

CDC Coffee Break: Conducting a Cost Analysis



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Welcome to today's coffee break presented by the Evaluation and Program Effectiveness Team and the Division for Heart Disease and Stroke Prevention at the Centers for Disease Control and Prevention. We are fortunate to have Alberta Mirambeau as today's presenter. Alberta is a health scientist on the Evaluation and Program Effectiveness Team. My name is Martha Bose and I am today's moderator. I am an Evaluation Fellow here on the same team as Alberta. Today Alberta will be presenting on how to conduct a cost analysis.

*Note: Screen magnification settings may affect document appearance.

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Presentation Overview

- ❑ Cost analysis 101
- ❑ Cost analysis example
- ❑ General considerations
- ❑ Tools and resources
- ❑ Q & A

Just to give you a quick overview, today I'll be talking about conducting a cost analysis and sharing some key principles related to conducting a cost analysis. Then I'll walk through an example. I'll close with a few remarks for your consideration and then share some tools and resources that you can reference after this presentation.

Purpose of Economic Evaluation

- ❑ Application of analytic techniques to “identify, measure, value, and compare the costs and consequences of alternative programs or interventions”



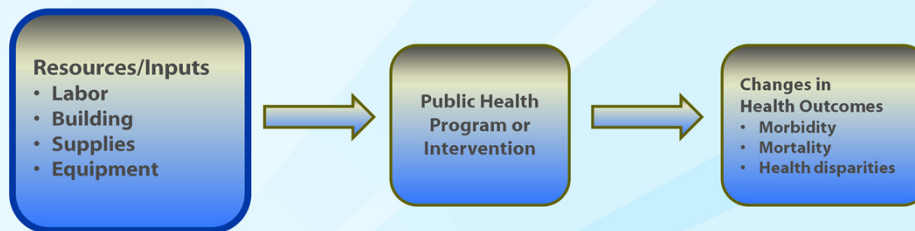
- ❑ Types of economic evaluation:
 - **Cost analysis**
 - Cost benefit analysis
 - Cost effectiveness analysis
 - Cost utility analysis

CDC. *Applying Cost Analysis to Public Health Programs.*
Atlanta, GA: US Dept. of Health and Human Services

Before we actually talk about conducting a cost analysis I want to pause and talk about the purpose of economic evaluation. Economic evaluation in public health programs focuses on the resources used to implement a program or intervention and the health impacts of that program.

Using the simplified logic model before you, economic evaluation focuses on the resources and inputs and then factors changes in health outcomes so that decision makers are able to use it as a tool to make choices and comparisons about whether the outcomes yielded from a program are worth the resources used to produce those results. There are various types of techniques when applying economic evaluation. There is a cost analysis, cost benefit analysis, and cost effectiveness analysis among many others. Obviously today I'll be spending more time on conducting a cost analysis.

Cost Analysis 101: **Definition**



“involves the systematic collection, categorization, and analysis of the costs [resources/inputs] associated with a...health intervention”

CDC. *Applying Cost Analysis to Public Health Programs.*
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Let's start by defining a cost analysis. Borrowing from the earlier image, we see that the cost analysis focuses primarily on the inputs and resources and it doesn't yet factor the outcomes of a program so inherently the emphasis of a cost analysis is on the costs. Therefore, conducting a cost analysis is the first step to applying any economic evaluation to your program. It's also beneficial to conduct a cost analysis when truly answering the question: how much does it cost to implement program or intervention X?

Cost Analysis 101: Key Concepts

“involves the systematic collection, categorization, and analysis of the **costs** associated with a ...health intervention”

- ❑ Determine the purpose and develop a plan
- ❑ Whose costs...or whose *perspective*? For example:
 - Public health system perspective
 - Insurer perspective
 - Societal perspective
- ❑ Timeline of cost collection
 - Prospectively
 - Retrospectively

Here are a few key concepts related to cost analyses. With any evaluation you want to start with a purpose and a plan and this point is ideal to seek the consultation and services of a health economist. While the expertise of an economist will be needed for a majority of your economic evaluation efforts or the more advanced analyses it's still important to be very involved as a program administrator, so that you're much more informed and prepared to undergo a cost analysis by understanding a few key principles.

One of those principles has to do with which costs are counted or in other words from whose perspective? Everyone has a cost to pay so there are a few perspectives to consider when determining those costs. Think about the public health system perspective, which is used when you are looking at how much funding the public health system needs to just start up and operate a program. Another example is the insurer perspective and in this case they are most interested in the cost incurred through claims or reimbursements. Whereas the societal perspective looks at costs incurred by all parties and this is the most common perspective.

So let's say you're responsible for implementing a YMCA lifestyle modification program. From the societal perspective the health insurance, if a health insurance agency is also partially funding that program, has a cost. The YMCA also has costs—maybe for the facilities or for employee time; Even if the program is free, the participants may have a cost whether through transportation costs, time lost from work or daycare expenses. The societal perspective accounts for all of these hidden costs incurred by someone in society.

Another point I want to mention about conducting a cost analysis is the timeline in which you do it. If you are collecting the data while the program is being implemented then the costs are being captured prospectively. If the program period has already taken place and you're looking at costs after the fact then that's a retrospective approach. Assessing costs prospectively is ideal because it allows for a more systematic and accurate data collection process.

Cost Analysis 101: Key Terms

- ❑ Resources = workforce, workspace, equipment, etc.
- ❑ Cost categories = line items factored into cost analysis
- ❑ Costs = value of resources
 - Financial costs = market value (e.g. employee salary, utilities)
 - Economic costs = estimated value of resource (e.g. volunteer time, donated space)

Accounting for financial **AND** economic costs strengthens the accuracy and credibility of economic evaluations

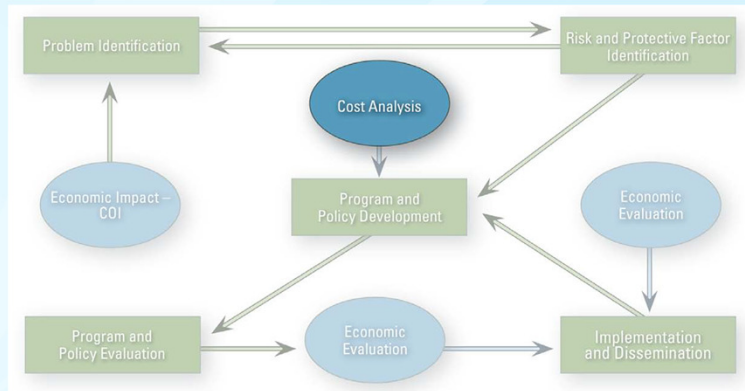
On this slide are a few key terms and in essence when we're talking about conducting a cost analysis we are operationalizing resources, which translates into the workforce, workspace, et cetera. These can then be itemized through your cost categories. It is through the development of the cost categories you start to determine which costs you are going to count in your cost analysis. Then you consider the costs or the value of those resources.

We can then go a step further with costs by looking at them in two ways: financial or economic. Financial costs refers to what commonly comes to mind when we think of costs, such as the market value or the price tag of a resource. The financial costs of running a program are more easily identified in a budget sheet. On the other hand, economic costs are those costs that do exist but there may not be a direct exchange of funding so I refer to these as your hidden costs. For example, just because the time of a volunteer is not reflected in a budget sheet doesn't mean that there isn't a monetary value for their time.

Although the financial costs are a convenient source for conducting a cost analysis they also give an incomplete picture of the resources that it takes to implement a program. If there is a resource that is needed to implement a program then that cost should also be accounted for and when you account for both financial and economic costs, you are strengthening the accuracy and credibility of your economic analysis.

Cost Analysis 101: Key Message

A cost analysis serves as the foundation for all public health economic evaluations.



CDC. (2009). *Five-Part Webcast on Economic Evaluation*. Atlanta, GA: US Dept. of Health and Human Services

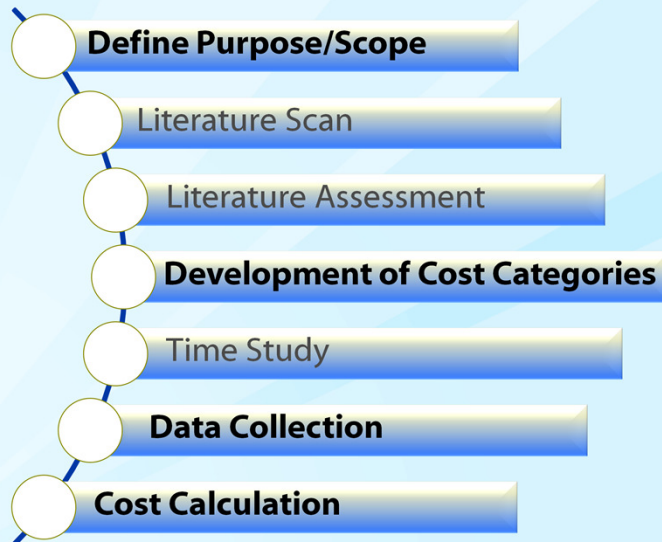
A cost analysis is the first step to applying economic evaluation to your program and it's important to understand that a sound economic evaluation stems from a sound cost analysis. It is simply the first step.



Example Approach for Conducting a Cost Analysis of a Community Health Worker (CHW) Program

Now we can actually go into the example. Today I'll be talking a bit about the steps that we use for conducting a cost analysis of a community health worker program. This is just one approach and one method to conducting a cost analysis and it is not to be implied as the only way to do so.

CHW Cost Analysis



On this slide I lay out the major steps that we took in this process and bolded the steps that I think are most important to remember when conducting your own cost analysis; the other steps are ideal but not necessary. I will walk through each step in the next few slides.

CHW Cost Analysis: Defined Purpose and Scope

- Purposes:
 - Articulate full range of cost for program initiation and implementation
 - Inform decision making
 - Make a contribution to the field in understanding associated costs for CHW programs
- Project scope:
 - Costs associated with one program component
 - One year of program implementation — retrospectively
 - Public health system perspective

As I mentioned before, with program evaluation or economic evaluation you always want to define the purpose and the scope. In this instance, we wanted to articulate the full range of cost for this program and this helped us define what the project was and what it wasn't and right away we were able to see what our limitations would be.

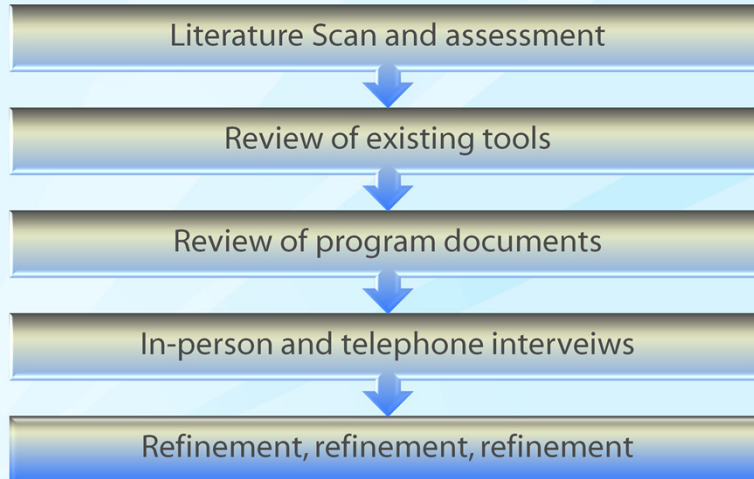
We decided that the cost analysis would be based on just the community health worker program component, which is part of a much larger program; and we were going to do it retrospectively and look at a one year period. We also decided to use the public health system perspective—meaning we weren't going to account for other costs such as those incurred by the participants or insurance companies.

CHW Cost Analysis: Literature Scan and Assessment

- ❑ Helped to understand landscape of CHW-related costs
- ❑ Literature scan:
 - Key search terms: CHWs (and their equivalents), cost effectiveness/cost benefits/cost-
 - Identified 23 records for further assessment
- ❑ Literature assessment:
 - Data abstraction of select elements
 - Identified 12 records to serve as key references
- ❑ Gaps revealed:
 - Cost data mainly pertained to healthcare utilization (i.e. insurer perspective)
 - Limited description and scope of programmatic costs

The second step that we took was a literature scan. We conducted a literature scan and assessment and in essence you can translate this into doing your homework. This helped us to really understand what other programs have done in the literature and how they did it. We determined which studies were relevant to our particular program and what ideas we could borrow from cost analyses that were conducted previously.

CHW Cost Analysis: Development of Cost Categories



After that, we developed the cost categories. This picture shows the series of steps that we took. We used information from the literature scan, looked at other cost analysis tools, reviewed program documents, and dialogued with the program staff. With each step there was a different version of the cost categories as we identified what data were and were not available. This process was certainly an iterative process and should be reflective of your program.

CHW Cost Analysis: Cost Categories

Cost categories	Data sources	Cost assignment
Personnel		
■ CHWs	Hospital general ledger, time study	Actual salary, time study
■ Supervisory Staff	Hospital general ledger, time study	Actual salary, time study
■ Volunteer	N/A	Bureau of Labor, time study
■ Administrative support (e.g. human resources, payroll, technology support)	Hospital general ledger	Standard NVRH overhead rate
Program Costs		
■ Training/Professional Development	Training records	Actual costs, local rates/national averages
■ Mileage	Hospital general ledger	Actual cost
■ Travel reimbursement to participants	Hospital general ledger	Actual cost
■ Marketing/promotional material	Hospital general ledger	Actual cost
Operational Costs		
■ Workspace	Building floor plan	Commercial real estate averages
■ Office supplies	Hospital general ledger	Actual cost
■ Miscellaneous: housekeeping, heating, electricity, snow removal, professional dues, copier lease, recycling fee	Hospital general ledger & subsidiary journal	Actual cost
Start-up Costs		
■ Furniture (e.g. desks, chairs, tables, etc.)	Hospital general ledger	Actual costs
■ Computer desktops/monitors	Hospital general ledger	Actual costs
■ Office telephones	Hospital general ledger	Actual costs

On this slide are the items that we actually identified as our cost categories. I don't expect you to be able to read every detail on this chart; we'll have these slides available on our website for you to review at your own leisure. What I'd like to emphasize here is that the cost categories that you eventually land on should be reflective of your program.

Let's say, for instance, the lifestyle interventions of the WISEWOMAN program differs from state to state; therefore, one would expect that while they are all working to accomplish similar goals, their program and therefore their costs are different. So you will want to ensure that your cost categories are reflective of your program's particular setting and activities.

CHW Cost Analysis: Time Study

- ❑ Used to determine the allocation of time to CoCo Team
- ❑ Process:
 - Used tracking form that listed categories of duties
 - Completed by CHWs, CHW supervisor, Project Director, and volunteer
 - Conducted over 2 week period
- ❑ Provided insight on:
 - Proportion of CHW time performed for key tasks
 - Population reach
 - Type of volunteer support
- ❑ Ideal, but not absolutely necessary



In our cost analysis we also conducted a time study and this helped us to be able to look at how the community health workers were allocating their time to specific activities. Now, it is not an essential step but it is ideal because this activity enabled us to have another layer of information on how costs were being expended and used in terms of the community health worker's time.

CHW Cost Analysis: **Data Collection**

- ❑ Referred to original data sources
 - Hospital general ledger and subsidiary journal
- ❑ Accessed industry standards
 - Average cost of commercial real estate
 - VT department of labor figures
- ❑ Other sources: time study and programmatic records

Once you have done all these different activities, then you want to actually collect the data. When possible, we used original data source and used industry standards for the economic costs. Industry standards were used for items such as volunteer time and workspace.

CHW Cost Analysis: Cost Calculation

- Costs divided into 2 categories
 - Personnel: salary and fringe benefits
 - Operational: direct and in-direct program expenses



- Sensitivity analysis
 - To determine the most/least expensive scenarios
 - Variables: personnel, office, space, and trainings

Then, lastly, you calculate your costs. I have noted here that we conducted a sensitivity analysis as part of our endeavor and this helped us to look at different scenarios from the least expensive program scenario to the most expensive program setting for implementing the program.

In Summary...

- ❑ Define Purpose/Scope
- ❑ Be systematic and thorough when identifying cost categories
- ❑ Use cost categories that reflect your particular program
- ❑ Consider variables that may not be reflected budgets
- ❑ Use original or actual data sources when possible

In summary, here are a few things that I'd like to share with you that we learned from this process of conducting a cost analysis:

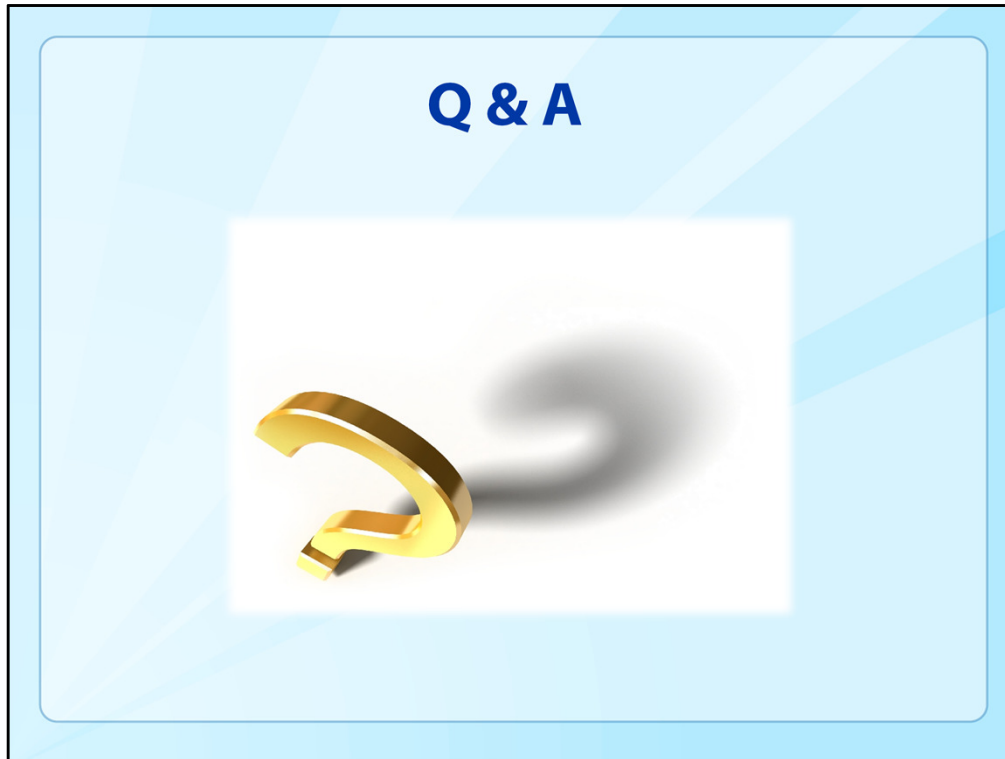
- You definitely want to be systematic and thorough when identifying your cost categories and ensuring that they reflect your particular program.
- Remember to consider variables that may not be reflected in your budget, such as in-kind support, volunteer time
- And when possible use original or actual data sources.

While most decision makers are most interested in the benefit or results of program costs, which is usually provided through cost effectiveness or cost benefit analysis, it remains essential that cost analyses are conducted with accuracy and a degree of rigor. And most importantly, that they are considered as the first step to any type of economic evaluation.

Tools and Resources

- CDC, Division for Heart Disease and Stroke Prevention: 5-Part Podcasts on Economic Evaluation (Module 3—Cost analysis)
 - http://www.cdc.gov/dhdsp/programs/nhdsp_program/economic_evaluation/index.htm
- January 2012 CDC Coffee Break: Introduction to Economic Evaluation
 - http://www.cdc.gov/dhdsp/pubs/docs/CB_January_10_2012.pdf
- CDC: Self-study on economic evaluation
 - <http://www.cdc.gov/owcd/EET/Preface/Preface.html>
- CDC's 2nd edition book on prevention effectiveness:
 - Haddix AC, Teutsch SM, Corso PS, eds. *Prevention effectiveness: a guide to decision analysis and economic evaluation*. 2nd ed. New York, NY: Oxford University; 2003.
- From the Community Guide library: *Using and Understanding the Economic Evidence*
 - <http://www.thecommunityguide.org/library/Economics.pdf>

Here are a few tools and resources for your review and for referencing information related to economic evaluation. The first items listed served as the primary resource from which I referenced a majority of the information shared in the earlier parts of this presentation. The 5-part podcast can be found on our Division web-site and provides a module specifically on conducting a cost analysis. The other resources should also serve you well for learning more about economic evaluation.



Question 1: You mentioned that you recognize the limitations of the project. Could you elaborate on what those limitations were?

Response: When we started to determine the scope of the project and what was feasible to do we realized that by doing it retrospectively rather than prospectively we were going to be limited in the data that were going to be available to us; right away, that's a limitation. We also limited the project scope to just one year. The program has been in existence for over three years and an ideal situation would be to look at those entire three-year periods and to come up with an average of the costs—that way we have a more realistic understanding of the costs rather than just relying on one year. As we all know with the market and how costs fluctuate, an analysis of all three years would have provided a much more accurate and comprehensive understanding of the costs. And obviously the cost analysis was just for this one setting so we don't have any group to compare or another program that is similar in scope and context to compare the costs to; that also adds another limitation to the project.

Question 2: What were the benefits of adding a time study to the cost analysis?

Response: It allowed us to look at the distribution of time that the community health workers were devoting to certain activities. Therefore, not only were we able to know what proportion of the costs are committed to documenting activities or what proportion of the costs are committed to direct patient support; we were also able to see the reach. It was another way of looking at how often and to what extent the community health workers were coming in contact with individuals. It also allowed us to look at the time and scope of activities of the volunteers and not just the community health workers. This way we had an idea of not only of what the volunteers do but how they were contributing to the community health workers' activity. Thus, there were a few benefits for adding that component.

Thank You

**If you have any questions, comments, or
topic ideas send an email to:**

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If anyone thinks of additional questions or topics related to economic evaluation or ways you would like to receive more TA about economic evaluation please feel free to email us at the address listed on the slide.