the number of personnel who work on each type of case to determine the proportion of court costs incurred for each type of case. In this example, 10.7 percent of court personnel work on criminal cases and therefore the total cost of all criminal cases is $2.5 million (10.7 percent x $23.8 million = $2.5 million). Because there were 19,414 criminal dispositions, the cost of a criminal case is $132 ($2.5 million ÷ 19,414 = $132). See additional instructions and the Excel template at courtools.org. [30]

The bottom-up method. Although this approach is more time- and labor-intensive, it may provide a more accurate picture of court costs when investigating areas that involve wide variation in time spent per case. One benefit of the bottom-up approach is that it works well when you need to analyze court activities that involve actors from several agencies.[31] This method requires that you multiply the time spent per case by the hourly cost of labor. You can often calculate the time spent per case through interviews, published workload studies, or researchers' observations in the courts. In general, salaries of government employees are publicly available.[32]

Once you determine the total cost of all the court actors and the average time spent on case hearings, you can calculate the marginal cost. The Urban Institute, for example, has used this methodology to calculate the marginal cost of drug-court hearings. Researchers estimated the hourly cost of the personnel

Figure 12. National Center for State Courts, CourTool 10, "Cost per Case"

DATA ENTRY

	STEP 1						STEP 2		STEP 3	STEP 4
	Sort court personnel by case type						Determine total court expenditures and allocate by case type		Allocate total costs by case type	Calculate cost per case
CASE TYPES	SINGLE ASSIGNMENTS		MULTIPLE ASSIGNMENTS		FTE PERSONNEL		TOTAL COURT EXPENDITURES	BY CASE TYPE	TOTAL DISPOSITIONS	COST PER CASE
	STAFF	JUDICIAL OFFICER	STAFF	JUDICIAL OFFICER	TOTAL	PERCENT OF TOTAL		PRORATED BY FTE PERCENT OF TOTAL		
General Civil	12.0	2.0	4.0	5.0	23.0	14.9		3,562,969	3,450	1,033
Limited Civil	3.5		3.5	0.5	7.5	4.9		1,161,838	6,019	193
Criminal		14.0	2.0	0.5	16.5	10.7		2,556,043	19,414	132
Dependency	7.0	1.0			8.0	5.2		1,239,294	1,254	988
Delinquency	6.0	1.0	2.0	0.5	9.5	6.2	$23,856,402	1,471,661	1,624	906
Probate	14.0	0.5			14.5	9.4		2,246,220	1,985	1,132
Traffic	17.0	5.0	15.0	10.0	47.0	30.5		7,280,850	62,027	117
Domestic	19.0	2.0		2.0	23.0	14.9		3,562,969	3,746	951
	1.0	1.0	2.0	1.0	5.0	3.2		774,559		
Total	79.5	26.5	28.5	19.5	154.0	100.0		23,856,402	99,519	

Source: CourTool Measure 10: "Cost per Case." Available at http://www.courtools.org/Trial-Court-Performance-Measures.aspx and reprinted with permission from the National Center for State Courts.

involved in these hearings (judge, clerk, aide, U.S. attorney, defense attorney, and U.S. marshal). This amount totaled $3.50 per minute. Based on direct observation, drug-court hearings averaged 9.7 minutes longer than standard docket hearings, for a marginal cost of $33.95 per hearing (9.7 x $3.50 = $33.95).[33]

The bottom-up approach is commonly used to measure marginal costs in the courts. This is because resources used for court cases vary widely, and the average may not be representative of the types of cases being studied. Analysts at NPC Research—an organization that has conducted many drug-court studies—use a bottom-up method called transaction and institutional cost analysis (TICA). TICA includes the following steps, which can be used to guide any bottom-up analysis:

1. Determine the program process and how participants move through the process.
2. Identify where in the case flow client/agency interactions occur.
3. Identify the agencies involved in each transaction.
4. Determine the resources each agency uses for each transaction.
5. Determine the cost of the resources each agency uses for each transaction.
6. Calculate the cost results.

For details on the TICA bottom-up method, refer to *Enhancing Cost Analysis of Drug Courts: The Transactional and Institutional Cost Analysis Approach*.[34]

Keep in mind. The benefit of a reduction in court workloads will not translate into budget savings unless staffing levels are reduced when workload reduces. Instead, it is common for the courts to use these taxpayer benefits to reduce caseloads and backlogs. Such benefits are sometimes described as opportunity resources, because these resources are available for other uses.[35] This type of taxpayer benefit will not typically result in a financial savings; it instead provides the means to benefit the public by lowering caseloads and hastening case-processing times.

If fewer crimes occur in the future, it follows that there should be fewer arrests, and thus reduced law-enforcement costs.

LAW ENFORCEMENT

The cost of law enforcement is an important factor in many justice CBAs because nearly any effect on crime will have an effect on law enforcement. If fewer crimes occur in the future, it follows that there should be fewer arrests, and thus reduced costs.

Because police officers engage in a wide variety of activities, it is usually difficult to calculate the marginal cost of police work by using a top-down approach without conducting regression analysis (see "The top-down method" below). In general, it is better to use a bottom-up approach, investigating the time spent on the activity, and then multiplying that time by the cost of an officer's time.

The bottom-up method. You can often calculate the marginal cost of policing by multiplying the time an officer spends on an incident by the cost of the officer's salary and benefits.[36] In Washington State, for example, the Tacoma Police Department has calculated the marginal cost of arresting a person considered a "chronic minor offender" to be $165.[37] Analysts made this calculation by first estimating that an arrest includes three hours of an officer's time, and then multiplying that by an hourly rate of $55 (including wages, benefits, and equipment).

Keep in mind that the time it takes to investigate different types of incidents varies greatly. An analysis by the San Diego Police Department found that an average arrest keeps an officer out of service for 5.4 hours, but that certain incidents require much more time than others.[38] For instance, an arrest for public

KNOW YOUR COSTS

> ***DIRECT COSTS***

- Staff salary
- Fringe benefits (such as health insurance, employer's share of Social Security, workers' compensation, unemployment insurance, pension contribution, and vacation wages)
- Equipment, such as computers and office supplies
- Rent, occupancy, office maintenance, and other space-related costs
- Training

> ***INDIRECT COSTS***

- Executive staff
- Central support (such as human resources, fiscal department, and information technology)

> ***START-UP AND ONETIME COSTS*** (such as furniture, equipment, and consultants)

> ***FUTURE COSTS***

- Wage increases, including anticipated collective-bargaining settlements
- Additional pension contributions
- Anticipated escalation of health-insurance costs

> ***CAPITAL EXPENSES***

- Project planning, design, development, and professional services
- Real estate, materials, and construction

intoxication keeps an officer out of service for about three hours, whereas investigating a crime in progress (robbery, burglary, or auto theft) keeps an officer out of service for more than 10 hours.

Additionally, you can use the bottom-up method to calculate the cost of policing activities that do not result in an arrest. Not all incidents result in an arrest, but they all take an officer out of service. One challenge law enforcement agencies are facing is an increasing number of calls to respond to false burglar alarms. You can measure the amount of time false alarms keep officers out of service by calculating the period between officer dispatch and the time the call is closed. You can then calculate the marginal cost by multiplying the out-of-service time by the salary and benefits for the officers involved.

It is worth noting that taxpayer benefits resulting from fewer calls for service do not necessarily translate into budget savings. Rather than reduce the number of officers, jurisdictions might use the taxpayer benefit to increase the number of officers on patrol.

If the focus of an analysis is the financial savings related to a police department's change in workload, one approach is to measure the budgetary savings related to a reduction in overtime spending. This was the approach used to measure the taxpayer benefits to law enforcement in a recent cost-benefit analysis of a New York City transitional job program for ex-offenders that reduced recidivism. Rather than look at the total marginal cost of the arrest, researchers measured only the portion of the marginal cost that required overtime pay ($359).[39]

The top-down method. Alternatively, some jurisdictions use regression analysis to measure the marginal cost of an arrest by studying the relationship between arrests and total law enforcement costs over a multiyear period. Regression analysis allows you to control for fixed costs and other workload factors that affect the total cost of policing (such as the number of traffic citations) in order to estimate the marginal cost of an arrest. (See the sidebar "Regression Analysis," page 10). The Washington State Institute for Public Policy has used this approach to estimate that the marginal cost of an arrest in that state is $670. The Utah Commission on Criminal and Juvenile Justice (CCJJ) has also used regression analysis to estimate that the marginal cost of a property arrest is $880 and of a violent arrest is $4,509. These are long-run marginal costs because they include the cost of changes in staffing. For additional information on using regression analysis to measure the marginal cost of an arrest, see *WSIPP's Benefit-Cost Tool for States: Examining Policy Options in Sentencing and Corrections* and CCJJ's white paper *Introduction to an Econometric Cost-Benefit Approach*.[40]

PROGRAMS

The criminal justice system also includes activities that may not be categorized as corrections, community corrections, judicial, or law enforcement. Best described as programs, these include job training, reentry programs, and

treatment for substance use.

Calculating the marginal cost of these programs is usually straightforward, because programs, almost by definition, have discrete line-item budgets that researchers can use to collect costs. But keep in mind this important consideration when calculating the marginal cost of programs: sometimes the average cost of a program is the correct marginal cost for the purpose of a cost-benefit analysis.

Because cost-benefit studies sometimes investigate whether it is worthwhile to begin—or terminate—a specific program, it is appropriate in these cases to include fixed costs if they are a component of a new investment, or could be saved if the program were terminated. Thus, the average cost, which includes the fixed costs, is the appropriate cost for the analysis.

When calculating the cost of programs, look out for a common pitfall: although programs are often funded through a single budget, sometimes other entities bear a portion of the cost. It is often helpful to use a structured template to ensure that you measure costs comprehensively. The Substance Abuse Services Cost Analysis Program Cost Module, for example, was developed to measure all costs when researching drug treatment programs.[41] This is a useful tool for estimating costs and can serve as a template for cost-collection instruments for other programs or fields. The sidebar "Know Your Costs" (page 20) provides a checklist to follow when surveying program costs.

The case of technology investments highlights the potential pitfalls of undercounting program costs. When collecting technology costs, be sure to include not only the cost of the technology itself, but also those of maintenance, installation, and personnel needed to manage and use the resource, as well as any additional staff training required.[42]

Remember that program costs sometimes have offsetting benefits in other areas of the justice system (for example, an electronic monitoring program that reduces jail costs). In such cases it is important to clarify whether these offsetting benefits are included in the calculation of the cost of the program—that is, whether these savings reduce the cost of the program.

Analysts should carefully document and explain their calculations and results.

Justice agencies should improve the availability of public data that can be used to make marginal-cost calculations.

Recommendations

Analysts and justice agencies can take a number of steps to improve the accuracy of marginal costs and the cost-benefit analyses they support. Analysts should carefully document and explain their calculations and results. Justice agencies should improve the availability of public data that can be used to make marginal-cost calculations.

ANALYSTS

Because the accuracy of marginal costs is paramount to a rigorous cost-benefit analysis, report all the marginal costs used in a CBA and document the sources and methods used to calculate these costs. Detail on these inputs will foster

readers' trust and improve the policy relevance of the analysis by providing clarity on how the government costs were measured .

Be sure to refer to taxpayer benefits—that is, the benefits of reduced government workloads—as benefits and not savings. This is a critical distinction: although an analysis can determine whether a reduction in workload will create a taxpayer benefit, only budget and administrative decisions will determine whether these benefits will translate into budget savings. Moreover, to some people, the term "taxpayer savings" might suggest a reduction in taxes and revenues. It is more likely that benefits will be used to reduce budget gaps and fund other needs rather than provide a tangible savings to taxpayers. (See the sidebar "Taxpayer Benefits Versus Taxpayer Savings," page 5, for more on this topic).

JUSTICE AGENCIES

Cost-benefit analysts face two main challenges when investigating justice system costs: either the available published data is of average costs, rather than marginal costs, or there is little published data that can be used to calculate justice agencies' marginal costs.

When justice agencies calculate marginal costs, they should make these figures available publicly. If agencies do not calculate marginal costs, they should publish detailed information on spending and workload so that researchers can use it to make more accurate calculations of marginal costs. Not only do these steps promote transparency, they also ensure that cost-benefit analysis conducted by others uses consistent figures.

Corrections agencies already provide clear, accessible information about average costs per inmate, and some also publish the average cost of probation or parole cases. They should supplement this information with data on the short-run and long-run marginal costs of both incarceration and supervision. The Illinois Department of Corrections, for example, publishes in its annual report the short-run marginal cost and average cost for each of its facilities.[43] Corrections agencies could publish data about individual housing units' staffing ratios that would allow analysts to calculate long-run marginal costs. This information would be a tremendous benefit to the field, given the importance of marginal costs for a credible cost-benefit analysis. It could also potentially have significant impact on policymaking in initiatives such as justice reinvestment.

In other segments of the justice system, such as law enforcement and the courts, it is not practical for agencies to publish marginal costs regularly, for the same reason that they don't publish average costs (such as the average cost of an arrest or a court case). These are labor-intensive exercises and may not be worth the investment. Instead, law enforcement agencies and court systems should report budget and workload data at as detailed a level as possible, so that researchers can use the information to develop better estimates independently. The New York Police Department, for example, publishes the average time from arrest to complaint on a yearly basis.[44]

Resources

METHODS

Additional information on marginal costs is available on the website of the Cost-Benefit Knowledge Bank for Criminal Justice (cbkb.org). Figure 13 includes a list of the resources discussed in this guide. Detailed information about the sources and methods used by the Washington State Institute for Public Policy (WSIPP)—a leading producer of justice-related CBAs—is available in the appendices of their cost-benefit reports. (See Appendix D2 in *WSIPP's Benefit-Cost Tool for States: Examining Policy Options in Sentencing and Corrections*.)

DATA

The most accurate, up-to-date information about justice-system costs will often be readily available from justice agencies. When possible, it makes sense to work directly with public officials to collect this data. Information on justice-system spending is often available on the websites of justice agencies and executive budget offices. These budget documents are often accompanied by information on outputs and workload that can be useful in analyses. Government agencies sometimes publish information about public employee salaries; third-party websites that promote government transparency, such as sunshinereview.org, often aggregate this information.

The federal government collects aggregate data that can be useful when calculating marginal costs. Information on federal, state, and municipal employee salaries is available

Figure 13. Marginal-cost resources

GENERAL SOURCES FOR METHODS

- Cost-Benefit Knowledge Bank for Criminal Justice: cbkb.org
- Washington State Institute for Public Policy: wsipp.wa.gov
- Greg G. Chen et al., *Budget Tools: Financial Methods in the Public Sector* (Washington, DC: CQ Press, 2008).
- John K. Roman et al., *Cost-Benefit Analysis and Crime Control* (Washington, DC: Urban Institute Press, 2010).
- Pamela Lachman and S. Rebecca Neusteter, *Tracking Costs and Savings Through Justice Reinvestment* (Washington, DC: Urban Institute, 2012).

CORRECTIONS

Christopher Murray, *Process Evaluation of Breaking the Cycle* (Pierce County, WA: Pierce County Performance Audit Committee, September 24, 2009).

COURTS

- CourTool Measure 10: "Cost per Case." National Center for State Courts
- Dave Crumpton, Shannon Carey, and Michael Finigan, *Enhancing Cost Analysis of Drug Courts: The Transactional and Institutional Cost Analysis Approach* (Portland, OR: NPA Research, October 2004).

LAW ENFORCEMENT

Julius C. Chaidez, "How to Calculate the Cost of a Youth Arrest" (Washington, DC: National Juvenile Justice Network, November 2012).

PROGRAMS

Substance Abuse Services Cost Analysis Program (SASCAP), (Research Triangle Park, NC: RTI International).

DATA RESOURCES

- U.S. Census Annual Survey of Public Employment & Payroll
- U.S. Census Annual Survey of State & Local Government Finances
- Bureau of Justice Statistics Expenditure and Employment Data Collections
- Sunshine Review (information about public employee salaries)

through the U.S. Census Annual Survey of Public Employment & Payroll. This survey provides state and local government data on full-time and part-time employment, part-time hours worked, full-time equivalent employment, and payroll statistics, by governmental function. Information on aggregate spending for each functional area of government is available through the U.S. Census Annual Survey of State & Local Government Finances. Additionally, the Expenditure and Employment Data Collections prepared by the Bureau of Justice Statistics (BJS) uses this Census data to calculate annual expenditures for state and federal police protection, judicial services, and corrections. BJS also reports this information for the largest local governments (counties with populations of 500,000 or more and cities with populations of 300,000 or more).

Conclusion

Governments are increasingly looking to economic analyses to inform their criminal justice policies and programs. The results will be useful to policymakers only if costs are calculated accurately. As discussed in this guide, one challenge of collecting marginal costs is that although the process can seem straightforward, even small errors in calculations can compromise a cost-benefit analysis. Practitioners must devote the time and resources necessary to accurately calculate taxpayer costs. This attention to detail will make cost-benefit studies more valuable and can ultimately help generate justice programs and policies that are more cost-effective.

ENDNOTES

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2 The mean per-capita cost of state corrections institutions was $28,323 per Tracey Kyckelhahn, *State Corrections Expenditures FY 1982-2010* (Bureau of Justice Statistics, December 2012). The mean per-capita cost of prison—including costs outside the corrections budget, such as underfunded retirement benefits—was $31,286 in the 40 states analyzed by Christian Henrichson and Ruth Delaney, *The Price of Prisons: What Incarceration Costs Taxpayers* (New York: Vera Institute of Justice, 2012).

3 Paul Heroux, "Addressing the prison's budget and population," *Taunton Daily Gazette*, February 17, 2011. http://www.tauntongazette.com/opinions/x43522680/GUEST-OPINION-Addressing-the-prison-s-budget-and-population (accessed January 9, 2013).

4 Greg G. Chen et al. *Budget Tools: Financial Methods in the Public Sector*. (Washington, DC: CQ Press, 2009), 13.

5 Steve Aos and Elizabeth Drake, *WSIPP's Benefit-Cost Tool for States: Examining Policy Options in Sentencing and Corrections* (Olympia, WA: Washington State Institute for Public Policy, 2010), 28. http://www.wsipp.wa.gov/pub.asp?docid=10-08-1201 (accessed January 9, 2013).

6 Ibid., 28.

7 Pamela Lachman and S. Rebecca Neusteter, *Tracking Costs and Savings through Justice Reinvestment* (Washington, DC: Urban Institute, 2012), http://www.urban.org/publications/412541.html (accessed January 9, 2013).

8 Ann Netten, "Identifying Costs and Costing Complex Intervention Programs," in *Cost-Benefit Analysis and Crime Control*, edited by John K. Roman, Terence Dunworth, and Kevin Marsh (Washington, DC: Urban Institute Press, 2010), 37.

9 Ann Netten, University of Kent, "RE: taxonomy of costs," October 12, 2012, personal e-mail.

10 The hourly wage in this hypothetical example assumes that the employee works 365 days per year ($55,000 ÷ 365 days ÷ 8 hours per day—$18.84 per hour). In practice, employees have days off and this calculation would require an adjustment that accounts for the number of days per year that each employee is working. This adjustment is called a relief factor. See page 14 of this guide for more information on relief factors.

11 Ibid.

12 Cost-Benefit Knowledge Bank for Criminal Justice, "Calculating Drug-Court Costs: An Interview with Shannon Carey," September 14, 2011, http://cbkb.org/2011/09/drug-court-costs-shannon-carey-interview/ (accessed January 9, 2013).

13 Henrichson and Delaney, 2012, 4.

14 Netten, 2010, 40.

15 Henrichson and Delaney, 2012, 22-23.

16 Netten, 2010, 44.

17 Christopher Murray, *Process Evaluation of Breaking the Cycle* (Pierce County, WA: Pierce County Performance Audit Committee, September 24, 2009). http://www.co.pierce.wa.us/DocumentCenter/View/1341 (accessed March 8, 2013).

18 These calculations are on pages 41–42, Murray, 2009.

19 These calculations are on page 42, Murray, 2009.

20 These calculations are on page 47, Murray, 2009.

21 These numbers have been rounded. Actual computations from *Process Evaluation of Breaking the Cycle* are as follows: Long-run marginal cost (per day) = 27,892,430 ÷ 1,343 ÷ 366 = $56.75 (see Murray, 2009, page 42). Short-run marginal cost (per day) = 8,739,845 ÷ 1,343 ÷ 365 = $17.83 (see Murray, 2009, page 56).

22 For more information on relief factors, see Camille Graham Camp, *Prison Staffing Analysis: A Training Manual*, (Washington, DC: National Institute of Corrections, 2008), 39.

23 These calculations are on pages 43-47, Murray, 2009.

24 Murray calculates the variable costs using a top-down approach. The author obtained line-item budgets for the various variable costs (e.g., medical, food, pharmacy) and divided the annual total by the average daily population. (See Murray, 2009, 47).

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30 CourTool Measure 10: "Cost per Case" is available at http://www.courtools.org/Trial-Court-Performance-Measures.aspx (accessed April 25, 2013).

31 Cost-Benefit Knowledge Bank for Criminal Justice, "Calculating Drug-Court Costs," 2011.

32 The salaries for public employees are often available on government websites. Information for public employee salaries, in many states,

is available at Sunshine Review, at http://sunshinereview.org (accessed April 30, 2013). Information on judicial salaries is available from the National Center of State Courts' Survey of Judicial Salaries, at http://www.ncsc.org/salarytracker (accessed April 30, 2013).

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About the Cost-Benefit Knowledge Bank for Criminal Justice

The Cost-Benefit Knowledge Bank for Criminal Justice (CBKB) helps to broaden the knowledge base of practitioners and policymakers about criminal justice cost-benefit analysis, deepen the knowledge and practice in this area, and support practitioners in building their capacity to promote, use, and interpret cost-benefit analysis in criminal justice settings.

About the Cost-Benefit Analysis Unit

Vera's Cost-Benefit Analysis Unit provides policymakers with clear, accessible information on the economic pros and cons associated with criminal and juvenile justice investments so that they can identify effective, affordable interventions for their jurisdictions and allocate resources accordingly.

This guide is available on Vera's website at www.vera.org/marginalcosts.

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