

EVALUATION TECHNICAL ASSISTANCE BRIEF

for OAH & ACYF Teenage Pregnancy Prevention Grantees

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An Overview of Economic Evaluation Methods

The Office of Adolescent Health's Teen Pregnancy Prevention (TPP) grantees are poised to contribute to the limited knowledge base on the cost and return on investment of programs designed to prevent teen pregnancies and improve related sexual health outcomes. Current grantees have an opportunity to collect accurate, credible data about the cost of such programs to inform the field. Grantees with impact data from rigorous evaluations can pair that data with program cost data to answer additional questions about whether these programs are cost-effective. For example, a grantee could examine how much it costs to operate a specific teen pregnancy prevention program or how the cost of providing a program compares to the benefits realized for participating teens and the broader community. Grantees undertaking these types of analyses—commonly referred to as economic evaluations—will need to collect data and select methods appropriate for the questions they want to answer. This brief discusses (1) common economic evaluation methods, (2) the kinds of questions that each method can help us answer, and (3) the data requirements.

Illustrative research questions

Cost analysis: How much does it cost to provide a specific program?

Cost-effectiveness analysis: How much does it cost to have one more youth use a condom?

Cost benefit analysis: Do a program's benefits outweigh its costs?

Understanding Common Economic Evaluation Methods

A variety of economic evaluation methods are available, each of which can provide answers to different types of questions and has its own unique data requirements. In this section, we discuss three economic evaluation methods that can be useful for answering questions about the costs of teen pregnancy prevention programs: (1) cost analysis, (2) cost-effectiveness analysis, and (3) cost-benefit analysis.

Cost analysis is the systematic collection, categorization, and analysis of a program's costs. It provides a basis for identifying the resources required to implement a program and understanding the cost of providing services. A cost analysis also serves as the foundation for all other economic evaluation methods. Cost analyses can be used to express results in various ways. Total program cost is equal to the sum of the costs for all resources used for programming, including accounting costs and in-kind contributions (Levin and McEwan 2001). Alternatively,

marginal cost could be used to express the change in total cost that results from adding another service component or serving one more individual. Researchers and model developers have used different methods to estimate the cost of implementing some teen pregnancy prevention models, typically focusing on the programs' total and per participant costs (Aos et al. 2004; Philliber et al. 2002; Rosenthal et al 2009; and Thomas 2011).

Data Requirements. Cost analyses require collecting information about all resources—sometimes referred to as ingredients or components—used for programming (Levin and McEwan 2001). Importantly, the definition of resource encompasses more than money spent or budgeted costs. A cost analysis should measure accounting costs (actual costs incurred), including direct personnel costs, such as salaries and fringe benefits; direct non-personnel costs, such as supplies and materials, equipment, facilities, and so on; and indirect costs (overhead), which can include both personnel and non-personnel costs. A cost analysis may also include resources used without charge, including such in-kind contributions as volunteer time and donated goods. When estimating the cost for an agency to implement a particular program, it is important to include the costs of in-kind contributions to give an accurate picture of total cost because another program might not have access to the same donated resources. It will be necessary to estimate costs for in-kind contributions because they do not typically appear in accounting records.

Examples of **in-kind contributions** include volunteer time, food donated for a program session, and space donated for program implementation or facilitator training.



Additional data, including data on participation and on how staff spend their time, can supplement cost data to help answer questions of interest.

- Participant data, such as data on youth's enrollment and attendance, can be paired with total program cost to produce unit costs, such as the average cost to serve one participant (calculated as the total cost of the program divided by the number of participants receiving the program) and the average cost to provide one session to one participant (calculated as the total cost of the program divided by the total number of sessions offered).
- For more in-depth analyses of how resources are allocated within the program, grantees can collect data on how staff spend their time. This makes it possible to allocate program cost to specific activities or tasks that staff perform (for example, the costs associated with providing direct services or the cost of all management and administrative activities).

Limitations. A cost analysis will not reveal the answers to questions about cost-effectiveness or how program costs compare to program benefits. Findings from a cost analysis reflect only the experiences of a specific implementing organization. Although the findings are a good indicator of the cost of implementing a similar program in a similar context, they would not necessarily apply to all teen pregnancy prevention programs or to all agencies that implement the same program model. Differences in program model expectations and implementation experiences make it difficult to compare the total program cost for several different programs; it is better to use unit costs for such comparisons.

Cost-effectiveness analysis results in metrics that portray the cost of achieving a change in a specific outcome of interest. For example, in the field of teen pregnancy prevention, a cost-effectiveness analysis can indicate the number of pregnancies or sexually transmitted infections that are averted for every dollar invested in a program. Alternately, it can indicate the cost per pregnancy prevented by a program or the cost of increasing the rate of condom use. Cost-effectiveness is typically expressed as a ratio: program costs divided by a program's effectiveness at changing the outcome of interest. A comparison of the cost-effectiveness ratios for different programs would indicate which program produces a given outcome at the lowest cost. Several teen pregnancy prevention programs have been evaluated through cost-effectiveness analyses, including a combined cost-effectiveness analysis of the following programs: Draw the Line/Respect the Line, Postponing Sexual Involvement, Human Sexuality, Health Screening, Teen Talk, Reach for Health, Safer Choices, and Reducing the Risk (Olaiya 2006).

Data Requirements. Cost-effectiveness analyses are based on program cost, program impact data, and data on participant enrollment. First, one needs to calculate the average or marginal

Defining the time period and perspective for an economic evaluation

Grantees who plan to conduct an economic evaluation must define the time period during which they will collect cost data and decide which costs to include (for example, the implementing agency's costs and/or the participants' costs). The appropriate time period and perspective depends on the research questions you want to answer.

Time period: The time period defines the bounds around which costs are collected or estimated. For example, the analysis could focus on the cost to launch a program or the cost to provide programming for one year or one full program cycle.

Perspective: Teen pregnancy prevention programs typically have many stakeholders, including the implementing agency, the funding agency, the participants, and society as a whole. Grantees can examine program costs from any of these perspectives. The results of an analysis of the program's costs for society could be different from an analysis of the program's costs for an implementing agency.

cost of providing services, which is the numerator of the cost-effectiveness ratio. The impact of the program on the outcome of interest—such as the rate of new sexually transmitted infections—is the denominator of the cost-effectiveness ratio. Whether to use the average or marginal cost in the numerator depends on the question of interest. For example, the average cost-effectiveness ratios of two programs can be compared to determine which represents a more efficient use of resources. Within a program, one can use marginal cost-effectiveness ratios to compare whether adding one service or another—for example, distributing free condoms to program participants or providing free access to a contraception help hotline—is a more efficient use of resources.

Limitations. Cost-effectiveness analyses can be used to examine only one outcome at a time, so a cost-effectiveness ratio cannot capture the program's full impact on behavior across multiple outcomes. These analyses also are typically focused on outcome data from a particular point in time (for example, condom use three months after the programming ends), and therefore cannot be used to account for program benefits that occur beyond the analysis time frame. Moreover, the comparison of cost-effectiveness ratios for different programs works only when identical outcomes are used in computing the denominators. For example, suppose one study revealed that spending \$1,500 per youth on a program corresponded with one less instance of unprotected sex, and a second study revealed that spending \$1,800 on each youth who

participated in a different program resulted in the uptake of one additional long-acting reversible contraception. Although the second program costs more per unit, because each study measured a different outcome, it is not possible to directly compare their results. Finally, although a cost-effectiveness analysis can be used to demonstrate whether a program is more cost-effective than its alternatives, it does not reveal whether the program's costs exceed its benefits.

Teen pregnancy can have high social, economic, and personal costs. Teen parents often experience social and physical consequences, and taxpayers bear many of the costs. In 2010, the national cost to taxpayers of teen childbearing was estimated to be \$9.4 billion; the average annual cost to taxpayers for one child born to a teen mother was nearly \$1,700 (National Campaign 2013). Programs that reduce teen pregnancy may help to reduce or avert these costs.

Cost-benefit analysis is done to determine whether a program's costs were lower than the value of its benefits (in monetary units), which indicates whether the program was an efficient use of resources. Results can be expressed as either a simple difference (benefits minus costs, in which case a number greater than zero is desired) or as a ratio of program cost to program benefits (in which case a number less than one is desired). In contrast with a cost-effectiveness analysis, which presents costs in relation to a unit change of a single outcome, a cost-benefit analysis is done to examine costs in relation to the monetary value of all outcomes the program potentially affects. For example, a cost-benefit analysis of a teen pregnancy prevention program could factor in the monetary value of such benefits as a reduction in pregnancies and sexually transmitted infections (STIs) and an increase in condom use that took place as a result of the program. Because the results of a cost-benefit analysis are expressed as dollars saved or a unitless ratio, a cost-benefit analysis allows us to compare different studies and programs, even if the outcomes differ. Some researchers (such as Hoffman and Maynard 2008; Philliber et al. 2001; Philliber et al. 2002; Thomas 2011; Wang et al. 2000), have conducted cost-benefit analyses on teen pregnancy prevention programs, including Carrera, Safer Choices, and BART, but this research is limited in scope and in the number of programs studied.

Data Requirements. A cost-benefit analysis requires the same data as a cost-effectiveness analysis, plus a valuation of outcomes (from a variety of perspectives) in dollars. Some outcomes of interest may already be expressed in monetary terms (for instance, earnings); however, researchers will often need to collect additional data from external sources to value program benefits in dollars. The benefits are calculated from program impacts, either as the monetary value

of a positive impact (for instance, increased high school graduation rates), or as the monetary value of averted costs for decreasing an undesired outcome (for instance, lowered teen pregnancy rates). Suppose, for example, a group of youth participating in a program had fewer teen pregnancies and were more likely to graduate from high school than a group of young people who did not participate in the program. With higher graduation rates, the program group would have higher earnings, on average, than the control group would have. One can estimate the dollar value of these increased earnings. In addition, the program produces a benefit of averted teen pregnancies, which are costly to taxpayers. To include the benefits of the averted teen pregnancies, which would reduce costs to the individuals and to society, one can use existing estimates of the costs of teen pregnancy (see box at left).

Return on investment and social return on investment

Two other methods you might consider are return on investment and social return on investment analysis. These methods are similar to cost benefit analysis in that they consider program benefits and costs.

Return on investment is a measurement of the financial benefits (returns) from an investment as a percentage of its costs. For instance, it reveals the amount of money made from licensing fees for a new program as a percentage of the cost to develop the program. Return on investment is equal to the net gain from an investment (current value of the investment minus its initial cost) divided by the initial cost. A return on investment ratio greater than zero means the investor gained more than he or she initially invested in the program; a higher ratio indicates a larger gain.

Social return on investment analysis is a measurement of the value of the social impact of a program as a percentage of the cost of program services. It is like a cost-benefit analysis in that it compares costs to benefits. Drawing from the methods for calculating the return from financial investments, social return on investment analyses account for social, economic, and environmental costs and benefits, and financial proxies are used to capture outcomes that are not easily expressed in dollars (Banke-Thomas et al. 2015). For instance, a social return on investment may be calculated using the perceived value of an outcome as an estimate of its monetary value. The concept of perceived value incorporates what individuals are willing to pay or sacrifice (for example, time) to have access to a particular good or service, or to change an environmental condition.

Limitations. Placing a dollar value on program benefits can be challenging. Some benefits of the program might have no market value, but they could be important to the funder or implementing organization. Consider a program that increases teens’ knowledge of STIs or improves their self-esteem and decision making skills. These sorts of outcomes are not easily converted to dollars. Program benefits also may occur after the analysis time frame, which could result in an undercounting in the analysis of the benefits. If an impact analysis depends only on six-month follow-up data to measure impacts, it will not capture any potential program impacts beyond that time frame. Therefore, even if the program reduced the pregnancy rate one year after implementation, the cost-benefit analysis would not capture this impact because the benefit was unknown at the time of analysis. A related concern is that some outcomes, such as higher high school graduation rates or a delay of childbearing, can have lifelong social and economic benefits (Hoffman and Maynard 2008). A cost-benefit analysis might not fully capture the value of these long-term benefits if they are not estimated and incorporated into total program benefits.

TPP grantees who are collecting impact data for their evaluations are well positioned to conduct a cost-effectiveness study. See Appendix A for suggestions on what additional cost data you may need to collect to supplement the OAH performance measures and develop an estimate of total program cost.

Selecting an Economic Evaluation Method

When selecting which type of economic evaluation to use, grantees should consider the intended research questions and the data available. A cost analysis can help answer questions about how affordable a program is, or it can help identify resources required for program implementation and how they are used. This type of evaluation relies on cost data alone. On the other hand, cost-effectiveness and cost-benefit analyses can be used to address questions about whether to invest in a particular program or which program to select to maximize social or economic returns. All require additional data beyond program costs, specifically, they require information on program impacts. Table 1 is a summary of the research questions and data requirements for different economic evaluation methods. The process of selecting which economic evaluation method to use may be iterative, as researchers balance the research questions they want to answer with the data that are available. Figure 1 shows this process. As a first step in determining how to approach an economic analysis, researchers must identify which method would be best to answer their research questions. Next, they can determine whether they have access to or are able to collect the data required for the method. If it is not feasible to collect all required data components, the researchers might have to reconsider the research questions.

Table 1. Research Questions and Data Collection Needs for Economic Evaluation Methods

Analysis Method	Key Research Questions	Data Collection Requirements				
		Accounting Cost Data	Estimates of In-Kind Contributions	Participant Data	Program Impact Data	Monetary Value of Program Benefits
Cost Analysis	<ul style="list-style-type: none"> How much did it cost to provide a program during a particular time period? How much did it cost to serve one youth? 	✓	✓	✓*		
Cost-Effectiveness Analysis	<ul style="list-style-type: none"> How much did it cost to avert one teen pregnancy? Which program reduced the teen pregnancy rate for the lowest cost? How many STIs were averted with each dollar invested in a program? 	✓	✓	✓	✓	
Cost-Benefit Analysis	<ul style="list-style-type: none"> Did the benefits of a program exceed its costs? For every dollar invested in a program, how many dollars were saved? 	✓	✓	✓	✓	✓

*Participant data may be used to conduct a cost analysis, but are not required.

Suppose researchers want to answer the following research question: “Did the benefits of the teen pregnancy prevention program exceed its costs?” To answer this, they could conduct a cost-benefit analysis. They would have to collect data on program costs and impacts, and find sources from the literature that suggest a dollar value for outcomes of interest that were not already expressed as dollars or estimate the dollar values themselves. Without this, they could not move forward with a cost-benefit analysis. However, they could conduct a cost-effectiveness analysis without information on the monetary value of outcomes of interest. Such an analysis could help answer this question: “How much did it cost to avert one teen pregnancy?” Even though the researchers would not be able to answer the original research question, they would have gained information on the economic value of the program by using a different method.

Developing a Clear and Deliberate Plan

When planning any economic evaluation, grantees need to develop clear and deliberate plans early on for collecting data on program costs and other required data. Doing such planning will outline all of the types of data needed, when to collect them, and how to collect them. Notably, all of the economic evaluation methods discussed in this brief require cost data, and therefore, plans for collection of these data are necessary to inform any type of economic evaluation. The specific research questions and analysis plans for an economic evaluation will determine which method is most appropriate and what additional data may be required.

Figure 1. Process for Selecting an Economic Evaluation Method



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APPENDIX A: OAH Performance Measures and Cost Analysis

The Office of Adolescent Health’s (OAH) 2010-2015 Teen Pregnancy Prevention Program performance measures include several measures related to cost at both the grantee and program levels. While these measures do not require grantees to collect all of the data necessary to conduct an analysis of the total cost to provide a program, they provide a large portion of the needed information. Grantee-level measures fall into three categories that include personnel costs, office space and facilities, and financial diversification and sustainability (i.e., information about funding sources). Program-level performance measures fall into two broad categories that cover payments to program developers or distributors and other direct costs to support program implementation. In order to calculate total program cost, grantees would need to supplement the performance measures with the following data: (1) payments to developers/distributors, materials and supplies, and other direct costs paid for directly by the grantee; (2) other miscellaneous resources used by the grantee or program; (3) equipment used by the grantee or program; and (4) indirect costs. Figure 1 provides detailed information on the resources captured by the grantee- and program-level performance measures and the additional information required to estimate a program’s total cost. Consistent with the performance measures, the most relevant perspective for the grantees is that of the implementing agency—the performance measures require estimates that value in-kind contributions and other donations the program may have used free of charge.

Figure 1. Summary of Performance Measures and Additional Data for Cost Analysis

