



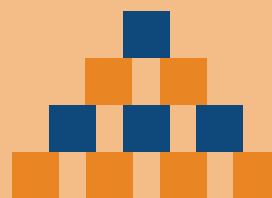
COST ANALYSIS IN PROGRAM EVALUATION

*A GUIDE FOR CHILD WELFARE RESEARCHERS
AND SERVICE PROVIDERS*

- Create an estimate of total costs



- Estimate program component costs



- Estimate costs per participant



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Acknowledgments

Building on the momentum created during the 2011 National Child Welfare Evaluation Summit, the Children's Bureau convened three Child Welfare Research and Evaluation Workgroups. Each workgroup examined a particular evaluation topic or issue with the goal of improving child welfare research and evaluation and strengthening the link between research and practice. The *Calculating the Costs of Child Welfare Services Workgroup* created this guide. Workgroup members included:

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Suggested citation:

Calculating the Costs of Child Welfare Services Workgroup. (2013). *Cost analysis in program evaluation: A guide for child welfare researchers and service providers*. Washington, DC: Children's Bureau, Administration for Children and Families, U.S. Department of Health and Human Services.

This product was created under JBS International, Inc., Contract No. HHSP23320095638WC funded by the Children's Bureau, Administration for Children and Families, U.S. Department of Health and Human Services. The content of this product does not necessarily reflect the official views of the Children's Bureau.



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COST ANALYSIS IN PROGRAM EVALUATION: A GUIDE FOR CHILD WELFARE RESEARCHERS AND SERVICE PROVIDERS

> Introduction

Child welfare decision-makers at all levels (local, State, Federal, and Tribal) are accountable to a variety of stakeholders for the distribution of scarce resources to improve outcomes for children and families. In this context, it is important to know which reform efforts and interventions have the greatest likelihood of achieving desired outcomes, for which participants, in the most cost-effective manner. A systematic cost analysis provides stakeholders information about the monetary value of resources used to deliver services along the continuum of child welfare programs from prevention to permanency. When a consistent approach is used to collect and analyze cost data, cost analysis can also support comparisons of costs across services, programs, and agencies.

While child welfare administrators regularly estimate the costs of services for budgeting purposes, evaluation-oriented cost analyses remain rare in the child welfare field (Goldhaber-Fiebert, Snowden, Wulczyn, Landsverk, & Horwitz, 2011). Analyses that have been conducted or are underway use various methods to collect cost data and develop cost estimates.¹ As a result, comparing estimates produced by different studies of similar services or programs can be difficult.

Increasingly, Federal agencies require cost analyses to be a part of the evaluations of the projects they fund. Many options exist for analyzing program costs as part of broader

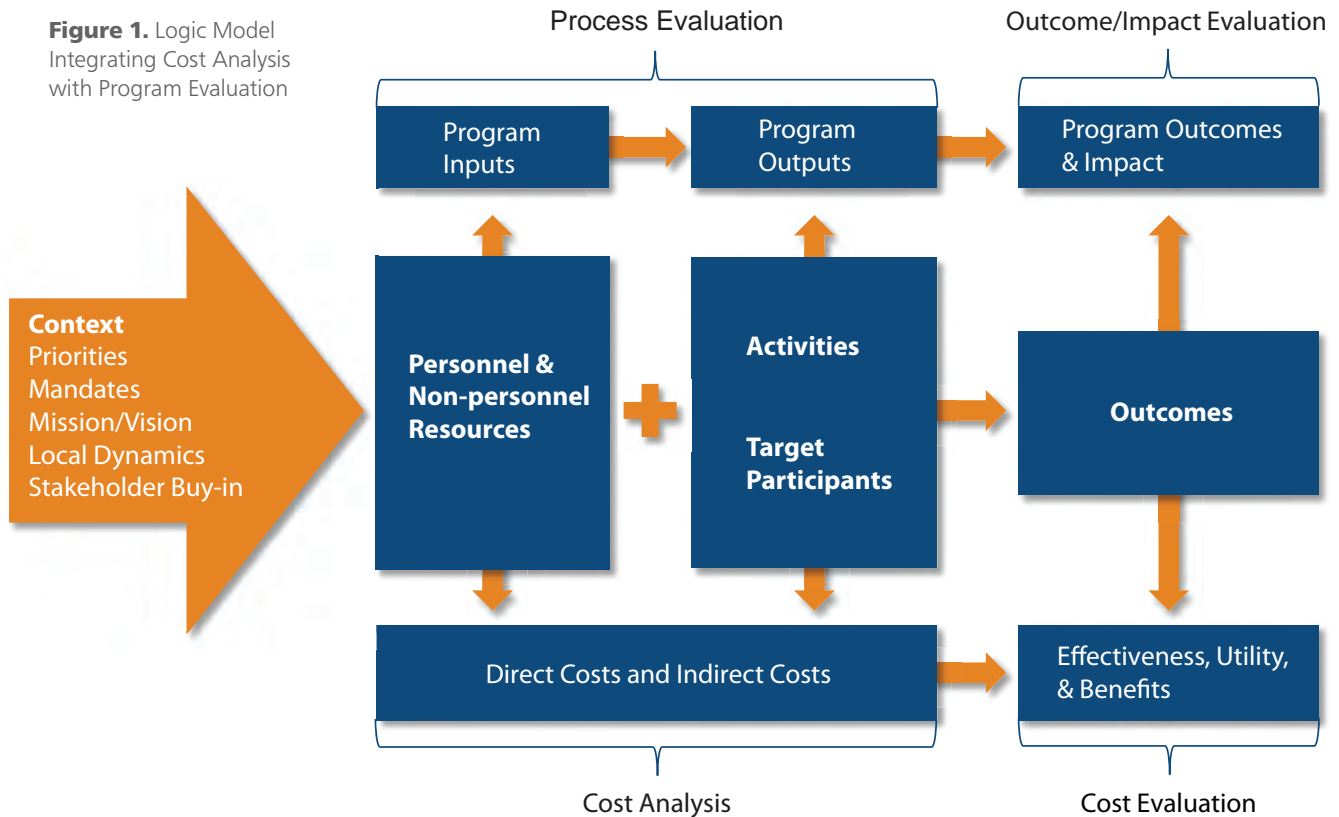
evaluation efforts (Yates, 2009), and cost data collection and analysis are more likely to be successful when they are included in evaluation planning from the outset.

This guide, developed by a group of experts assembled by the Children’s Bureau within the U.S. Department of Health and Human Services, provides support for child welfare service providers and evaluators interested in conducting cost analyses, especially as part of broader evaluations of child welfare services. The guide begins by offering a framework for integrating cost analysis into program evaluations, which supports successful implementation of cost analysis and produces a fuller understanding of the programs or services studied. Next, the guide presents key principles and concepts in cost analysis. It then provides guidance for defining the scope and purpose of a cost analysis and determining the information needed to conduct it. Finally, it explains core steps in conducting a cost analysis and describes the advantages and disadvantages of specific methods for collecting and analyzing cost data.

In text boxes throughout, the guide presents an example of cost analysis for one type of child welfare service, in-home services, to illustrate the methods described and opportunities for integrating cost analysis into broader program evaluations. More detail about this example and a second example of a cost analysis of a home-visiting program are presented in the Appendices.

¹ For example, the Washington State Institute for Public Policy (Lee et al., 2012) calculates return on investment for social programs using cost estimates from various sources, including existing studies and budget information from program developers. The Cost Calculator (Chamberlain et al., 2011), developed by Harriet Ward and other researchers at Loughborough University, employs an “ingredients” approach to costing child welfare services. It identifies core child welfare practice processes, disaggregates them into discrete activities, and estimates costs for these activities. The resulting information is combined with child-level placement data to estimate the total cost of care for a child over a period of time. The economic analysis included in the ongoing Mother and Infant Home Visiting Program Evaluation (MIHOPE) collects cost data at both the family level and the site level. The data gathered from each site are then summarized across sites and home visiting models (J. Ingels, personal communication, April 11, 2013).

Figure 1. Logic Model Integrating Cost Analysis with Program Evaluation



> A Conceptual Framework for the Role of Cost Analysis in Program Evaluation

Analyses of program costs can produce measures that provide important insight into the operation of child welfare programs, including the overall cost of implementing and sustaining a program, costs for specific program activities, and costs per program participant. Cost analyses also establish a foundation for other types of economic analysis, such as comparisons of program costs and benefits. Integrating cost analyses into evaluation planning offers opportunities to build on information collected through other evaluation components, such as process, outcome, or impact studies.

Figure 1 illustrates the relationships among cost, process, and outcome/impact evaluations. Cost analysis relies on information about a program’s implementation, such as the specific programmatic activities, the type

and quantity of resources used in delivering program services, the number and characteristics of people receiving services, and the intensity or “dosage” of services provided. These kinds of information—program inputs and outputs—are also the focus of process evaluations, which answer the questions of “what is done,” “when,” “by whom,” and “to whom.”

Evaluations that include cost analysis *and* studies of program outcomes or impacts may offer opportunities for cost-effectiveness or cost-benefit analyses (also referred to as benefit-cost analyses). Cost-effectiveness analysis examines the relationship between a program’s costs and a relevant unit of program effectiveness. For instance, a cost-effectiveness analysis might assess the programmatic cost per case of child maltreatment prevented. Cost-benefit analysis quantifies program benefits in monetary terms and assesses whether they exceed program costs. The precision of these analyses depends, in part, on accurate analysis of program costs.

> Key Concepts and Principles in Cost Analysis

The following concepts and principles are important to consider when conducting cost analysis for program evaluation.

Costs are resources used, not money spent.

Cost analysis considers the value of *all* resources used in providing a service, whether or not the resources were purchased directly by the program. Providing a child welfare service or operating a program typically requires two general types of resources: personnel and non-personnel (Corso and Filene, 2009). In many social service programs, staff time is the primary resource necessary for delivering a service. In addition, a program is likely to require non-personnel resources such as office space and facilities, supplies and materials, training, equipment, contracted services, travel, and utilities. Program participants also contribute resources in the form of time spent in program activities and, in some cases, out-of-pocket costs for transportation.

It is important to establish a value not only for accounting costs—costs that are likely to appear in agency expenditure records and budgets—but also for items that an agency receives free of charge. A program’s use of resources at no cost—for example, volunteer labor, donated office space, and participants’ time—creates an opportunity cost for society, since those resources could be used productively in other ways. The time that a participant spends attending program activities might otherwise be spent in paid employment, for example, while office space donated to a program might be filled by another provider. Moreover, services or items offered as in-kind contributions to one agency may need to be purchased by another (Corso and Filene, 2009; Corso and Lutzker, 2006).

The perspective of the analysis affects the costs considered.

Defining the perspective of a cost analysis answers the question, “Costs to whom?” It operates as a filter for selecting the set of cost elements that should be included

in the analysis (Haddix, Corso, & Gorsky, 2003; Foster, Connor, & Nguyen, 2001). Cost analyses commonly consider the perspective of: (1) the funding agency or government; (2) the service provider or implementing agency; (3) the client or recipient of services; or (4) society as a whole. The perspective of society reflects a combination of unduplicated costs to the government (Federal, State, or local) or funding agency, the service provider, and the recipient of services.

The questions that a cost analysis seeks to answer affect the choice of cost perspective. The illustrations of analyses in this guide focus on costs to the implementing agency. This information can be helpful to other agencies

considering replicating a program or service. Analyzing costs from the perspective of society is important when a cost estimate is used in a cost-benefit analysis that considers benefits accruing to both individuals and government.

COSTS ARE DEFINED AS THE MONETARY VALUE OF THE RESOURCES USED TO IMPLEMENT A PROGRAM (YATES, 2009).

Costs must be adjusted to account for the passage of time.

Several types of adjustments must be made to determine the value of costs that occur at different times. Costs incurred in different years should be adjusted for inflation so that all costs are measured in the same base year—usually the earliest year considered in the analysis. The Consumer Price Index (CPI) Inflation Calculator from the Bureau of Labor Statistics (http://www.bls.gov/data/inflation_calculator.htm) is available to assist with this adjustment.

Adjustments must also be made to future costs to reflect people’s time preferences with respect to costs. A dollar in the present year is worth more than a dollar in a future year because it can be invested and earn interest. Conversely, a cost incurred in the future is worth less in the present. This adjustment is important when comparing costs and benefits that occur at different times or when comparing the costs of programs implemented over different lengths of time (Centers for Disease Control, n.d.). The present value of a future cost is calculated by applying a *discount factor*. For more on this topic, see: <http://www.cdc.gov/owcd/eet/Cost/Fixed/4.html#howdowediscountfuturecosts>.

Finally, evaluators must adjust costs of resources that are purchased in one year but have value in future years—for example, a piece of equipment whose useful life is expected to be more than one year (Haddix et al., 2003). In this case, the annual cost of the resource must be determined by annuitizing the capital cost—spreading the cost appropriately over the equipment’s useful life. If a cost analysis covers more than one year, this calculation must also discount costs that occur in future years. For more on annuitizing capital costs, see: <http://www.cdc.gov/owcd/eet/Cost/Fixed/4.html#annuitizingcapitalcosts>.

Costs can be variable or fixed.

Variable costs increase or decrease with the level of output, such as the number of participants served. For example, a home visiting program intending to serve additional families may need more educational materials and, possibly, additional direct service staff, thereby increasing personnel and non-personnel costs. Fixed costs, on the other hand, do not vary with the quantity of output. For example, rent, equipment lease payments, and wages and salaries of administrative staff are not likely to vary in the short term with the number of clients served.

Cost analyses should distinguish between marginal and average costs.

Marginal costs and average costs are two ways of relating costs to the quantity of output, such as number of units of service provided. The **average cost** of a service is the total cost of a program divided by the total units of service provided. For example, if the total costs of providing a home visiting program during one year were \$500,000 and the program provided 1,000 visits during the year, the average cost per home visit would be \$500. The **marginal cost** of a service is the cost for providing one additional unit of that service. The marginal cost of a service generally excludes fixed costs. For instance, the marginal cost of a home visit could be calculated as the value of staff time, transportation, and educational materials required to provide an additional visit.

> Defining the Purpose and Scope of the Cost Analysis

Before beginning the cost analysis, the evaluator should engage internal and external stakeholders (e.g., agency leadership and staff, legislators, funders) to: (1) clarify the goal and audience for the analysis; (2) clearly define the service to be analyzed; and (3) specify the time period to be covered.

What are the goals and who is the audience for the cost analysis?

Evaluators should consider the questions that need to be answered through a cost analysis, who needs the information, and how the information will be used. For instance, a cost analysis can be designed to compare the costs of two programs, to explore the cost of expanding an existing program, or to provide information needed to compare a program’s costs and benefits. At the most basic level, a cost analysis can help child welfare administrators understand the costs of providing a program or service.

What program or service will be analyzed?

Before beginning a cost analysis, it is important to define the intervention, service, or program to be analyzed (Westat, Inc., Chapin Hall Center for Children, & James Bell Associates, 2002). One way is to define the individual activities or components that compose the program or service, and its beginning, middle, and end. Creating a program logic model can be helpful for this step.

When identifying program activities or components, it may be helpful to begin by labeling broad categories and identifying individual activities within each category. In their cost study of the Family Connections program, Corso and Filene (2009) analyzed costs by dividing them into two broad categories: (1) direct service-related costs; and (2) administrative costs. They further disaggregated these two categories into specific activities. Activities related to direct services included, for example, working directly with clients, making referrals, and conducting case management. Administrative activities included provision and receipt of supervision, training, and outreach, among others. Another approach to defining program

activities is to identify individual steps or services that are part of the service process. For example, intake, assessment, and case transfer might be the individual steps identified for child protective services.

What time period will be covered?

Clearly defining the time period over which cost data will be collected is also important (Brodowski and Filene, 2009). Cost analyses may cover several years to provide information on how costs vary over time or focus on a single year that is considered to be representative of the program's typical operating state. Evaluators should also specify the program's stage of implementation during the cost analysis because costs are likely to differ between a startup or planning period and a period of steady-state implementation, when the program is operating at or near full capacity.

> Conducting the Cost Analysis

A common approach to calculating program costs is the ingredient method (also known as the resource cost method). This approach includes itemizing the resources (or ingredients) necessary to provide services, and calculating or estimating the costs of each resource (Levin and McEwan, 2001). Researchers have advocated this method as a means to develop cost estimates that

reflect the value of all resources required for delivering a service (Plotnik & Deppman, 1999; Boulatoff & Jump, 2007; Levin & McEwan, 2001). This section outlines how the ingredient method can be applied to cost analysis of child welfare services. By combining information on the costs and use of resources with data on program participation, an evaluator can develop estimates of the total cost of a program, the cost of its key components or activities, and costs per participant. The process involves eight main steps:

- 1 Itemize resources used to implement the program
- 2 Collect data on resource costs
- 3 Collect data on resource allocation
- 4 Estimate the value of indirect costs
- 5 Create an estimate of total costs
- 6 Estimate costs of individual program components or activities
- 7 Estimate costs per participant
- 8 Conduct sensitivity analyses and examine cost variation

In describing the process, we highlight options for tailoring the detail and comprehensiveness of data collection to the goals of the analysis and resources available to conduct it.

To demonstrate the integration of cost analysis and program evaluation, we provide an illustration of how cost data could be developed for an evaluation of the effectiveness of intact family services provided by a public child welfare agency. This illustration (which uses fictitious data) is presented throughout this section in box insets.

Illustration of a Cost Analysis of Intact Family Services (In-Home Services)

The purpose of this analysis is to provide the public child welfare agency's leadership with the cost of a core child welfare service in conjunction with the evaluation of the intact family services program as a whole. Given this purpose, the analysis focuses only on the implementing agency's perspective and does not consider the larger costs to society. That is, the analysis only considers the specific costs incurred by the child welfare agency to deliver the program as intended.

Intact family services include case management and referral services provided to families that have been reported to the public child welfare agency for child maltreatment and for whom a determination is made that the child(ren) can remain safely in the home. The purpose of these services is to address the underlying causes of the issue that brought the family to the attention of the child welfare agency.

1 Itemize Resources Used to Implement the Program

The initial step in the analysis is to itemize the resources necessary to implement the program or provide the service. In general, resources can be categorized as personnel and non-personnel.

- Personnel resources include direct service staff time and the proportion of management and administrative staff time allocated to the program or service. It is important not to assume that all management tasks are overhead costs. Some management tasks are directly related to a program or service, and managers may be able to estimate the amount of time they spend on direct program activities.
- Non-personnel resources include all other items necessary for delivering the program or service—for example, supplies and materials, equipment, office space, and transportation.

The value of personnel and non-personnel resources is then categorized into direct and indirect costs. A process evaluation can help identify the kinds of resources used in providing a program.



2 Collect Data on Resource Costs

Once resources required to operate a program are specified, the evaluator should pinpoint sources of data on resource costs and methods for collecting those data.² Accounting records for the period covered by the analysis are likely to be important sources of information on staff salaries and other expenditures. Program budgets are generally *not* good sources of information for cost analyses, as they present anticipated, rather than actual, costs. In addition, program budgets are likely to be an incomplete accounting of resources required to deliver a program. For instance, they may not reflect the value of volunteer labor or donated supplies.

Data on resource costs also may be collected through interviews with staff familiar with program operations and expenditures, and/or surveys or templates designed especially for this purpose. The templates can be divided into sections addressing annual costs of personnel, buildings, and facilities; supplies and materials; equipment; contracted services; and other categories on the ingredient list. Practical examples of templates for collection of cost data include the Drug Abuse Treatment Cost Analysis Program (<http://www.datcap.com>) and the National Assembly on School-Based Health Care Cost Survey (http://www.sbh4all.org/site/c.ckLQKbOVLkK6E/b.7547173/k.9F58/Cost_Survey.htm).³

Illustration of a Cost Analysis for Intact Family Services

Ongoing case management begins after the investigation of the reported maltreatment is completed. This program is bound by the completion of the investigation and the transfer of responsibility to a case manager. These services typically end when it is determined that the family has the resources, knowledge, and strengths to continue safely caring for the child(ren) without child welfare involvement so the case may be safely closed. Services may also end with the removal of the child(ren) from the home and placement into foster care.

One unit of five case managers at a central office within this county-administered, public child welfare agency is assigned to serving intact families. This unit consists of one supervisor and five case managers, or six full-time equivalents (FTEs). These five case managers have a maximum capacity for serving 12 families each for a total team capacity of 60 families that can be served at any one time. The remaining units consist of two investigations units (2 supervisors and 10 investigators, or 12 FTEs) and two foster care and adoption units (2 supervisors and 10 case managers, or 12 FTEs). In addition, the personnel who provide the infrastructure, management, and administrative services (30 FTEs) are also housed at this site. Therefore, the intact family services unit represents 10% of all the FTEs.

² See the Appendix for the program components and resources identified for the illustration.

³ Copyright restrictions on the use of these instruments may apply. They are noted here as examples only.

Data collection on resource costs must account for resources that are shared among multiple programs. If the resource is shared, only the portion used by the program being analyzed should be included in the cost estimate. For example, if multiple programs share an office, include only the value of the space used by the program that is the focus of the cost analysis.

Accounting records will not likely include resources that are donated to the program, such as volunteer time. The evaluator conducting the cost analysis can estimate the value of these resources using information on market prices for similar resources. For instance, the value of volunteer labor may be estimated using typical wages for the position held by a volunteer. An example of typical wages can be found on the United States Department of Labor-Bureau of Labor Statistics Web page (<http://www.bls.gov/bls/blswage.htm>). Similarly, the value of office space donated to a program may be estimated using commercial lease rates in a local area. This approach is appropriate because providers of a similar program may have to pay these costs if donations are not available.



3 Collect Data on Resource Allocation

Once the evaluator has information about resource costs, he or she needs to determine how much of each resource is used in providing the individual components or activities that compose the program. Because personnel often represent the main resource used in providing child welfare services, it is particularly important to understand how much staff time is used to deliver a program or service, and how that time is allocated across the components of the program or service. In addition, data on how much time staff spend serving individual clients, if available, can help the evaluator identify differences in costs across families or types of families.

The evaluator can collect data on how staff use their time prospectively through time diaries or retrospectively through the use of interviews, focus groups, or surveys. The approach selected depends on the priorities for the cost analysis and the time and resources available to conduct it.

Illustration of a Cost Analysis for Intact Family Services

The evaluator opted to collect cost data prospectively. Also, the agency leadership elected to examine the costs of the program over a one-year period. The program staff were asked to record how they used their time during four one-week periods over a year. Collecting time-use data at multiple points may help the evaluator capture differing patterns in time use over the course of a year. Program staff recorded their time on a log each work day, allocating time to key activities in 15-minute increments. The staff completed the sheet daily over the course of each week under review.

Prospective data collection requires that respondents record regularly how they spend their time during a specific period or throughout the length of an intervention (Anderson, Bowland, Cartwright, & Bassin, 1998; Corso & Filene, 2009; Yates, 1999). Each day, staff might enter on a log the amount of time they spent on specific program activities, such as visits with families, traveling to visits, advocacy on behalf of families, and writing case notes. (See the Appendices for examples of key activities.) The log might also require staff to indicate the client who received the service. (Examples of time logs can be found in the National Institute on Drug Abuse (NIDA) manual, "Measuring and Improving Costs, Cost-Effectiveness, and Cost-Benefit for Substance Abuse Treatment Programs" [Yates, 1999], available at: <http://archives.drugabuse.gov/IMPCOST/IMPCOSTIndex.html>.)

Under retrospective data collection methods, respondents are asked to recall how they spent their time during a particular period (such as the previous day or week) or how they generally spend their time. These questions can be posed to program staff through interviews, focus groups, or surveys.

Program managers or evaluators planning a cost analysis must weigh the various advantages and disadvantages of prospective and retrospective methods for collecting data on staff time use. Prospective data collection allows an evaluator to collect detailed data on how staff use their time and other resources in providing services to individual clients. On the other hand, it can place a high burden on program staff members, who

must complete logs or diaries regularly over an extended period, and sustaining consistent staff participation over time may be difficult. Retrospective reports of time use are less burdensome for staff but are also generally believed to be less accurate than prospective time diaries, because responses to questions are considered more susceptible to error. In particular, respondents may over-report time spent in socially desirable activities, have difficulty recalling their activities during the reference period, or find it challenging to report how they spend their time.



4 Estimate the Value of Indirect Costs

Indirect costs (sometimes called overhead costs) are not directly associated with a specific program or service. They may include administrative functions that are shared across programs and services, such as training, accounting, human resources, and information technology, or costs related to overall agency management. Sometimes expenditures for facilities, utilities, or equipment are considered indirect costs.⁴

Illustration of a Cost Analysis for Intact Family Services

To estimate the proportion of overhead costs attributable to in-home services, we multiply the agency budget for these indirect services by the proportion of the agency staff allocated to intact family services (see the Appendix for more detail). Because the intact services unit represents 10% of the agency FTEs, we attribute 10%, or \$176,000, of the total agency indirect costs (\$1,760,000) to the intact family services.

By adding the key direct service component costs and the indirect costs, we can determine the total program costs for a 12-month period. Based on this example, the total program cost for a 12-month period is \$537,250.

Agencies use various methods for determining indirect costs. A common approach is to establish an indirect cost rate (a percentage) and apply this rate to direct costs, such as salaries. Some agencies establish separate indirect cost rates for overhead costs and general and administrative costs. Indirect cost rates may be applied to different combinations of direct costs: salaries only; salaries and fringe benefits; or salaries, fringe benefits, and other direct costs.

It is important to include indirect costs in a cost analysis because these resources support the delivery of program services. Total indirect costs may be estimated by using an agency's established indirect cost rate and applying it to direct costs, following the same procedure used by the agency. Another option is to use the total indirect costs an agency has calculated for a program during the period covered by the cost analysis.

It is also possible to create an estimate of a program's indirect costs when an established indirect cost rate is unavailable. To do so, the evaluator would itemize the resources that are generally considered under indirect costs, determine the total costs of these resources to the agency during the analysis period, and allocate costs to a program based on the program's share of an agency's direct costs. If costs are analyzed at the participant level, a program's indirect costs can be allocated based on the share of direct costs attributable to the individual participant (see the NIDA manual [Yates, 1999] for a complete description of this approach).

The evaluator conducting the analysis should take care not to double-count resources when collecting and using data on indirect costs. For example, an organization may consider facilities to be an indirect cost and allocate these costs to individual programs or projects through an established indirect cost rate. When an indirect cost rate is used in a cost analysis, the evaluator should identify the specific types of costs covered under this rate and reconcile this information with other cost data collected.



⁴ In a cost-effectiveness or cost-benefit analysis, "indirect costs" may refer to the unintended or spillover costs a program creates, or to productivity losses resulting from a person's participation in a treatment or intervention.

5 Create an Estimate of Total Costs

Creating an estimate of total program or service costs using the ingredient method involves summing the total costs of each resource identified. Before creating this total, resource costs should be adjusted to ensure that they represent only those costs related to the program or service being analyzed and the period covered by the analysis.

In presenting the total cost estimate, it may be helpful to combine resource categories. For instance, all resources related to facilities could be combined into a single category, as could supplies and equipment. Doing so will streamline the reporting of results.

When comparing total costs across similar programs or multiple sites of a single program, consider that many factors can contribute to differences in total costs. For example, programs may serve varying numbers of participants or face different local costs for office space. It is important to consider these differences in context. Comparing costs is also beneficial for performance management.

It may be helpful to examine how the proportions of specific types of costs vary across programs or sites, for example, by calculating and comparing personnel costs or indirect/overhead costs as a percentage of total costs. When making such comparisons, it is important to consider how each program or site's setting and implementation may influence costs.



6 Estimate Costs of Individual Program Components or Activities

To estimate the cost of individual program components or activities, the evaluator conducting the cost analysis can use information on resource costs and allocation. The approaches available for estimating program component costs depend on the information available for the analysis.

Estimating component costs based on staff time use and total program cost. One approach is to allocate the total program cost among program components

in the same proportions as staff report using their time. Under this approach, the total value of each staff member's compensation can be divided among program components or activities based on the percentage of time the staff member reported spending on that component or activity. The value of other resources can then be allocated to program components based on the overall proportion of time that staff report spending on each component. This method provides a workable overall estimate of program component costs but does not provide insight into how these costs may vary among program participants.

Estimating component costs based on cost per unit of time. The cost evaluator can develop a more precise estimate of program component costs if the analysis includes detailed data on use of staff time and other resources. In this case, the cost of each resource per unit of time should be calculated (for example, the value of an hour of a staff member's time or the value of an hour of facility use). This amount can be multiplied by the number of hours that resource was used for a particular component or activity to arrive at the cost per component. The cost of resources for which time-use data may not be available can then be allocated to program components in the same proportions as total staff time.

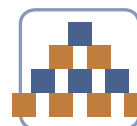


Illustration of a Cost Analysis for Intact Family Services

Using the cost-per-period of participation method, we identified a total of 550 participant-months (sum of families served each month for the 12-month period under review). With annual costs of \$537,250, cost-per-period of participation is \$977 ($\$537,250/550$). To estimate the cost per family, we multiply the cost-per-period of participation (\$977) by the average number of months a family participates in the program (6 months), or $\$977 \times 6$, for an estimated cost per family of \$5,862.

7 Estimate Costs Per Participant

Estimating costs per participant is critical for making analytic comparisons across programs with similar goals. It also provides a foundation for cost-benefit or cost-effectiveness analyses at the individual level. As with other elements of the cost analysis, the approach for estimating per-participant costs and the accuracy of these estimates depend on the data available for the analysis. To estimate costs per participant, some data on program participation must be available (at a minimum, the number of people served during the cost analysis period).

Average cost method. One approach is simply to divide total program costs for the cost period by the number of participants during the period. However, this method is generally not preferred, because it does not take into account such factors as service intensity or duration, which can vary across participants and affect actual costs and program outcomes.

Cost per core service. Another approach is to estimate the cost of delivering a “core” program service; for example, a home visit. This method relies on data indicating the number of times a service is delivered during the cost period and the number of times an individual participant receives it. The total program cost can then be divided by the number of visits provided, producing a cost per home visit delivered, for example. This value would then be multiplied by the number of home visits received by an average family during the entire duration of their participation, producing an estimate of the cost per family. While this approach may provide information on how costs vary among participants, it can be difficult to define a program’s “core” service.

Average cost per period. A third approach relies on estimating the cost to serve a participant for a specific period of time, such as a day, week, or month. This approach uses data on the length of program participation for individual participants. Total program costs during the cost analysis period (for example, a year) are divided by the total number of days, weeks, or months that all participants spent in the program during the cost analysis period—that is, the sum, across all participants, of the number of days, weeks, or months each was enrolled in the program. (For programs of short duration, the evaluator might calculate a cost per participant day or week.)

To calculate the average cost per participant, the cost per day, week, or month is multiplied by the average

number of days, weeks, or months a participant stays in the program from entry through exit. When calculating the average duration of participation, evaluators should include all days, weeks, or months between entry and exit, even if entry or exit occurs before or after the cost analysis period. The evaluator can use data on the range of length of participation to get a sense of how costs vary among participants. This method produces a reasonably accurate estimate of per-participant costs, but it does not account for variation in the intensity of services across participants—that is, whether individual participants use more or less staff time or other resources.

Cost per unit of activity. Collecting data on direct service provision at the participant level allows for more sophisticated analysis of per-participant costs. In contrast to the methods for calculating per-participant costs described above, this approach does not start with a total cost period amount. Rather, costs of program resources per unit of time are multiplied by the amount of time individual participants use these resources to develop an estimate of per-participant costs. For example, an evaluator could ask staff providing direct services to complete time diaries indicating the number of hours spent delivering services to individual clients. The evaluator could then identify the cost for an hour of each staff member’s time. Using information about the number of hours a client spends in the program or service, the evaluator could calculate the cost of direct service provision per participant (number of hours x cost of staff time per hour). To create an estimate of non-personnel costs per participant, the cost of other resources could be divided equally among participants or allocated in proportion to the number of hours a participant receives services.

Estimates of per-participant costs developed in this way would support analysis of how costs vary among participants with different characteristics. In addition, they can be averaged across participants, if average costs are of interest. In general, compared to other methods, this approach produces an estimate that is likely to be more precise (as long as data collection procedures are sound), but it also involves a greater burden in terms of the data required. The NIDA manual provides additional detail on calculating per-participant costs in this way.



8 Conduct Sensitivity Analyses and Examine Cost Variation

Cost analyses should include tests of whether and how results change with adjustments in assumptions or cost parameters. These tests are known as sensitivity analyses.

If any assumptions about the value of resources were made during the cost analysis, these assumptions should also be tested by varying them to assess the effect on cost estimates. An evaluator might also conduct a sensitivity analysis by varying one cost element at a time and determining the effect on the cost estimate. For example, an evaluator might explore how changes in staff compensation influence estimates of per-participant costs. This kind of analysis could provide information on the implications of hiring staff with different education levels (and associated differences in average compensation).

Examining how estimates of per-participant costs vary across programs, sites, and groups of participants is also likely to be informative. These kinds of analyses can help identify factors that drive cost variation by exploring relationships between observed costs and the characteristics of program, site, and participant groups.

In general, estimates expressed in terms of a single figure may be misleading to decision-makers. A program's true costs are more likely to be within a range that may be affected by individual cost components and their unit values.



> Conclusion

Cost analysis that employs the methods outlined in this guide is doable. Cost analysis is important as part of a comprehensive approach to evaluating programs, and it can serve as a foundation for more rigorous cost evaluation such as cost-effectiveness and cost-benefit analyses.

> Glossary

Cost Analysis: “A thorough description of the type and amount of all resources used to produce ... services” (Yates, 1999).

Cost-Benefit Analysis: Analysis that “attempt[s] to calculate the actual costs of delivering services and the monetary value of improving particular outcomes for children and families, and to measure whether the benefits exceed the costs” (https://www.childwelfare.gov/preventing/evaluating/cost_benefit.cfm).

Cost-Effectiveness Analysis: Analysis that “attempt[s] to determine which practices and policies protect the greatest number of children for the lowest price,” by identifying “key measures of program effectiveness (outcomes)” and comparing “different strategies to affect those outcomes” (https://www.childwelfare.gov/preventing/evaluating/cost_effect.cfm).

Costs: “Value (typically monetary) of the amounts of different types of resources consumed to implement the program” (Yates, 2009).

Direct Costs: “Those costs that can be assigned to a particular case or program, for example, the monetary value of a case worker’s person-time used to counsel a client” (Bell, 2011).

Fixed Costs: “Costs whose total remains constant (within a relevant range) even though the volume of the activity may vary” (http://www.cdc.gov/dhdsp/programs/nhdsp_program/economic_evaluation/index.htm).

Impact Evaluation: The purpose of an impact evaluation is to determine the extent to which the objectives of the program or policy are accomplished and whether any unintended effects could be identified (often thought of as distal outcomes) (Theodoulou and Kofinis, 2004).

Indirect Costs: “Costs that are not identified specifically with a particular case or program, for example, the cost of facilities” (Bell, 2011).¹

Outcome Evaluation: The purpose of an outcome evaluation is to characterize the extent to which the knowledge, attitudes, behaviors, and practices have

¹ In cost-benefit analysis or cost-effectiveness analysis, indirect costs typically refer to productivity losses.

changed for those individuals or entities who received the intervention or who were targeted by the policy compared to non-recipients (often thought of as proximal outcomes) (Theodoulou & Kofinis, 2004).

Process Evaluation: The purpose of a process or implementation evaluation is to characterize the process through which an intervention or policy is implemented. It focuses on inputs and outputs of the program, quantifying the dosage of the intervention, the implementation fidelity, and its ability to affect change (Theodoulou & Kofinis, 2004).

Sensitivity Analysis: “Examination of effects of varying specific assumptions on costs, benefits, effectiveness, and comparisons of these” (Yates, 2009).

Variable Costs: “Costs which vary with the level of output and which respond proportionately to changes in volume of activity” (http://www.cdc.gov/dhdsp/programs/nhdsp_program/economic_evaluation/index.htm).

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> Appendices

In the following two appendices, we provide fictitious data for the cost analyses of two child welfare services. These illustrations are completely fictitious and solely for the purpose of demonstrating how a cost analysis would be conducted: first, by identifying the key program components and activities; second, by specifying all the resources; and third, by adding value to all those resources before calculating the total cost of the program.

Appendix 1. Illustration of Cost Analysis of an Intact Family Services Program

Key Components

Category	Activities
Direct services to families	Planning and preparation: <ul style="list-style-type: none"> ▪ Identifying contact goals and objectives ▪ Case planning
Direct services to families	Contact with families: <ul style="list-style-type: none"> ▪ Case planning discussion/review ▪ Strengths and needs reassessments ▪ Visits to monitor progress and provide support, including visits with individual family members (for example, seeing a child at school, making a home visit to discuss progress with the parent) ▪ Other types of contact with the family (not necessarily in person); e.g., phone, e-mail, or text
Direct services to families	Case management: <ul style="list-style-type: none"> ▪ Frontline supervision, case assignment, and case consultation ▪ Time spent in court and/or interacting with attorneys, if applicable ▪ Attendance at team meetings ▪ Communication between the case manager and the original investigator
Direct services to families	Services linkage and contacts with collaterals: <ul style="list-style-type: none"> ▪ Identification and referrals for additional services ▪ Information gathering (e.g., school records, medical records) and contacts with other service providers
Direct services to families	Travel/transportation to complete assigned duties
Direct services to families	Case documentation: <ul style="list-style-type: none"> ▪ Case notes ▪ Case plan ▪ Referral forms (for families to services) ▪ Court reports, if applicable ▪ Documentation or paperwork related to expenses and other internal agency requests (e.g., paperwork related to case opening/closure/transfer to out-of-home placement)
Direct services to families	Other activities depending on an agency's practice model and service delivery array

Category (continued)	Activities
Management and administration ¹	Middle management planning, consultation, and supervision, including review and approval of case documentation
Management and administration	Coordination and facilitation of team meetings
Management and administration	General counsel/legal services
Management and administration	Internal reporting and communication (e.g., agency staff meetings to communicate relevant information, meetings to review data for continuous improvement)
Management and administration	Human resources (e.g., staff recruitment and selection, benefits management)
Management and administration	Training (e.g., training personnel who are providing new-hire training and ongoing staff training and/or coaching, curriculum development, and implementation)
Management and administration	Information Technology: <ul style="list-style-type: none"> ▪ Staff to support the use of technology for case documentation, such as laptops, tablets, and cell phones ▪ Staff to manage case management/information systems ▪ Staff to develop and release program output and outcomes reports
Management and administration	External reporting and communication (e.g., reports/communication to funders/legislators and other stakeholders, reporting to Federal Government)
Management and administration	General program management, including accounting, contracting, policy and planning, and quality assurance

¹ In some financial models, this key component may be separated into two components – management and administrative services and infrastructure or indirect services.

Resources	Examples
Personnel (proportion of salaries, benefits, and taxes applicable to intact family services)	<ul style="list-style-type: none"> ▪ Case managers ▪ Case assistants, if applicable ▪ Frontline supervisors ▪ Program management ▪ Family team meeting facilitators and coordinators ▪ Quality assurance staff ▪ Agency leadership ▪ Agency legal counsel, if court involvement ▪ Accounting staff ▪ Information technology staff (to maintain and develop the case management system or other reporting system) ▪ Human resources staff ▪ Training staff ▪ Policy and planning staff ▪ Contracts and procurement staff ▪ Clerical staff ▪ Value of any donated/volunteer labor

Resources <i>(continued)</i>	Examples
Contracted services	Professional and paraprofessional services, if applicable (e.g., mental health or substance abuse screening consultants, homemaker services contracted or hired directly by the child welfare agency, available to all units)
Materials and supplies	Proportion of these costs allocated to the intact family program (e.g., paper, pens, other office supplies)
Depreciation costs of durable equipment	Cars, smartphones, computers/laptops, office furniture
Facilities/office space	Proportion of rent and other building costs allocated to the intact family program
Travel	Mileage: <ul style="list-style-type: none"> ▪ For visits with families ▪ To service providers on behalf of families ▪ To training ▪ For travel to court hearings, if applicable Vouchers or reimbursements to families for travel
Utilities	Proportion of these costs allocated to the intact family program

The following data-collection instrument captures all costs for personnel (that is, the dedicated supervisor and five case managers) and non-personnel resources of the program during the period of analysis.

Resources	Total Annual Cost
Intact case manager salary	\$225,000 (\$45K x 5 case managers)
Intact case manager benefits and taxes	\$56,250 (\$11,250 x 5)
Intact supervisor salary	\$60,000
Intact supervisor benefits and taxes	\$15,000
Travel expenditures	\$5,000
Materials and supplies—paper, pens, etc. (proportion of costs applicable to program)	\$1,500
Annual costs of durable equipment—desks, printers, cars, etc. (proportion of costs applicable to program)	\$1,250
Annual lease/mortgage payment (proportion of costs applicable to program)	\$3,000
Utilities—electricity, gas, water, etc. (proportion of costs applicable to program)	\$1,500
Salaries, benefits, and taxes for all other personnel (allocated based on proportion of time spent on intact family services)	\$168,750
Total	\$537,250

Indirect Resources	Total Agency Annualized Indirect (Overhead) Costs	Portion Assigned to Intact Family Services
Annual costs of durable equipment	\$12,500	\$1,250 (\$12,500 x .10)
Annual lease/mortgage payment	\$30,000	\$3,000 (\$30,000 x .10)
Utilities	\$15,000	\$1,500 (\$15,000 x .10)
Salaries, benefits, and taxes for all other personnel	\$1,687,500	\$168,750 (\$1,687,500 x .10)

Appendix 2. Illustration of Cost Analysis of a Home Visiting Program

Key Components

Category	Activities
Direct services to enrolled families	Initial screening and assessment <ul style="list-style-type: none"> ▪ Assessing client needs ▪ Analyzing family situations ▪ Collecting information needed to develop service delivery plans
Direct services to enrolled families	Home visit preparation and delivery <ul style="list-style-type: none"> ▪ Preparing for home visits, including developing service delivery plans and communicating with clients to schedule visits ▪ Delivery of home visits, including providing counseling and support, demonstrating or modeling skills, conducting periodic screenings and assessments, and other activities
Direct services to enrolled families	Case management and service linkage <ul style="list-style-type: none"> ▪ Arranging and coordinating services on behalf of a family, including advocacy on behalf of a client ▪ Consulting with other staff and providers ▪ Identifying appropriate resources for families
Direct services to enrolled families	Services/activities other than home visits <ul style="list-style-type: none"> ▪ Providing or participating in services other than home visits, such as parent group meetings
Direct services to enrolled families	Case documentation <ul style="list-style-type: none"> ▪ Completing case notes and recording data to document services provided and client status
Direct services to enrolled families	Travel/transportation <ul style="list-style-type: none"> ▪ Traveling to clients' homes or other locations to provide services. ▪ Transporting clients to locations outside their homes.

Category <i>(continued)</i>	Activities
Management and Administration	Outreach and recruitment <ul style="list-style-type: none"> ▪ Communication informing other providers and potential participants about services available
Management and Administration	Eligibility determination and referral <ul style="list-style-type: none"> ▪ Conducting screenings and assessments related to eligibility determinations and enrolling clients; referring clients who cannot be served to other agencies
Management and Administration	Staff recruitment <ul style="list-style-type: none"> ▪ Recruiting and hiring program staff
Management and Administration	Staff training <ul style="list-style-type: none"> ▪ Providing or attending in-house or outside trainings that support delivery of services or program operations
Management and Administration	Staff supervision and consultation <ul style="list-style-type: none"> ▪ Providing or receiving feedback and supervision; participating in staff meetings or consultations related to service delivery
Management and Administration	Fundraising <ul style="list-style-type: none"> ▪ Grant-writing, fundraising, and leveraging funding
Management and Administration	Planning and collaboration <ul style="list-style-type: none"> ▪ Strategic planning and decision-making, participating in professional/community committees, working with partners to align goals and strategies
Management and Administration	External communication <ul style="list-style-type: none"> ▪ Communicating with partners/stakeholders; building awareness or support for home visiting programs among policymakers
Management and Administration	Continuous quality improvement <ul style="list-style-type: none"> ▪ Analyzing data to monitor program implementation and assess fidelity to the Evidence-Based Home-Visiting program model (not for program evaluation)
Management and Administration	General management and administration <ul style="list-style-type: none"> ▪ Budgeting and financial reporting, managing or negotiating contracts, and other management and administrative functions and activities that do not belong under other categories

Resources	Examples
Personnel (proportion of salaries/fringe benefits attributable to work on the home visiting program and value of any volunteer labor)	<ul style="list-style-type: none"> ▪ Home visitors ▪ Supervisors ▪ Program management ▪ Administrative and support staff ▪ Volunteers
Materials and supplies	<ul style="list-style-type: none"> ▪ Office supplies ▪ Computer software ▪ Postage ▪ Educational materials ▪ Client support materials
Annual costs of durable equipment	<ul style="list-style-type: none"> ▪ Cars ▪ Computers/laptops ▪ Office furniture
Facilities/office space	Cost for facilities (whether owned/leased/donated) used by the home visiting program
Travel	<ul style="list-style-type: none"> ▪ Travel/mileage to conduct home visits or visit other service providers on families' behalf, or provide transportation to families ▪ Travel to attend professional trainings
Contracted services	Costs for professional or technical consultants to the home visiting program
Other direct costs	<ul style="list-style-type: none"> ▪ Fees paid to home visiting model developers ▪ Costs of staff training and professional development
Indirect/overhead costs	Costs of shared administrative functions or other resources shared across programs

Example cost estimate for one year of home visiting program operation

Resources	Annual Cost
Personnel	\$406,800
Materials and supplies	\$35,500
Annual costs of equipment	\$4,800
Facilities/office space	\$8,500
Travel	\$22,500
Contracted services	\$11,500
Other direct costs	\$6,400
Indirect/overhead costs	\$80,750
Total	\$576,750

In this example, we estimate per-participant costs using the average duration of enrollment in the home visiting program and the cost per day of family enrollment during the cost study period. Using data on program participation, we begin by determining the average length of enrollment between program entry and exit for 125 families served at some point during the cost study period. (Days enrolled before and after the cost period are included in our calculation of average duration.) We calculate the average length of enrollment per family to be 217 days. We also calculate the total number of days of family enrollment during the cost study period (that is, the number of days each family was enrolled during the cost study period, summed across all enrolled families). The total number of days of family enrollment is 24,192.

A cost per day of family enrollment is calculated by dividing total annual costs by the total number of days of family enrollment during the cost study period ($\$576,750/24,192$). Therefore, the cost per day is \$23.84. To estimate the average cost per family, the cost per day is

multiplied by the average number of days between a family's program entry and exit ($\$23.84 \times 217$). We estimate that the program costs \$5,173 to serve a family, on average.

In addition to calculating average costs per family, we may also calculate: (1) the range in cost per family (by determining the minimum and maximum number of days of family enrollment and multiplying these amounts by the cost per day of enrollment); and (2) the median cost per family (by determining the median number of days families were enrolled and multiplying this amount by the cost per day of family enrollment). These measures will provide an indicator of variation in costs among families served.

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