

Introduction

Programs and interventions cost money, and in this era of ever-tightening budgets for public health programs, economic analysis is one of several tools you can use to answer key questions like:

- Is the money we spend on a program justified by the benefits that result from that program?
- Does one of our options provide better value than another option?
- Where can we put our money for the best effect?
- Does the program save money?

These analyses are in increasing demand from stakeholders, including state legislatures, funders, and hospital administrators. This tip sheet series will give you pointers on how to conduct an economic analysis, with links to resources that provide more in-depth information.

To conduct an economic analysis, you must first be able to describe the links between your program activities and the health outcomes you want to see in your population. Therefore, a strong logic model is the best starting point. Second, from the beginning of your program, you must have a plan to collect both cost data and outcome data so that you can monitor the real costs—and the real outcomes—of your program. Third, you must determine how to describe your program outcomes in terms of money saved: Do your program participants have fewer medical costs? Are they missing less work or using fewer government resources? Fourth, you must put your costs, outcomes, and savings together in an equation or template to measure your economic outcomes. Finally, you must share your findings with your stakeholders. This series provides three tip sheets:

Tip Sheet 1: Preparing for and Conducting Your Program Evaluation

The first step is to determine whether your program has a health impact. This tip sheet describes the basics of program evaluation and what you need from your evaluation to create your economic analysis.

Tip Sheet 2: Preparing for Your Economic Analysis

This tip sheet describes various types of economic analysis, data elements you need, and different ways of figuring out how much money your program may be saving.

Tip Sheet 3: Conducting and Promoting Your Economic Analysis

This tip sheet includes links to economic analysis templates, discusses the nuances of conducting the analysis, and offers pointers for presenting the outcomes to your audience.



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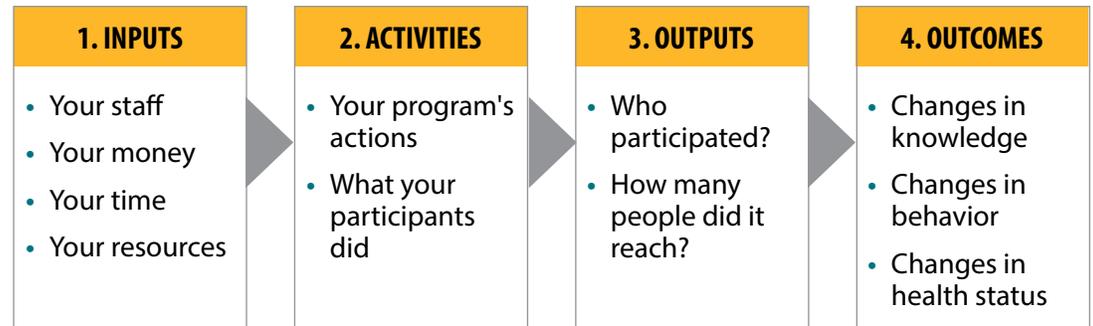
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Preparing for and Conducting Your Program Evaluation

What effect will my program have?

To know whether your program has a fiscal impact, you must first determine whether your program has a health impact. You must be able to draw a clear line between your program's goals, activities, and intended outcomes. The most common way to do this is to create a logic model, such as in the figure below, illustrating a step-by-step process, from inputs (your resources) to activities (your actions) to outputs (the number of people who participate in your program) to outcomes (changes in your target population's knowledge, behavior, or health).



Part I of the American Academy of Pediatrics' (AAP) [Evaluating Your Community-Based Program](#) can guide the design of your program evaluation.

How will I measure that effect?

You must have measurable outcomes that you can then translate into estimated savings for the economic analysis. Measurable outcomes include:

- **Changes in health status**, such as reductions in body mass index among children in a treatment program;
- **Changes in health care usage**, such as a reduction in emergency department visits for children with asthma;
- **Changes in knowledge**, such as parent's awareness of safe sleep practices; and
- **Changes in a health-related behavior**, such as an increase in the use of prenatal care.

Will I need to collect cost data?

It is best to collect financial and economic cost data from the very beginning of the program to ensure that your economic evaluation is accurate and complete. The more complete your data are, the more robust your program and economic analyses can be: Demographics, participant feedback, and other data can be important in the long run, but be sure that your data-collection efforts are reasonable and do not put undue burden on your team, your partners, or your participants. Otherwise, they will not be sustainable. "**Financial costs**" are direct monetary costs that would appear in a typical budget. "**Economic costs**" are the estimated value of resources that have value but are not directly paid for, such as donated equipment and in-kind services. Be sure to

let any partners know that you are interested in collecting these data, both to see if they are willing to share this information and to ensure that they are collecting the data from the beginning. Partners who are reluctant to share direct financial data may be able to give you estimates, if necessary.

How do the effects of my program link to my targeted health outcomes?

Your logic model should make it clear how the changes in your target population's knowledge, behavior, and health are linked to your intended outcomes. For instance, if your program focuses on providing breastfeeding education to first-time mothers, is there evidence in the literature that providing this kind of education increases the rate of breastfeeding among your target population? Establishing these links typically requires a review of the literature to see if other researchers have found these connections.

When you have program data, you can start to explore these questions:

1. Were there effects on participants?
 - You can compare before (baseline) and after data to measure changes in your participants directly.
 - You can also compare your participants with similar nonparticipants to see if your program has had an effect.
2. Were there effects on nonparticipants?
3. Were there effects on my community at large?

Part II of AAP's [*Evaluating Your Community-Based Program*](#) can guide implementation of your program evaluation and provides more information about setting up and conducting statistical analysis of your data to determine the effects of your program.

EVIDENCE IN THE LITERATURE CAN INCLUDE

- Peer-reviewed journals;
- Reports and white papers from state and federal entities; and
- Report and white papers from reputable nonprofits and research institutes.

RESOURCES

American Academy of Pediatrics. (2008). *Healthy Tomorrows Partnership: Evaluating your Community-Based Program*. Elk Grove Village, IL: AAP. Retrieved from <https://www2.aap.org/commpeds/htpcp/resources.html#eval>



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Preparing for Your Economic Analysis

When you have finished planning your program evaluation, you can prepare for your economic analysis. This tip sheet walks you through the basics of planning for an economic evaluation.

Who is my audience?

Determining your audience is an important step in setting up your economic analysis because you must be able to describe the costs and benefits of your program as they accrue to your target audience. Most commonly, your audience will be:

- Your organization, particularly if your organization is spending money and resources on the program;
- Your funders, including private funders, grant makers, and state and federal government agencies, who will be interested to know whether you are using their funds efficiently; and
- Your community at large or society as a whole, which includes your organization, your funders, the recipients of your services, families, and any other members of the community that your program affects positively or negatively.

Be sensitive to the information needs of your audience and what they hope to see in an economic analysis. For example, an analysis showing that one of your partners is losing revenue with your program may cause problems with their leadership, even if your program is producing positive economic results for other partners.

Which type of economic analysis should I use?

Several types of economic analyses are available, and the analysis you choose depends on your data, your audience, and what you want to demonstrate:

- **Return on Investment (ROI)**
Use an ROI analysis to see if a single program saves more money than it costs. The total costs of the program are tallied and compared to the money the program saved. You can use ROI to show that a program is saving money in the long run, perhaps by reducing medical costs.
- **Cost-effectiveness Analysis (CEA)**
A CEA is a tool for comparing two programs that have similar outcomes to determine which program is a better use of funds. The total cost of each program is tallied, and the cost per participant is calculated. You can use CEA to choose between two programs when resources are limited.
- **Cost-Benefit Analysis (CBA)**
A CBA allows you to compare programs that have different outcomes. As with the ROI, the money each program saves is tallied and, like the CEA, the totals are compared to determine which program has a greater benefit for the money spent.

What is the timeframe for analysis?

Your economic analysis will ideally begin with the first year of your program. This first year includes all start-up costs and may or may not have any outputs or outcomes. Your analysis should include each year of your program implementation. For this analysis, the year can be a federal fiscal year, a state fiscal year, or a calendar year—whichever is most appropriate given your funding sources.

It is important to consider how far into the future you will measure your potential program benefits. Commonly, economic analysis takes potential benefits into account 3–5 years forward. You want to be able to capture savings for as long a period as you can realistically link them to your program. This is an area where reviewing the literature can be helpful. For instance, if you find that past studies show that providing child safety seat education results in more parents using these seats at a 2 year follow-up, you can realistically project that your program will have positive impacts 2 years after the intervention.

What are the costs of my program?

Use your logic model to get an idea of the value of your inputs. It's important to include and track the value of all the resources used, even if a given resource was not purchased directly for your program. Account for resources like existing office space and donated participants' time, as well. For instance, one Healthy Tomorrows program incorporates injury-prevention counseling into a well-child visit. Although the pediatricians do not charge the program for the time they take to conduct the injury-prevention counseling, the pediatrician's time during the office visit does have a value that should be included in the analysis. Costs might include:

- Costs that your organization pays:
 - Staff salaries in whole or in part depending on how much time a person spends on the program
 - Training costs
 - Equipment and supplies costs
 - Fees for consultants
 - Reimbursements or payments to participants
- Costs that other partners of your program pay, including grant funds and donations of staff time, equipment, and other resources; and
- Costs that participants pay, such as equipment or supplies they need to purchase.

What are the estimated savings of my program?

Now that you have identified program outcomes that can be linked to specific improvements in health behaviors or health outcomes, the next step is to determine the potential cost savings of those health outcomes. Determining the estimated savings of your program can be a more complicated process than estimating costs. In general, you are looking to prevent health behaviors and health outcomes that result in higher costs resulting from poor health. You can simplify this task by using a three-step process, which is illustrated in the figure on the next page:

1. MEASURE SPECIFIC PROGRAM OUTCOMES

Program participation resulted in 50% more children participating in at least 1 hour of exercise per day.

2. LINK TO BROADER HEALTH OUTCOMES

Children who participate in 1 hour of exercise show a clinically-significant improvement in BMI scores.

3. LINK TO COST SAVINGS IN THE LITERATURE

Clinically significant improvements in BMI scores can result in annual medical savings between \$30 and \$450 per child.

You may find estimated savings in:

- **Direct medical costs**, such as out-of-pocket costs for families and the cost of medical procedures:
 - [Medical Expenditure Panel Survey](#). Survey-based data sets that provide national estimates of health care use and payments for individuals and families
 - [Health Care Cost Institute](#). State-level data on the costs of more than 240 medical services
- **Indirect costs** such as work loss, worker replacement, reduced productivity, and lower wages:
 - [Bureau of Labor Statistics](#). Wage estimates for a variety of professions and geographic areas
- **Societal costs**, such as the cost of necessary social services (e.g., income assistance) and judicial services such as juvenile detention or incarceration, if applicable.

It is not always possible to pick direct and indirect costs from the above sources for your estimated savings, so review the literature to see if other researchers have estimated savings for programs similar to yours. Searching for keywords related to your program, with phrases like “economic analysis,” “cost savings,” “cost benefit,” and “return on investment” will help you find sources for other studies.

This step may require some creativity to find similar studies in the literature: Be sure that you are always transparent as to the assumptions you’ve made in determining your estimated savings if you use this method.

What if the results aren’t what I expected?

It may be that your data do not show that your program has the desired effect or that it is not yet possible to measure the effect of your program. This can happen when health outcomes occur far in the future. For instance, you might not be able to directly measure the impact of increasing physical activity in a preschool classroom because your program follow-up is only 6 months—too short a period to expect to see changes in a child’s BMI or blood markers. In this case, you can use your logic model to point to projected health outcomes and estimated savings. You must be clear when presenting this information to your audience that your program may only potentially show these outcomes and savings.

RESOURCES

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Conducting and Promoting Your Economic Analysis

You will generally set up your economic analysis in Microsoft Excel for ease of data entry and collection. You can set up your own Excel file; use the template the Healthy Tomorrows program provides; or download and adapt a template from another institution, such as:

- [The Medicaid Return on Investment Template](#) from the Center for Health Care Strategies;
- [Cost-Benefit Analysis Template](#) from the University of Pennsylvania; and
- [Cost/Benefit Analysis Tools](#) from Connecticut's Department of Administrative Services, Bureau of Enterprise Systems and Technology.

How do I account for the time value of money?

It is important to ensure that you are measuring your dollar amounts appropriately. More detailed instructions are available in the resources cited, but the most important tips to keep in mind are:

- Make sure that you express all your initial costs and savings in the same fiscal year (FY) using the [Consumer Price Index Inflation Calculator](#). For example, if you are using literature on direct medical costs from FY2006, you should convert those amounts to 2016 dollars.
- For costs and savings in the future, you will want to discount those future savings. Money in the future is worth less than money in the current year because of inflation and uncertainty. The standard discount rate is 3 percent.

How do I perform a sensitivity analysis?

A "sensitivity analysis" is a technique in which you vary the data in your analysis to see how your outcomes differ in best-case and worst-case scenarios as well as on average. You may find when researching the estimated savings of your program that there is a range of potential savings. You might also find that there is a range of possible health outcomes. For example, your nutrition education may help reduce childhood obesity by half a percent to 3 percent: You will want to see if your program has a positive financial outcome under both circumstances. You might also want to present both best-case and worst-case scenarios to your audience, which can be helpful if you can demonstrate that your program is still economically feasible under a variety of circumstances. Conducting a sensitivity analysis makes your overall economic analysis stronger and more realistic. Both [Solver](#) and [SolverTable](#) are modules for Excel that will help you conduct sensitivity analysis.

Interpreting the outcomes: is this program worth the money?

There are several ways to interpret your economic analysis data:

- **Comparing your program to nonintervention.** This is the base case/do-nothing scenario. You should show how your program saved money compared to no intervention at all. Most commonly, you demonstrate that your program prevented

the costs of poor health outcomes that would have occurred otherwise. For example, you might show that referring children to coordinated care services reduces future medical costs to the state Medicaid program compared to children who do not receive coordinated services.

- **Comparing your program to alternative programs.** You may be able to compare your program to other programs, either within your organization or to other programs discovered in the literature. Comparing your costs and benefits, such as total estimated savings per participant or per program dollar spent, to similar programs can help you make the case that your program is worth sustaining. For example, your analysis may find that your childhood obesity reduction program's return on investment (ROI) compares favorably to peer-reviewed childhood obesity programs you found in the literature.
- **Positive ROI.** A positive ROI demonstrates that your program saves (returns) more money than it costs to develop and implement. This information can help you argue that funding for your program should continue or be increased.
- **Negative ROI.** A negative ROI means that your program returns less money than it costs to develop and implement. This finding does not necessarily mean that your program is not worth supporting, however: It may be that your program produces positive health outcomes further into the future than you have accounted for. For example, investments in a child literacy program may not produce a monetary reward until that child has graduated from high school and entered the workforce at a higher pay rate than he or she would have earned without the literacy support. In this case, turn to the literature to find support for your arguments that future benefits make your program worthwhile.

How do I explain economic analysis to my stakeholders?

Be sure to clearly describe both the program costs and the program savings in terms that make the most sense for your audience. You can present your analysis in a variety of ways, including:

- Net savings for your stakeholder;
- Savings per fiscal year from your program;
- Savings per participant in your program;
- For every \$1 spent on your program, your stakeholders save \$1 or more in the costs associated; and
- The costs of prevention—your program—compared to the costs of treatment, particularly for chronic disease or undesirable health behaviors.

How do I promote my program outcomes?

How you promote your program outcomes depends on your audience:

- **An executive summary** (see Michigan example in the Resources) is appropriate for policymakers and other readers who will be interested in details about your program and economic evaluation but who will not have time to read more than a few pages. An executive summary should emphasize your findings and provide enough information about your methods to assure your audience that your numbers have a solid basis in fact.
- **Infographics** (see Florida example in the Resources) are appropriate for dissemination in social media, to the public, and to other stakeholders who will respond best to the data in a visual form and who are less interested in details about the analysis.

RESOURCES

Delaney, J. A. C., & Seeger, J. D. (2013). Chapter 11: Sensitivity Analysis. In P. Velentgas, N. A. Dreyer, P. Nourjah, et al. (Eds.), *Developing a Protocol for Observational Comparative Effectiveness Research: A User's Guide*. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK126178>

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