

# Cost-Benefit Analysis: A Primer for Community Health Workers

*The Community Health  
Worker Evaluation Tool Kit*

A Project of the University of Arizona  
Rural Health Office and  
College of Public Health



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## 1. Was this exercise helpful? (Circle answer)

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1

2

3

4

Extremely helpful

5

## 2. What would you change or add to the exercise to make it more useful?

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## 3. Would you be interested in learning about workshops on conducting CBAs? (Circle one)

YES

NO

## 4. Would you be willing to share your experiences conducting CBAs or related projects as case studies?

### OPTIONAL

5. Your name: \_\_\_\_\_

6. Program Name: \_\_\_\_\_

7. Program Address: \_\_\_\_\_

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*Thank You!*

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# Executive Summary:

## Cost-Benefit Analysis - A Quick Overview

### *What Is Cost-Benefit Analysis?*

Cost-Benefit Analysis compares the benefits of the program that can be measured in dollars with the costs of running the program. A CBA results in statements such as:

*"This program yields \$3.00 in savings for every \$1.00 spent on the program."*

In addition to proving a program's value in monetary terms, CBAs can improve internal operations by helping to identify what works and what doesn't, and by directing internal resources to those interventions or components that work best. Furthermore, a CBA can help to establish a culture of accountability throughout an organization, and back up that accountability with real data.

### *What Types of Programs Can Conduct a CBA?*

Any CHW program can perform a CBA. Since Cost-Benefit Analysis only considers benefits that can be measured in dollars, programs that can identify those dollar savings more easily will have an advantage. Examples of these benefits include:

- Reduced costs of unnecessary ER utilization due to better primary care access;
- Reduced future medical costs due to early intervention or disease prevention;
- Reduced expenditures for social or educational programs due to reduced drug abuse, early prenatal care, etc.

Conducting a CBA does not require a special staff or a large investment, and it is not

technically complex; even small programs should be able to conduct a basic version. Because the formal analysis focuses on only a subset of a program's benefits—those that can be measured in dollars—a CBA may be less complex than a typical outcomes study.

### *Why Your Program Should Conduct a Cost-Benefit Analysis?*

Cost-Benefit Analysis (CBA) is one way to demonstrate to funders, government agencies, managed care organizations (MCOs), and other audiences that your program is effective. Because CBA includes both the benefits that you provide to your community as well as the costs of providing those benefits, this type of analysis is becoming more widely used. It has particular appeal for commercial organizations, such as MCOs, with which CHW programs are increasingly partnering.

### *What Is the Role of the Community Health Worker in Conducting a CBA?*

Because CHWs are on the front lines of service delivery, their perspectives on the benefits provided to the community is essential. Furthermore, CHWs can "reality test" the CBA methods used and can suggest improvements. In return, CHWs gain a better appreciation of the value they provide, and can see clearly which programs and approaches work best. Also, participation gives CHWs an opportunity to see their organization from the perspectives of funders and outside agencies. As a result, CHWs are better equipped to suggest and address changes that can improve the overall effectiveness of the organization.

## How to Conduct a CBA

There are three main steps in conducting a Cost-Benefit Analysis:

- (1) Measuring program costs;
- (2) Measuring program benefits; and
- (3) Putting costs and benefits together.

### (1) Measuring Program Costs

Measuring program costs begins with an organization's financial statement. Every cost element that is directly or indirectly associated with the provision of the program is identified. If a cost element is associated with more than one program, a portion of it must be allocated to the program in question. These are typically "overhead" items, such as the director's salary, the cost of utilities, and insurance premiums. Organizations sometimes survey staff in order to allocate employee salaries between different programs.

Certain costs that don't show up on the books—"indirect" costs and "intangible" costs—are sometimes included. Indirect costs result from an intervention but are unintentional, for example, the cost of work time lost by clients in order to participate in a program. Intangible costs are those that are purely subjective, such as "pain and suffering." While these are often documented, they are not formally included due to measurement difficulties.

### Summary Of Steps In Measuring Costs

- Collect appropriate budget documents (financial statements, proposal budgets, other).
- Identify the direct costs of the program or intervention.
- Allocate a portion of shared and overhead costs, such as management salaries, to the intervention or program.
- Add all direct and indirect costs that are to be included.

### (2) Measuring Program Benefits

Measuring benefits requires three main steps: (1) identifying and listing all of the benefits of a program (i.e. the ways that it helps your clients); (2) deciding which of these to include in the analysis and (3) measuring those benefits in terms of dollar savings.

CHWs, other staff, clients and others can help to identify a program's benefits, which should include not just benefits to clients but to others as well. For example, reduced emergency room costs may not specifically benefit clients, but they may benefit the state Medicaid program.

Once all benefits are identified, they can be grouped into three categories: those that are to be formally included in the benefit-cost ratio calculation; those that are not included in the formal analysis but are used to reinforce the benefit-cost ratio; and those that are less important and can be excluded altogether.

To be formally included in the benefit-cost ratio calculation, a benefit must be measurable in terms of dollars—this represents a small subset of the benefits of a typical program. To these should be applied two additional selection criteria: their importance, and the feasibility and ease of measuring them. In many cases, the benefits selected for the CBA turn out to be costs that are averted as a result of the program or intervention. For example, if treating a patient with a certain condition costs x dollars, then preventing one case of that disease saves x dollars. From this simple type of analysis, total program savings can be extrapolated.

Secondary data from published research studies can often be used to convert a program's results into dollar savings. For example, suppose a smoking cessation program helped a pregnant woman to stop smoking. Further, a published study demonstrates that reducing smoking among pregnant women saves an average of x dollars in direct medical costs. Therefore, x dollars in savings can be applied to each of the women that stopped smoking as a result of the intervention. The literature is filled with research studies which may be used in this way. (See the Resource Section in the Primer.)



What about benefits that can't be measured in dollars? It is true that these benefits are often more important than the dollar benefits of a program—in fact, they are usually central to the mission of the organization. It may seem strange that these benefits are left out of the formal benefit-cost ratio calculation, but they are still very important to the overall Cost-Benefit Analysis. These benefits can supplement and strengthen a CBA analysis. Combining both dollar and non-dollar benefits can create a strong case for a program through statements such as:

*By reducing unnecessary emergency room visits and inpatient costs, this program saved \$3.26 for every dollar of program costs. In addition, rates of high school dropout, teen pregnancy, and domestic violence declined by 42%, 34% and 65%. 92% of participating families reported the family environment and individual self-esteem were 'greatly improved.'*

The point is to show that, even excluding some really important (non-dollar) benefits, the program results in substantial benefits compared to its costs.

Before completing the analysis, can you be sure that the benefits you measured are the result of your program? If, for example, a community-based cancer screening outreach program is conducted at the same time as a citywide cancer awareness campaign, the outreach program may not be able to claim responsibility for the full increase in screening. These are called confounding factors and it is important to identify them and try to assess their impact on your study.

## Summary of Steps in Measuring Benefits

1. Identify all of the benefits of your program.
2. Group them into:
  - a) those to be formally included in the benefit-cost ratio calculation;
  - b) those to be used to supplement and reinforce the CBA;
  - c) those that are less important and can be excluded.
3. Measure your results and convert them to dollar savings, using secondary data, if needed.
4. Identify and measure those benefits that can't be expressed in terms of dollars.
5. Combine dollar savings and non-dollar benefits to explain the effectiveness of your program.

### (3) Putting Costs and Benefits Together

Once you have calculated total costs and total benefits (both in terms of dollars), you can put the two together by calculating the ratio of benefits to costs,

$$\text{Benefit-cost ratio} = \frac{\text{total benefits in dollars}}{\text{total costs}}$$

*(Usually expressed as the ratio of dollars of benefit per one dollar of cost.)*

A typical statement that could result from a CBA is:

*"This program's ratio of benefits to costs is 3.4:1, i.e., there are \$3.40 of benefits for every dollar of program costs."*

## Presenting CBA Results

The results of a CBA will be most effective if the presentation is tailored to your audience and focuses on those benefits that your audience is most likely to value. For example, state health agencies are often interested in population health outcomes, such as the infant mortality rate, while MCOs may want to know how an intervention impacts HEDIS indicators. (HEDIS is a set of outcome indicators developed by the National Committee of Quality Assurance to evaluate MCO quality. A list of HEDIS Indicators is provided in the Appendix.)

The effectiveness of the presentation will also be enhanced by using terminology that is familiar to the audience. For example, an audience of MCO executives may be interested in cost savings in terms of costs per member per month (PMPM), which is how MCOs often look at costs.

In addition, it may be necessary to manage the expectations of an audience and to educate them about the selection of benefits and the limitations or preliminary nature of the CBA results. Funders are interested in a range of outcomes and issues, and it may be appropriate to showcase CBA results within a comprehensive presentation of program benefits.



## Putting It All Together - Two Examples

### Example: Maternal and Child Health Outreach

*The following steps would be appropriate in conducting a CBA for a community-based prenatal care outreach program for women in an under-served community:*

- Program costs are determined through financial statements. Because of several overlapping programs, a staff survey is conducted to allocate salaries to the outreach program.
- Board, staff and CHWs meet to discuss program benefits. While early detection of unrelated conditions, improved attitude towards primary care, increased involvement of fathers, reductions in clinical depression rates are crucial outcomes, the reduction in the rate of low birthweight (LBW) babies is selected as the primary CBA benefit because it can be linked to hospitalization costs through the literature.
- Hospital records are used to determine the reduction in the LBW rate during the program year.
- A published study showing the average hospitalization cost for LBW babies is used to determine the costs averted through this program, i.e., the program's dollar benefits.
- The costs, benefits, and benefit-cost ratio are calculated. Based on this, the program is able to state that: "For every dollar spent on this program, "x" dollars are saved in direct medical costs."
- A presentation is given to a local Medicaid MCO which includes: the benefit-cost ratio, estimated savings per member per month (PMPM) for a typical Medicaid MCO population, the increase in the number of clients that had established a usual source of care, the increase in the involvement of fathers, and the reduction in clinical depression.
- The meeting is followed by contract discussions between the MCO and the program.

### Example: HIV/AIDS

*The following steps might be followed in conducting a three-year CBA for an aggressive community-based HIV/AIDS prevention, counseling and referral intervention.*

- Program costs are determined through financial statements.
- The board, staff, and volunteers hold two community forums to discuss community needs as well as measurement of program outcomes.
- Possible program benefits identified at the meetings include: increases in the number of participants at educational sessions, the rates of screening, number and frequency of participation in needle exchange, kept appointments among HIV positive referrals, self-reported rate of safe-sex practices, increased health knowledge of AIDS, reduced growth rate in community seropositivity, reduction in medical expenditures due to averted transmission and early treatment.
- Reduction in medical expenditures may be selected for the benefit-cost calculation. Health Department records are used to determine the change in the incidence of HIV.
- A published study showing the average savings resulting from an averted HIV infection may be used to convert the reduction in incidence of HIV to cost savings.
- The costs, benefits, and benefit-cost ratio are calculated. Based on this, the program is able to state that: "For every dollar spent on this program, x dollars are saved in direct medical costs. In addition, community knowledge of HIV risks and rates of safe sex practices increased by 320% and 212%, respectively, and 23% of clients established a regular source of primary care."
- A presentation is given to the local health department resulting in a substantial increase in funding.

# I. Introduction

## *This section will explain:*

...what cost-benefit analysis is,  
 ...how it differs from other types of cost studies,  
 ...when it is the best approach to use,  
 ...why it can be useful for CHW programs, and  
 ...where there are sources of help.

## *Demonstrating Value*

Community health worker (CHW) programs are under increasing pressure from funders, government agencies and partnership organizations to demonstrate that they provide value. “Value” means not only the level of the desired outcome that is achieved, but also the cost of achieving that outcome. This is exactly what cost-benefit analysis is all about.

Organizations that fund or partner with CHW programs - foundations, local health departments, federal program offices, providers, MCOs - are increasingly interested in concrete information that demonstrates the value of CHW programs. This translates in some cases into direct pressure from funders for such data. More often it takes the form of a subtle funding bias toward those programs that demonstrate their value. As one funder put it,

*“...we still fund the programs that we think are best. But if there are two programs that are basically equivalent, we’ll fund the one with good data on its costs and benefits.”*

There are many ways to evaluate a program’s effectiveness, and most are probably familiar to those in community-based programs. They include: descriptive or “formative” evaluations that look at program structure and process; budget analyses; outcomes studies that measure the actual impact on a population or community; and various types of “cost” analysis, such as cost-effectiveness and cost-utility analysis. Cost-benefit analysis (CBA) is but one among a wide range of evaluation tools.

## *The Goal of This Primer*

This Primer is a basic “How To” for conducting a cost-benefit analysis. It includes step by step instruction, a guide to additional resources, many examples relevant to a range of program types<sup>1</sup>, and a glossary of terms. Every CHW program, regardless of previous experience, should be able, with the help of this primer, to design and execute a basic CBA with little or no outside help. The use of outside resources, however, is encouraged and key resources are described.

### **In the long run, we hope that this Primer will help to:**

- increase the capacity for this type of analysis among CHW programs,
- focus attention on the development of new approaches and outcome measures that accurately measure complex CHW outcomes, and
- ultimately assure continued support for CHW programs.

Along with numerous case examples, a Resource Section provides information for those programs interested in conducting a CBA. A glossary of terms is provided at the end of the Report.

<sup>1</sup>Note that all examples that are included in the text are hypothetical, although they are meant to be realistic and often include real data, which is cited when applicable



## What is Cost-Benefit Analysis?

Cost-benefit analysis sounds complicated, but it really isn't. It simply measures the benefits of a program and compares those benefits to the cost of achieving them. What is unique about CBA is that it only considers costs and benefits that have a dollar value. To conduct a CBA, one simply adds up the dollar costs of a program, adds up the dollar benefits, and calculates the ratio of the two. The result of a CBA is typically expressed as the benefits per dollar of costs.

### Example: Childhood Immunization

**A hypothetical CBA for a children's immunization program resulted in the following:**

- Monetary benefits totaling \$1.2 million per year
- Monetary costs of running the program totaling \$600,000 per year
- A ratio of benefits to costs equal to \$1,200,000/\$600,000, which can
- Be expressed as a benefit to cost ration of 2:1.

The benefits in this CBA are based on the savings that result from averting disease among people that otherwise wouldn't be immunized. By averting disease, the program is averting the "direct medical costs" and "lost work time costs" that are associated with it.

**Based on this CBA, the program can state that:**

*"For every dollar spent on this immunization program, two dollars are saved in medical and lost work time costs."*

## How Does Cost-Benefit Analysis Relate to Other Evaluation Tools?

Cost-benefit analysis is one of a set of methods that are commonly used to evaluate CHW programs. Most of these methods can be grouped into three main evaluation approaches:

### Descriptive or "formative" evaluations.

These evaluation methods look at how a program is implemented, typically utilizing "process" variables, and how it is organized or structured, predominantly using "structure" variables. Examples of process variables include: number of services delivered, whether they were done correctly, and how accurately they were recorded. Examples of structure variables include: staffing levels, facilities and equipment, and policies and procedures.

### Outcomes studies.

Outcomes studies describe the effect, the program had on clients. These studies ask, Did the program achieve the intended results? Outcomes can be defined in many different ways. An intermediate outcome may be, for example, the number of clients who visit a health center in response to the outreach. A long term outcome of the outreach is the reduction in the incidence of the disease.

### Cost analyses.

A cost analysis is any study that not only considers the outcomes of a program, but also the costs of achieving those outcomes. There are three commonly used approaches to conducting cost studies: cost-effectiveness, cost-utility and cost-benefit. The differences and uses of each are described below.

## Alternative Types of Cost Studies

### Cost-benefit analysis (CBA):

CBA analyses result in statements such as:  
*"The benefit to cost ratio is 2.8:1"*  
 or *"The net savings of program A are \$2 million."*

CBA quantifies benefits and costs in strictly monetary terms. Benefits are frequently defined as the costs associated with a disease or condition that are averted by the intervention. This approach is useful because one can then compare the net savings of programs that have entirely different kinds of benefits. (On the other hand this approach is less useful when benefits are defined in terms of lives saved. It is difficult to quantify the value of "a life saved" or "an additional three years of life".)

### Cost-effectiveness analysis (CEA):

CEA allows one to say, *"Program A costs x dollars per year of life saved."* CEA measures some benefits in non-monetary units, such as years of life saved or days of disability avoided. Rather than a net monetary value, CEA results in a ratio of benefits to costs such as dollars per year of life saved. This is especially valuable in comparing two programs with similar outcomes, e.g.

*"Procedure A costs less per year of life saved than procedure B."*

Two procedures with very different levels of therapeutic value could have very similar CE ratios. Of course, this is precisely what often occurs in health care. For this reason, CEA works best when comparing different approaches that achieve a very similar outcome.

### Cost utility analysis (CUA):

CUA results in statements such as,  
*"Program A costs x dollars per quality of life year gained."*

CUA is used when quality of life is the important outcome. CUA allows one to compare interventions based on the cost per quality of life years (QALYs) gained. QALYs combine years of life and quality of life in a single measure, which is calculated as the sum of the years of life gained times the quality of life in each of those years, or the health utility. For example, a cancer patient in severe pain may live five years but have a QALYs of only 3 to 4 years. Health utility indexes can be obtained by using one of several different methods to measure the study group's preferences for years versus quality, or by using national indexes based on surveys of the general public.

## CBA versus CEA and CUA?

CBA is appropriate in many different situations, is very useful for comparing the value of diverse programs, and can be the simplest to conduct. CEA is primarily useful when comparing the cost-effectiveness of two programs with similar outcomes. CUA is only appropriate when the researcher is specifically interested in quality of life measurement.

A limitation of CBA is that, in reducing a program's performance to a numeric benefit-cost ratio - the "bottom line" result of the CBA - it logically focuses on program benefits that can be measured in terms of dollar value, such as medical cost savings resulting from an intervention. While other, "non-monetary" benefits are not explicitly included in the benefit-cost ratio calculation, they are very much taken into consideration as part of the larger Cost-Benefit Analysis, and are used in conjunction with the benefit-cost-ratio to bolster the case for a particular program.



In some cases the benefit-cost ratio itself is so strong and compelling that little more needs to be said. For example, a program designed to establish a usual source of care within a community may achieve a very high benefit-cost ratio in terms of emergency room savings. While there are certainly many associated indirect benefits, the fact that every dollar spent on the program saves the state \$3 in medical costs may be more than enough to make its case to a particular audience of interest.

In many cases, however, such monetary benefits may represent only a small portion of a program's true benefits in terms of services provided to people who need them. For example, a program that addresses teen violence may have relatively limited measurable dollar benefits, while providing extremely high value for a community in crisis. Suppose such a program one that is designed to reduce youth violence through education and self-esteem building programs - has a relatively low benefit-cost ratio of 1.2:1. The benefits provided to the community, however, may be substantial in human terms. In this case, it might choose to emphasize the intangible and indirect benefits, and present the fact that providing these benefits even saves some money (i.e., the benefit-cost ratio) as "icing on the cake."

### Example: Family Conflict Resolution

A hypothetical CHW program is designed to reduce domestic violence through education, conflict resolution training and safe houses. Key outcomes of the highly successful program include: improved awareness and knowledge of domestic violence, conflict resolution techniques, access to safe environments, and reduced incidence of domestic violence. Important indirect outcomes include improved grades and educational attainment of family members, improved employability, improved self-esteem, improved home environment, reduced drug abuse, reduced teen pregnancy, etc. Many of

these benefits can have far reaching effects that last generations.

While this program may provide cherished benefits to its clients, it would prove difficult to calculate a dollar benefit amount that can be plugged into a CBA.

A key challenge for CHW programs is to find ways of defining and measuring program value that encompasses the full range of outcomes that CHWs achieve, whether or not they can be put into dollar terms. An important component of CBA is the part that comes after the CBA is completed - namely, educating the "customers" about the true value - in terms of both monetary and non-monetary benefits - that is provided by your program. Most program have a combination of outcome that include benefits that can be measured in dollar terms and those that can't. Programs should supplement the presentation of the CBA results with a description of the non-monetary benefits of the program.

### Other Advantages of Cost-Benefit Analysis

In addition to demonstrating a program's value to outside entities, CBA provides valuable feedback to staff, which can help to improve performance within the organization. A CBA helps to delineate what works and what doesn't, particularly when CBAs are conducted across different interventions, management approaches, CHW teams, or program sites. Furthermore, CBA helps to establish a culture of accountability throughout the organization.

Also, enumerating the benefits and costs of a program can be enlightening and rewarding to program boards, staff, CHWs, community leaders, and even clients. While these groups are often aware of the benefits of what they do, they typically have less understanding of their dollar value, and are often surprised by its magnitude.

## The Role of Community Health Workers in Conducting a CBA

It is critical to have CHWs involved in a CBA because of the “in-the-trenches” perspective they bring to the project as well as the enrichment of their understanding of their program from multiple perspectives - customers, funding agencies, providers, public health entities and policy-makers.

Whether directly staffing the project or playing a more advisory role, there are some specific ways that their involvement should be considered, including:

- Participating in the initial brainstorming and strategic planning for the project;
- Helping to design and “reality test” the methods used;
- Validating the process by making sure that it captures information that accurately portrays what the organization actually does;
- Helping to enumerate the specific benefits to the community that are to be considered in the analysis;
- Communicating the goals of the project to the clients, providers, and the community at-large;
- Helping to enumerate program costs by allocating their time and effort across various program components;
- Evaluating and interpreting the results of the analysis;
- Using the findings to suggest and address changes that can improve the overall effectiveness of the organization in carrying out its mission.

One of the most difficult aspects of CBA is data collection, and much of the effort often falls on the shoulders of CHWs. It is important to involve CHWs early in the development of strategies and methods for data collection, particularly those that they will carry out. CHWs should clearly understand both the need for information and the rationale for the particular balance between level of work effort and value of data collected. Data collection must be flexible in order to accommodate

changes in the collection methods, and in the types and amounts of information to be included, based on an ongoing assessment of the work effort involved. With CHWs involved and committed to the process, data collection can become a strongly positive aspect of the project rather than a constant difficulty.

## Getting Help in Conducting a CBA

Most organizations can conduct a fairly simple CBA, and this primer is meant to guide them through that process. The greatest difficulty usually involves data processing - getting and manipulating data from Medicaid, health departments, local providers, or vendors.

In many cases, published secondary data can be used to calculate dollar benefits from simple data you already have. For example, a program that conducts education about cancer screening can survey its client base to identify the increase in the rate of screening due to its intervention. The public health literature can then be mined to identify studies that show the cost savings attributable to screening for similar populations. This can be used to convert the program’s simple survey result to a dollar savings rate, completing the benefit side of the CBA.

Just as in the case of outcomes analysis or other evaluation methods, the more sophisticated you want the analysis to be, the more likely that outside assistance will be required. Technical assistance can be found in many forms, including private consultants or research staff at area universities, or an association that represents your particular type of program.

Additional funding may also be required. Some funding entities, such as foundations and government agencies will include evaluation funding for such a project in their program grants. Others may provide an independent evaluation grant. Despite the heightened interest in cost-benefit information, however, many funders, foundations in particular, require that their dollars fund programming, and are unwilling to pay for such studies.



## Where to Go for Help

### Federal Agencies.

For example, the U.S. Health Resources and Services Administration (HRSA) has published a very useful three-volume guide to cost analysis, *Economics in Maternal and Child Health*. The guide provides step by step information on developing cost analyses and offers numerous examples of cost analysis in the maternal and child health arena, but it is applicable to any field.

### Universities.

For hands-on technical assistance, try university-based research centers in your region, including those in health services research, community medicine, and social work. They may already have a research interest in your field, and in any case, can usually offer an inexpensive source of technical assistance.

### National and State Associations.

There are often technical resources and data available from national and state associations of related provider groups. National umbrella organizations frequently offer guides and technical assistance to their local agencies, and may conduct research on outcomes within their field. Examples include: Big Brothers Big Sisters (mentoring and intergenerational linkages); Child Welfare League of America for children and youth outreach programs; and Girls Incorporated for pregnancy prevention and substance abuse prevention.

A number of national umbrella organizations have published resources for local agencies which may be useful to a wider audience include: BSA *Scouting's Positive Impact on the Community* (1996); Girls Incorporated *Assess for Success* (Frederick and Nicholson 1991) Goodwill Industries *International Program Evaluation: Guidelines for Development and Implementation* (1994); and United Way of America *Measuring Program Outcomes: A Practical Approach* (Hatry, van Houten, Plantz and Greenway 1996), which contains worksheets and examples.

### Private Consultants.

Private consultants are valuable because of their availability and experience in conducting evaluations, data collection and statistical analysis. Association often maintain a directory of consultants. Or you can obtain a referral from another program in your geographic or outreach area.

### Accrediting Bodies.

Several accrediting bodies have also developed technical materials that are mainly useful for their specific agencies: The Accreditation Council on Services for People with Disabilities *Outcome Based Performance Measures: A Procedures Manual* (1995) which list specific outcomes for people with disabilities that they evaluate; The Council on Accreditation of Services for Families and Children *Manual for Agency Accreditation* (1992)

Most programs will benefit from outside assistance, whether from a university or private consultant, in addressing the most technical aspects of the project. (See the Resources Section for additional information on organizations to turn to.)

## II. Measuring Costs

### *This section covers:*

- ... the definitions of different types of costs.
- ... steps for calculating costs, and
- ... a sample program cost checklist.

### **Step 1:** *Identify Categories of Costs to Include*

Measuring the costs associated with a program or intervention is a straightforward accounting problem, with a few twists. There are several different categories of costs that must be taken into account: direct, indirect, and intangible.

#### ■ **Direct costs:**

These are the costs of materials, equipment, staff salaries, and overhead costs that go into an intervention. In an organization that has many programs or interventions, allocating overhead and staff costs to a single intervention can pose serious difficulties. Direct costs can also include in-kind costs or subsidies. If a program or intervention is subsidized by other programs, either financially or through in-kind gifts, these costs should be estimated and included in order to give a realistic picture of the costs associated with the intervention. The use of a donated phone line is an example of an in-kind cost item.

#### ■ **Indirect costs:**

Indirect costs are those costs that are incidental to carrying out an intervention. They are sometimes included when it is important to explicitly take into account the impact on the client of an intervention. If an intervention requires that the client miss two hours of work in order to participate, the indirect costs of the

program would include wages that the client gave up. For example, the indirect costs of a cancer screening program may include lost wages and transportation costs of the clients that participate.

While indirect costs may represent a significant burden to the client, they are often excluded from the analysis. This is for three main reasons: (1) they are often ignored because they are “off-balance sheet” costs that do not effect the program’s bottom line and therefore can be easily forgotten; (2) including these costs will reduce the benefit-cost ratio and make the program appear to be less cost-effective than programs that exclude them; and (3) many of these cost are difficult to measure or are “intangible” costs. (See Intangible Costs, below.)

Programs may, however, wish to include such costs if they are interested in comparing the cost-effectiveness of different programs within their organization, or if they are benchmarking their cost-benefit results to other programs that include such costs.

In order to measure these costs, a program can conduct interviews or surveys among clients to determine, for example, wages foregone, transportation costs, and other costs that the client identifies. Secondary data, such as city bus fares and minimum wage rates can be used to develop gross estimates of these costs (e.g., estimated salary multiplied by work time displaced by the intervention).



### ■ Intangible costs:

These are the costs that are purely subjective, such as pain and suffering. While they can't be measured, per se, they can be valued and taken into consideration.

CBA tends to focus only on the tangible direct costs, although sometimes indirect costs are included. Thus, a typical CBA considers the direct accounting costs of the intervention, and perhaps any major costs resulting from absence from work, or medical risks.

## Step 2: Gather Cost Data

Identify the appropriate internal budget documents for the program and the intervention in question. These might include annual and quarterly financial reports, individual project or cost-center budgets, or even budgets contained in proposals to funders, as long as they are still relevant. This process can be broken out into the following tasks:

- Work through the budgets to identify and record every specific line item cost associated with the programs being studied.
- Identify those line items that relate to other programs, as well. For example, an organization may conduct outreach and education for both teens and adults, but is conducting the cost-benefit analysis only on its teen interventions. Many of the program's costs—such as rent and staff salaries—are likely to be shared by the two programs. Some portion of these shared costs must be allocated to the teen program.

There are no fixed rules for allocating costs, other than that they should approximate the actual flow of dollars to the different program areas to the extent that is practical. One method involves surveying staff to determine the percentage of their time devoted to each program. This is used to allocate a portion of their salary to the program in question.

For example, suppose an employee spends his or her time as follows: Program A - 10%, Program B - 20%, Program C - 50%, and administrative and other non-program-specific activities - 20%. Calculate the time allocated to each program as a percentage of total program time, as follows: add program percentages (10+20+50=80) and divide each program percentage by the total *program*-related percentage (Program A =  $10/80 = 12.5\%$ ).

Next, these individual employee salary allocations are aggregated by weighting each one according to their actual salary level. For example, suppose Employee A spends 12.5% of his program-related time on Program A and earns \$20,000 per year, then \$2,000 would be allocated to this program.

To allocate other shared costs, such as rent, utilities and other overhead costs, one useful method is to apply the allocation of staff costs to these other costs. For example, if 23% of staff time is allocated to the program, then 23% of all other shared costs would be allocated to the program. To better reflect the actual allocation of resources, it may be useful to use a "weighted" staff allocation to reflect differences in salaries among employees. To do this, add up all of the allocated portions of salaries (\$2000 in the above example) of all employees and divide by the total of all salaries. This approach is illustrated in the example that follows this section.

After applying a general allocation percentage to overhead costs, specific line items can then be fine tuned to better reflect your staff's assessment of the actual use of that resource by the program in question. For example, consider an organization that uses the staff's allocation of program time in this case, 23% in order to allocate overhead costs to a program. But this particular program requires a significant amount of space for training, space which is not used for any other program. Based on staff's assessment of the use of this resource, 60% of the rent (rather than 23%) is allocated to this program.

An alternative method for allocating shared costs to a program is to add up all of the staff costs and direct costs and calculate the combined proportion of all direct costs. That percentage can be used as above to allocated shared costs.

**Note:** when adding up program costs, it is important to consider in-kind donations. For example, if a program is using donated space to conduct educational sessions, it may want to include the true rental value of that space as a line item cost. This will depend on the purpose of the study. As in the case of indirect costs, above, including these costs will reduce the benefit-cost ratio and make the program appear to be less cost-effective than programs that exclude them. Programs may be able to justify excluding these costs to the extent that their ability to secure such in-kind donations is indeed part of their value. Programs may, nevertheless wish to include such costs to assess their own internal efficiency across program areas, or if funders or external auditors require their inclusion.

- If it is important to include in your analysis the costs borne by the client or others, indirect costs can be measured and formally incorporated. (See Indirect Costs, above.)

### Step 3: Add Up All Costs

Add up all the costs associated with the program - direct, staff, other overhead, and indirect.

It is also useful to calculate unit costs (average costs) by dividing total by the number of clients. This will facilitate comparisons of costs across programs of different sizes.



## Example: Measuring Costs

In the following hypothetical example, there is no project-specific budget for Intervention A, so costs are estimated from the program's annual financial statements. Staffing costs are allocated by a work effort survey. Overhead costs are allocated by the weighted average of the staffing cost allocations. Half of the shared intervention-related costs are allocated to Intervention A based on a staff assessment of where the dollars actually flow. As can be seen in this example, the total organizational budget is \$381,000. Of this amount, \$100,570 is allocated to Intervention A.

Category	Total Organization Budget (\$)	Percentage Dedicated Intervention A (%)	Cost for Intervention A (\$)
<b>Staffing</b>			
1. Executive Director	80,000	12	9,600
2. Program Director	50,000	16	8,000
3. Admin Assistant	24,000	32	7,680
4. Admin Assistant	24,000	14	3,360
5. CHWs (6)	100,000	25	25,000
6. TOTAL STAFF	278,000	19.3*	53,640
<b>Other Overhead</b>			
7. Rent	18,000	19.3*	3474
8. Insurance	500	19.3*	97
9. Telephone	1,200	19.3*	232
10. Postage	300	19.3*	58
11. Outside services	5,000	19.3*	965
12. Furniture	1,200	19.3*	232
13. TOTAL Overhead	10,000		1,930
<b>Direct program costs</b>			
14. Cost Shared by Interventions A, B & C	12,000	50	6,000
15. Intervention A	39,000	100	39,000
16. Intervention B	20,000	0	0
17. Intervention C	16,000	0	0
18. TOTAL Program Costs	93,000	0	45,000
<b>19. TOTAL COSTS</b>	<b>\$381,000</b>		<b>\$100,570</b>
20. Cost per client (300 clients - Int. A)			\$335

\* The proportion is the weighted average of the percentage of salaries. It is calculated by dividing the Intervention A staff costs on line 6 by the Total Organization Staff budget (\$53,640/\$278,000).

## Program Cost Checklist

1. Collect appropriate budget documents. (financial statements, proposal budgets, other).
2. Identify direct costs by line item.
3. Identify shared direct costs and allocate them according to staff assessment.
4. Allocate staff salaries and benefits according to percentage of time per intervention, using a survey if necessary.
5. Allocate overhead costs according to the staffing allocation or the proportion of direct costs associated with the intervention.
6. Calculate any indirect costs that are to be included, using surveys or gross estimates based on secondary data.
7. Add up all costs.
8. Calculate unit costs by dividing total program costs by the number of clients served.



## III. Measuring Benefits

### *This section describes:*

- ... key steps to take in conducting CBA,
- ... how to pick the benefits, or outcomes, to be measured,
- ... how to measure outcomes, and
- ... where to get data.

At the end of the section there is a "Benefits Checklist" and sample illustration.

There is no "one way" to go about developing a cost-benefit analysis. But here we present a composite of successful methods from programs across the nation.

### **Step 1: Identify Benefits That Your "Customers" Value.**

Consider all of the possible current and future customers of your data, and determine their importance to you. Think through the issues associated with each key customer and the variables they would value. Contact a sample of them and conduct a short interview in order to validate your assessment of their interests and needs.

Your organization should try to think in terms of your principal customers' points of view. These customers may include foundations, MCOs, health departments, providers, and federal grant-making agencies. Each customer has measures that are particularly important to them, and figuring out what those are can help you to focus your strategy in a way that meets their needs as well as yours.

Educating your customers about what is important to your organization will help to achieve the broader objective of asserting more robust definitions of outcomes than are presently considered. Thus, in presenting Cost-Benefit information to customers, CHW programs should attempt both to "speak the customer's language" and also to educate customers about some of the harder-to-measure but significant personal and community benefits.

### **Step 2: Identify Benefits That Your Staff, Clients and Others Value.**

The measures of interest to your customers should be balanced against those that are important to your program. Your own organization may have a different set of motives and measures that interest you, such as: the differential effectiveness of alternative approaches within your mix (i.e. what is working best); how different worker categories function in different roles; which clients benefit most from certain interventions; or the right "dose of service."

### **Step 3: Develop a Clear Logic Model.**

It is important to understand how different possible outcomes are related to each other - i.e. the "logical" sequence of effect. Outcomes are benefits or changes in participants' knowledge, attitudes, values, skills, behavior, condition or status. Therefore there is usually not just one, but a combination or series of outcomes. For example, prenatal counseling received by teens may lead to increases in teens' knowledge of good prenatal care, which may lead to changes in behavior (diet, drugs, alcohol), which may lead to healthier newborns. (Plantz 1996) The farther one goes on this chain, the less the relative influence of the intervention and the more likely that other forces also contribute.

How far out should one go on this chain? In selecting an outcome, one must move far enough away from the intervention in time so that there is opportunity for meaningful change, but not so far that the influence of the intervention is too watered down. For example, for a prenatal care program to look at birth outcomes appears to be reasonable. But to look at development outcomes at age two seems to move too far away from the intervention in view of the many unrelated factors that can intervene during that time.

The same principal applies to an extension of program-specific outcomes to community-wide outcomes. If an intervention is given to a small number of people in a community, its impact on the community as a whole will be limited. In addition, these extended outcomes take time to work through the chain. It is not unusual to take three to five years to actually reflect an intervention's effectiveness farther out on the chain.

#### **Step 4:** *Select Benefits That Can Be Measured in Dollars.*

Program evaluations typically look at many different types of outcomes - from financial data to changes in population health status. The key in CBA is to identify those outcomes that can be translated into cost savings. This often depends, as will be shown, on the existence of external data that can be used to establish baseline rates and costs. For this reason it is often crucial to first conduct a literature review to determine the types of information that are available from secondary sources.

Cost benefit analyses tend to focus on direct medical costs, or to be more accurate, medical costs that are averted by the intervention. This is particularly clear in the context of a specific prevention: If disease A costs X dollars per patient to treat, then preventing one case saves X dollars. This is generally the way that benefits are considered in this Primer. While it may seem limiting to CHW programs that offer other, albeit less tangible, benefits, it is often significant. So

many programs can be shown to save substantial amounts in direct medical savings that it is not necessary to get into the often messy business of trying to quantify additional savings for more intangible benefits.

When it is not possible to obtain information about the direct medical costs averted by an intervention, it is often best to develop a cost effectiveness study or a cost-utility study, where the benefits are assumed and the analysis simply compares which intervention provides the most benefit for the least cost.

#### **Step 5:** *Select Benefits That Will Be Excluded from the Benefit-Cost Ratio Calculation, but Will Be Used to Reinforce the CBA.*

Program benefits that can't be measured in dollars are often more important than the dollar benefits, and are usually central to the mission of the organization. These benefits, while not included in the formal benefit-cost ratio calculation, are very important to the overall Cost-Benefit Analysis. These benefits can supplement and strengthen a CBA analysis substantially. Both dollar and non-dollar benefits are usually presented together to make a stronger overall case.

Examples of outcomes that are hard to measure in terms of dollar savings, but may be of key importance to CHW programs, include: building independence (e.g., shut-in clients able to walk to the store because of community health worker encouragement); improving employment opportunities; improving home environments and safety; enhancing greater personal responsibility; and community empowerment - such as a neighborhood that organizes to reclaim streets from gangs.



## Step 6: Conduct an Inventory of Existing Evaluation Data.

Very often there is a great deal of information already available that demonstrates your program's net benefits, or information that can be used to supplement or support the effort. For example, existing evaluations, outcomes studies, and financial reports can be mined for cost-benefit information.

### Different Strokes for Different Folks

All funding organizations want to know that their money is well spent. But there are some important differences in terms of specific outcome measures of interest, as well as ways of presenting and describing program results. Some examples:

#### Federal, state or local public agencies

Are likely to be more interested in broader public health outcomes, such as the number of clients reached through an intervention, or the rate of infant mortality for a defined region. Outcomes of particular interest may be established by national commissions or federal laws, such as Healthy People 2000 (e.g., reducing smoking in pregnant women to less than 10% , or immunizing 90% of children under two); or the federal Children's Health Insurance Program (CHIP), which sets targets for children's health insurance coverage. Health departments and foundations also frequently have a strong interest in community empowerment and relationship building within local health care and social service networks.

### Foundations

Typically want to know that the money was spent the way it was supposed to be spent, and that it did what it was supposed to do. Traditionally, this has suggested descriptive evaluation, financial audits, and perhaps, utilization rates - was the program implemented in the intended neighborhoods and how many clients were served? Increasingly, foundations look for community outcomes - e.g., declines in the rate of teenage pregnancy - but that demand is passive and they recognize the difficulties in such studies. Few foundations are aggressively funding such CBA studies.

### Managed Care Organizations (MCOs)

Are often very interested in how a CHW intervention affects specific HEDIS measures that they must report to accrediting agencies. They also are interested in the bottom line savings - both direct and indirect - that result from a CHW intervention. A key outcome of interest to MCOs is reduction in ER visits for primary care. There are many types of intervention that can impact this rate. Without thinking about it strategically, programs may not take the impact on ER visits into consideration. MCOs also tend to conceptualize cost savings in terms of dollars saved per member per month (PMPM). Converting dollar savings to PMPM numbers is a simple (=total savings/total relevant members/12) but often neglected way to bridge the culture gap when communicating with MCOs. Because there is often intense competition for members, MCOs are also interested in member retention rates.

## Example: Picking a CBA Outcome for a Healthy Start Maternal and Child Health Program

A hypothetical Healthy Start program has a large number of outcomes that it considers important. It initially considered several different outcomes:

1. The number of clients beginning primary care within the first and second trimesters of pregnancy
2. The reduction in infant mortality rate
3. The reduction in low birthweight rate

Numbers 2 and 3 are actual outcomes that can be quantified and translated into dollar savings. However, for this project the annual sample size for infant deaths is low compared to the number of LBW babies, and therefore less likely to result in statistically valid information. LBW is associated with high hospital costs, often related to care in the Neonatal Intensive Care Unit. There are national data that can be used to establish baseline rates and costs for similar populations. And finally, estimates of hospital cost savings resulting from reduced low birthweight rates carry a particularly powerful message to MCOs, and are relatively easy to calculate. Thus, it was concluded that the program would focus on the reduction in LBW rate <sup>(3)</sup>

## Step 7: Measure Benefits

To measure benefits you can use one of two methods, depending on the availability of data. When such data is available, one can directly measure pre- and post-intervention costs, and calculate the difference. Alternatively, one can collect data on pre- and post-intervention outcomes, calculate the difference, and then apply secondary data that enables one to convert the difference in outcomes into a monetary difference. Each is described below:

### A. Calculate Cost Savings Directly

It is often possible to measure cost savings directly. This method is simpler than the first, but requires pre-and post-intervention cost data, which is often not available.

## Example: Medical Care Access Outreach

A hypothetical outreach program is designed to improve access and quality of health care by establishing a usual source of primary care for Medicaid enrollees. Dollar benefits of this program include reduced emergency room use, and reduced hospitalization through early detection, treatment, and prevention of disease.

Rather than measuring intermediate outcomes and converting to dollar savings (as above), this program directly measured medical costs for clients and non-clients.

Using state Medicaid data, they were able to compare total health care expenditures for the client population before and after the intervention. They found that expenditures declined by 22%, saving an average of \$2,104 per client.



## B. Collect Baseline and Post-Intervention (e.g., “Before and After”) Outcomes

When pre-and post-intervention cost data is not available, one can use the following approach, which requires three pieces of information:

- a baseline outcome (for example, the screening rate before implementation of the intervention)
- the intervention outcome (what was the screening rate after the intervention)
- a cost factor (how much the difference in outcome saves)

There are many ways to collect these data, including collecting utilization data from payors (e.g., Medicaid) or providers and conducting surveys of clients. The chosen method will depend on the type of intervention and the availability of data.

**Following are hypothetical examples of various alternative approaches:**

- **Longitudinal studies**, in which a group is tested before and after an intervention.

*Example: One study screened church members for cholesterol levels before applying a church-based education program. Six months later they were re-screened.*

- **Longitudinal survey studies**, in which the baseline and/or the intervention outcome can be determined through a survey.

*Example: In a study of hypertension, the population was asked about prior screening rates, follow-up rates and attitudes. This baseline information was compared to post intervention information from both encounter records and surveys.*

- **Population-level studies**, in which the baseline and intervention outcomes are measured or collected from a secondary source for an entire population group, not just those receiving the intervention.

*Example: A Healthy Start evaluation compared rates of LBW and infant mortality in a community before and after providing the intervention among some members of the same population.*

In order to calculate savings, this program needs to know the LBW rate for its population pre-intervention, or for a similar population. Often this data is available from the State Medicaid Office or Department of Health.

- **Comparison group studies**, in which a comparison group with similar population characteristics is used as baseline (e.g., a different county with similar demographic characteristics). It can be used for long established programs for which it is impossible to collect pre-intervention data. Its validity, however, is sensitive to the similarity between populations, and it is best to compare many different sites statistically.

This technique can also strengthen a pre- and post-intervention study by helping to control for other changes that might impact the outcome. This is done by conducting a pre-and post-intervention study in multiple sites, including both intervention sites and control sites.

*Example: One study looked at the impact of Healthy Start programs by comparing the rates of infant mortality in Healthy Start sites and comparable non-Healthy Start sites. It was careful to select sites and populations with very similar characteristics.*

- **Comparison to a baseline**, in which the comparison group data is collected from the literature or other secondary sources.

*Example: A cancer screening program compared screening rates within the program to published estimates for a similar population. (Weinrich 1993) Finding published data on comparison groups that are sufficiently similar to the group under study may prove difficult.*

## Convert Outcomes Into Cost Savings.

Once outcomes measures are obtained, they can be converted to dollar savings by using secondary sources of data that link outcomes to costs. For example, suppose you have measured the impact of a smoking cessation program on smoking among pregnant women, and observed that X women stopped smoking. You identify a set of high quality, published studies showing that reducing smoking in pregnant women saves an average of y dollars in subsequent direct medical costs. Therefore, you can apply this y dollars saving to each of the women that stopped smoking as a result of your intervention.

### Case Example: AIDS Prevention

*A hypothetical case involving AIDS prevention demonstrates how the literature can be used to convert outcomes to dollar benefits.*

An AIDS prevention program tracks new cases of HIV infection before and after the implementation of a needle exchange program. Their study determines that they are able to reduce the incidence of HIV infection in their service area by 6%, or 12 cases.

To convert this outcome to dollar benefits, they turn to a published study (Pinkerton et al. "Cost-effectiveness of a community-level HIV risk reduction intervention." *American Journal of Public Health*. 1998;88:1239-1242.). This study indicates that the average lifetime medical cost of treating HIV and AIDS is \$119,000.

Based on this they calculate the direct medical savings associated with the program as:

12 cases prevented x \$119,000 =  
\$1,428,000.

## Using Secondary Data to Make Your Case

The literature is filled with statistics and research findings that can be used to support your case or to extrapolate your results. Section V of this Primer contains selected secondary data from the literature, as well as information and contact points for various program areas.

One can search for additional studies fairly easily. A good place to start is the National Library of Medicine's Medline database, which can be searched free of charge through the Internet Grateful Med site ([igm.nlm.nih.gov](http://igm.nlm.nih.gov)). Many associations also compile and disseminate data from the literature and from their own research studies. For example, to find information on hypertension prevention and screening, you might begin by contacting the communications director at the American Heart Association, the American College of Cardiology, the American College of Physicians and the American College of Family Medicine.



## Step 8: Adjust for Inflation

When using monetary data from different years, whether it is your own data or secondary data from the literature, you may need to adjust for year to year differences in real dollar values caused by inflation. It may not be especially important to adjust if the differences in years or dollar amounts are small. It depends in part on your audience and how important they consider the level of precision.

If you choose to make inflation adjustments, you can obtain consumer price index data for this purpose from the Bureau of Labor Statistics at <http://stats.bls.gov/>, or by telephone at 202-606-7000. You can use the general CPI or a component measure that seems to fit your case, such as the medical CPI.

A sample CPI table is as follows:

CPI Percentage Change		
	ALL ITEMS	MEDICAL CARE
1994	2.7	4.9
1995	2.5	3.9
1996	3.3	3.0
1997	1.7	2.8
1998	1.6	3.4
1999*	2.8	3.7

\*through 9 months  
 Source: US Department of Labor, Bureau of Labor Statistics

## Use the CPI to Adjust Dollars from Different Periods.

Suppose in the above outreach example, the \$2,104 in savings per client are in 1996 dollars. In order to show what the savings would be in current (1999) dollars, they can be adjusted for inflation using, in this case, the medical CPI, as follows:

### Example: Converting \$2,104 in 1996 Dollars into 1999 Dollars

In the Medical Care Outreach Case Example (above), it was determined that the program saved \$2104 per client through reduced ER and hospital admissions. To show how much that same program would save in current (1999) dollars, one could use the CPI to convert 1996 to 1999 dollars as follows:

Multiply \$2,104 by (1 + the percentage inflation rate) for each subsequent year.

#### Example:

1996: \$2,104

1997:  $\$2,104 \times (1 + .028) = \$2,163$

1998:  $\$2,163 \times (1 + .034) = \$2,237$

1999:  $\$2,237 \times (1 + .037) = \$2,320$

Thus, saving \$2,104 in 1999 would be like saving \$2,320 in 1999.

**Note:** to adjust back in time, simply subtract the preceding CPI percentage rate from 1 and multiply. For example, to adjust \$2,104 to 1995 dollars:  
 $\$2,104 \times (1 - .039) = \$2,022$

## Step 9: Discount Future Benefits

Another issue occurs when program costs expended in one year yield benefits that accrue in future years. In order to match current program costs and future benefits, one can “discount” the future dollar benefits (i.e. calculate their present value) in order to convert them into their current year value. Like inflation adjustment, it may not always be necessary, but depends on the audience and the magnitudes involved. Discount rates can be determined in many ways, but for our purposes, it is reasonable to assume a rate of return on investment that could be easily realized through a conservative investment, such as a money-market account or certificate of deposit at a bank. Assuming a discount rate of 5%, the calculation would be as presented in the following case example:

### Calculating the Present Value of a Future Benefit

**To calculate the present value of a benefit received after five years, use the formula:**

$$\text{Present value} = \text{future benefit} / (1 + \text{discount rate})^{\text{number of years}}$$

**Thus, to discount \$100,000 in benefits received five years after the intervention:**

$$\text{Present value} = 100,000 / (1.05)^5 = \$78,352.62$$

This calculation suggests that \$78,352.62 invested today in a money market account giving 5% interest would be worth \$100,000 at the end of five years.

## Step 10: Identify Other Factors That Might Explain Your Outcomes

One of the key problems with measuring outcomes is that factors other than the intervention can account for significant portions of the observed outcomes. These are often referred to as “confounding factors.” It is important to identify and address these factors up front. If they are not addressed, they can give misleading results and can be used by critics to negate otherwise valuable performance data. This problem tends to be exacerbated when outcomes are used that are farther out on the logic chain - such as change in community health status or five year patient Level outcomes.

Any explanation for an outcome - other than the intervention itself - that can account for all or part of the result is a confounding factor. Examples include: the effects of concurrent programs that are similar to yours; a major shift in popular attitudes; a change in prices or other economic factors, or even an unexplained national trend. For example, the evaluation of Healthy Start’s impact on infant mortality has been complicated in recent years by a substantial and largely unexplained decline in infant mortality nationwide.



## Example: Adjusting for Confounding Variables in a Prenatal Care Intervention

A hypothetical home visiting intervention provides education and outreach for prenatal care in a large urban center. It conducted an analysis showing a 10% decline in low-birth-weight babies within its service area after the program started. In making a presentation to an MCO, a health plan executive pointed out that the city had, during the intervention period, run an educational ad campaign using bus stop and billboard advertising. The meeting came to an abrupt end.

Upon further research, the two effects were disentangled. The Department of Public Health, which had sponsored the ad campaign, had tracked awareness as well as changes in LBW births throughout the city following the ads. The results had shown a consistent 4% reduction in LBW babies for similar areas throughout the city. Only in this particular service area was the reduction significantly different from the citywide 4%. Furthermore, a literature review found that similar programs in other cities had had an impact in the same range.

With this information, they were able to disentangle the two effects and reasonably to infer that the prenatal care intervention accounted for the remaining 6%. More sophisticated statistical models could perhaps show whether or not the interaction between the two program was important. But this sort of analysis is typically beyond the scope that the individual program can or needs to undertake.

The point here is that a crucial component of any CBA is to think through potentially confounding factors, and collect information that can be used to validate the benefits of your interventions.

## Where to Find Data

As can be seen, the type of data used depends on many factors: the type of intervention, the outcomes selected, the existence of cost data to convert outcomes into cost savings, the ability to track clients directly and collect self-reported information, and whether or not population- or program/client-level outcomes are desired. When outside data is required, there are several typical sources, including:

### ■ Medicaid:

Medicaid data can be used to directly calculate costs pre- and post-intervention. However, except in special cases, client-level data are not available because of confidentiality. However, detailed sub-groupings can often be obtained that can be used to isolate a small population of interest (e.g. by diagnosis, age, zip code of residence).

For example, if you are interested in costs of LBW births in a program's service area, you probably can't get data on clients versus non-clients, but you probably can get data on all births broken out by birthweight, for a restricted set of zip codes of interest. Because Medicaid is a state program, the level of access and sophistication of reporting varies considerably across sites. In some cases, private vendors are licensed by the state to manage and disseminate Medicaid data. A call to the state health department is the best way to start.

### ■ Medicare:

Medicare data can be obtained from the Health Care Financing Agency ([www.hcfa.gov](http://www.hcfa.gov)) as well as from private data vendors such as HCIA, Inc. ([www.hcia.com](http://www.hcia.com)) and MedStat ([www.medstat.com](http://www.medstat.com)). Managing large Medicare files can be tricky and custom studies can be expensive to purchase. But summary utilization and cost data is often available from published sources and this can provide baseline utilization estimates for comparison. For example, state, national and regional data on admission rates and the average costs of care by disease can be obtained.

### ■ Providers:

Data can be obtained directly from providers in a community. For example, to get baseline data on the rates and costs of ER utilization within a community, the community hospital can be directly approached for the data. In such cases this will probably require an agreement with the hospital, which may also be interested in the findings. Also, many state hospital associations collect, summarize and disseminate utilization and cost data.

### ■ Managed Care Organizations:

Managed care companies with Medicaid contracts can be a valuable source of information on utilization and costs, in particular because they tend to collect more data than others on ambulatory care, prevention, screening, and other outcomes of interest to CHWs. At the same time, MCOs will consider this proprietary information and will probably want to be assured of some control over its use.

## Maintain High Standards of Data Collection and Reporting.

It is crucial to maintain the highest integrity and accuracy in the collection and analysis of data and the presentation of results. Questions about data integrity or misleading interpretations can undermine an otherwise valuable analysis.

Several ways to assure data integrity include: building double-checking steps into the research process, carefully documenting the steps in the analysis, and having an external or disinterested party review the process and findings.

If your results aren't what were hoped for, consider this a process for improving performance over time. In this case, non-monetary benefits can be very important in reinforcing a small net monetary benefit.

### Example: Colorectal Screening

*The following steps show how a program might measure the benefits of a screening intervention:*

- Pick an outcome variable, such as the colorectal screening rate within a target population.
- Measure the baseline value for the population by conducting a survey to determine the pre-intervention rate of screening.
- Conduct the intervention.
- Re-survey at annual intervals to determine rates of screening: 6 month screening rate.
- Consider other factors that may impact the rate, such as a general media campaign running concurrently.
- Calculate the net increase in screening.
- Identify a secondary source of data that indicates the cost savings associated with an increase in screening and multiply by the increase in screening.



## Benefits Checklist

- 
- 1. Identify benefits that your customers value.
  - 2. Identify benefits that your staff, clients and others value.
  - 3. Develop a clear logic model linking your intervention to the expected outcomes.
  - 4. Select those benefits that can be measured in terms of dollars.
  - 5. Select benefits that will be excluded from the formal calculation but will be used to reinforce the CBA.
  - 6. Conduct an inventory of existing benefits-related data.
  - 7. Calculate cost savings directly or collect pre- and post-intervention outcomes data, and convert to cost savings.
  - 8. Adjust monetary benefits for inflation.
  - 9. Discount future benefits.
  - 10. Identify confounding factors.
-

## IV. Putting Costs and Benefits Together and Presenting Results

### *This section looks at:*

... putting cost and benefit data together,  
... calculating results, and  
... presenting results.

*This section also includes sample worksheets.*

Your results will speak for your organization on many levels. At one level, the results will indicate the value of the interventions that you perform. But for many customers, even more important than the actual numbers, it shows that your organization conducts itself in a professional, businesslike way, understands accountability, and is capable of effectively conducting and communicating a complex analysis. Many audiences, for example, will be less interested in the numbers themselves than in how you intend to use them to modify programs and improve performance in the future.

There are five pieces of information that should always result from a CBA:

1. Program benefits in dollars
2. Program costs in dollars
3. The net savings
4. The ratio of benefits to costs
5. A list or description of other benefits that can't be expressed in dollars

In addition, it is useful to express benefits, costs and net savings in terms of averages or per unit dollars, for example, savings per client or per educational session. This is particularly useful when comparing programs of different size.

### **Step 1:** Calculate the Ratio of Benefits to Costs

The ratio of benefits to costs is calculated dividing the total dollar benefit by the total cost, and expressing the result as a ratio:

*"The ratio of benefits to costs for this program is 6.3:1"*

In other words, the benefits are 6.3 times greater than the costs of delivering the program.

### **Step 2:** Package Your Results in Terms Your Audience Values and Understands

The results are in, but need to be packaged for consumption by the various customers of this information. Just as customers have different measures that interest them, they also have different ways of looking at and talking about such information. It is very important to package the information in terms that are most useful to them. For an MCO, you might emphasize bottom line savings and potential for improvement in HEDIS indicators. For health departments and foundations, you might focus on community partnerships and networks. The results can be formulated in ways to make their presentation more effective. For example, MCO executives



usually think about costs and cost savings in terms of costs per member per month, or “PMPM,” since this makes it easy to visualize the relationship between the amount of saving and the average premium received each month for each enrollee. Converting your results to these units is often simple to do and immediately cuts through many barriers.

## *Educate Your Audience and Manage Expectations*

In addition to benefits that your audience values, it can be valuable to include outcomes that are important to your organization. You should try to make a good case to your audience why these outcomes are important, even if they may appear to be “soft” or difficult to measure. Educating funders about the potential for harm to important CHW programs if dollars flow only to outcomes that are easy to measure can lead to better funding opportunities over the long run.

It can be valuable to involve the customers of this information, both external and internal, to be aware of and to contribute to the CBA process. However, it should also be explained to them that initial results represent a learning experience and should not be used to gauge performance or to make critical funding or strategic decisions.

## Calculating Savings Per Member Per Month (PMPM)

Suppose your organization is making a presentation to a Medicaid MCO. Your cancer screening program has been shown to have a high ratio of benefits to costs, 8.5:1. What this means is that for every dollar spent on screening, \$8.50 in direct medical costs are saved.

Suppose further that the MCO serves 24,000 Medicaid enrollees in this service area, and your organization estimates that it will take \$32,000 to conduct the screening intervention for this population. That means that you can expect savings of  $8.5 \times \$32,000$ , or \$272,000.

To convert this to PMPM, divide the total savings, \$272,000, by 12 months, and divide again by the number of members,  $\$272,000 / 12 / 24,000$ , to get the resulting savings of \$.94 PMPM. To calculate net savings, subtract the \$32,000 in program costs and recalculate.  $((272,000 - 32,000) / 12 / 24,000)$  \$.83 PMPM.)

# Cost-Benefit Analysis Worksheet

Description of Program or Intervention: \_\_\_\_\_

\_\_\_\_\_

**Costs:**

Staffing \$ \_\_\_\_\_

Overhead \$ \_\_\_\_\_

Direct program costs \$ \_\_\_\_\_

**Indirect Cost A**

Description: \_\_\_\_\_  
Dollars \$ \_\_\_\_\_

**Indirect Cost B**

Description: \_\_\_\_\_  
Dollars \$ \_\_\_\_\_

**Indirect Cost C**

Description: \_\_\_\_\_  
Dollars \$ \_\_\_\_\_

Total indirect program costs \$ \_\_\_\_\_

**Total Costs** \$ \_\_\_\_\_

Cost-Benefit Analysis:  
A Primer for Community  
Health Workers



# Cost-Benefit Analysis Worksheet (Cont...)

## Benefits:

### **Benefit A**

Description: \_\_\_\_\_  
 Dollars \$ \_\_\_\_\_  
 Inflation/Discount Adjusted Dollars \$ \_\_\_\_\_

### **Benefit B**

Description: \_\_\_\_\_  
 Dollars \$ \_\_\_\_\_  
 Inflation/Discount Adjusted Dollars \$ \_\_\_\_\_

### **Benefit C**

Description: \_\_\_\_\_  
 Dollars \$ \_\_\_\_\_  
 Inflation/Discount Adjusted Dollars \$ \_\_\_\_\_

### **Benefit D**

Description: \_\_\_\_\_  
 Dollars \$ \_\_\_\_\_  
 Inflation/Discount Adjusted Dollars \$ \_\_\_\_\_

**Total Benefit Dollars** \$ \_\_\_\_\_

---

# Cost-Benefit Analysis Worksheet (Cont...)

### Net Benefits:

Total Benefits - total costs = \$ \_\_\_\_\_

### Ratio of Benefits to Costs:

Total Benefits/total costs = \_\_\_\_\_ : \_\_\_\_\_

### Descriptions of Non-Monetary Benefits

- 1.- \_\_\_\_\_
- 2.- \_\_\_\_\_
- 3.- \_\_\_\_\_
- 4.- \_\_\_\_\_
- 5.- \_\_\_\_\_
- 6.- \_\_\_\_\_
- 7.- \_\_\_\_\_

Cost-Benefit Analysis:  
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## V. Resource Information

*This section describes resources for CHW programs planning to do CBA, including:*

- ... general resources,
- ... organizations that provide information or technical assistance,
- ... literature that provides cost benefit data for specific disease or health care categories.

### Textbooks

There are many excellent texts on conducting cost-benefit, cost-effectiveness and cost-utility analysis. We recommend the following:

Haddix AC, Teutsch SM, Schaffer PA, Dunet DO. *Prevention Effectiveness: A Guide to Decision Analysis and Economic Evaluation*. 1996. New York, NY: Oxford Univ. Press.

Tolley K, Rowland, N. *Evaluating the Cost-Effectiveness of Counseling in Health Care*. 1995. London: Routledge.

Warner KE, Luce BR. *Cost-Benefit and Cost-Effectiveness in Health Care: Principles, Practice and Potential*. 1982. Ann Arbor Michigan: Health Administration Press.

Bukoski WJ, Evans RI., eds. *Cost-Benefit/Cost-Effectiveness Research of Drug Abuse Prevention: Implications for Programming and Policy*. NIDA Research Monograph 176. US Department of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse. 1998.

### General Resources

**1.- Centers for Disease Control and Prevention** publishes several useful guides and maintains a database of CHW programs.

- *An Ounce of Prevention...What are the Returns? Second Edition*. 1999. Atlanta, Georgia: Centers for Disease Control and Prevention. This report summarizes cost and benefit data from the literature according to disease category, and is a very useful resource. This can also be directly downloaded from: <http://www.cdc.gov/epo/prevent.htm>
- A three volume set which is available on hard copy or CD describes numerous CHW programs:
  - (1) *Community Health Advisors: Models, Research, and Practice - Selected Annotations-United States, Vol. I* September 1994.
  - (2) *Community health Advisors: Programs in the United States - Health Promotion and Disease Prevention Vol. II* September 1994.
  - (3) *Community health Advisors/Workers: Selected Annotations and Programs in the United States, Vol. III* July 1998  
*Centers for Disease Control and Prevention. Atlanta, Georgia: Centers for Disease Control and Prevention.*

- The CDC can be contacted directly through several numbers:

- (1) General number: 404-639-3311, or
- (2) Centers for Disease Control and Prevention:  
770-488-1815/5080
- (3) CDC National Prevention Information Network: 800-458-5231.

## 2. Arizona Department of Health Services, Office of Women's and Children's Health.

- (1) *Health Start Program, Program Evaluation Report. May 11, 1998; and*
  - (2) *Health Start Program, Program Evaluation Report. January 15, 1997.*
- These reports provide technical methodological information on cost-benefit and cost-effectiveness analysis as applied to the Arizona Health Start Program.

## 3. Center for Policy Alternatives.

*Community Health Workers: A Leadership Brief on Preventive Health Programs.* 1998. Washington, DC. This report describes a variety of CHW programs and discusses attempts to measure costs and benefits. The Center can be contacted by telephone at 800-935-0699, or e-mail at [info@cfpa.org](mailto:info@cfpa.org).

4. **The United Way.** Publishes several resources for measuring CHW outcomes, and sponsors technical assistance workshops. A useful resource is the following publications:

- The United Way has published a useful guide to measuring outcomes:  
United Way of America. *Measuring Program Outcomes: A Practical Approach.* Alexandria, VA: United Way of America, 1996. The publication can be ordered at 800-772-0008, and more information can be obtained by contacting the United Way at 703-836-7111, or by e-mail at <http://unitedway.org/outcomes>.

## Managed Care

Case studies and program information CHW programs contemplating partnerships with managed care can be found in the following publications:

American Association of Health Plans. *Collaborative Strategies for success in the changing Medicaid Market: Improving managed Care Systems Through Partnerships between Health Plans and Community Based Organizations, Conference Summary.* Washington. DCV:AAHP. 1996. Contact the AAHP at 202-778-3200.

HRSA, Division of Healthy Start. *A Healthy Start handbook: Estimating Cost Savings to Medicaid managed Care Organizations Through Outreach, Care Coordination and Home Visiting.* US Department of Health and Human Services, Health Resources and Services Administration, Division of Healthy Start: Rockville, MD. 1998. For copies or further information, contact HCSA, Inc. 202-463-7551.

Joffe M, Back K. Vol. V. *A Community-Driven Approach to Infant Mortality Reduction: Collaboration with Managed Care.* National Center for Education in Maternal and Child Health, 1998.

Seedco Partnerships for Community Development, *Community Health Advisors: Emerging Opportunities In Managed Care,* 1997. Contact Christine Rico, 212-473-0255.



## Sampling of Disease and Condition-Specific Resources

Listed below are a sample of organizations to contact for specific information by disease category, as well as cost and benefit data from the literature, which can be used directly in calculating or presenting your CBA results.

### Notes for Using this Section

1.- This sample is based on a brief foray into the literature, not a comprehensive literature review. The absence of literature or organizations in any category should not imply that they do not exist, only that they were not identified in this brief survey.

In reading this section, please note the following.

2.- Cost savings (i.e., benefit) data are sometimes presented for particular diseases. For example, the entry:

#### Cost savings of:

**\$ 15,000** in direct medical costs in first year for LBW infants (US\$1988).

**Source:** Lewit EM, Baker, LS, Corman H, Shiono PH. "The direct cost of low birth weight." *Future Child* 1995; 5:35-56

...indicates that low birthweight babies cost, on average, \$15,000 in direct medical costs in the first year. Such cost information can be used to calculate the benefits of an intervention as the "costs averted" by a particular program. Based on this data, a program could claim a \$15,000 saving for every LBW baby that it can prevent. When available, years are shown so that inflation adjustments can be made.

When benefit-cost ratios are available, they are listed along with their source and any necessary explanatory information. For example, the entry:

#### Cost-benefit ratio of:

**7:1** Benefits of prenatal care in terms of neonatal intensive care costs.

**Source:** Morales WJ. "The cost of no prenatal care." *Journal of the Florida Medical Association*. 1985;72:852-55.

...is interpreted as follows: The cited study by Morales found that every \$1 spent on prenatal care resulted in \$7 of savings in neonatal intensive care costs. This data could be used to support the evidence from your own program's cost-benefit analysis.

3.- When using the data reported in this section, it is advisable to check the sources directly to make sure that the information can be applied to your particular situation. For example, are the population characteristics similar enough to yours? Are the outcomes comparable to the ones that you are measuring?

## Low Birthweight

### Where to Start:

U.S. Department of Health and Human Services, Health Resources and Services Administration, Division of Perinatal Systems and Women's Health (Healthy Start) 301-443-0543.  
[www.mchb.hrsa.gov](http://www.mchb.hrsa.gov)

Association of Maternal and Child Health  
202-775-0436  
[www.amchp.org](http://www.amchp.org)

The following literature review describes various CBA studies in maternal and child health. (Key findings are also presented in this report.): Health Resources and Services Administration, Maternal and Child Health Bureau. Economics in MCH. 1998.

(1) *Vol.1: An Introduction to Economic Analysis for MCH Practitioners.*

(2) *Vol. 2: A Review of Descriptive Cost studies and Economic Evaluations of Maternal and Child Health Interventions.*

(3) *Vol. 3: Costs of Family Health Services: Evaluation of Three Programs in New Jersey.*

US Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. 1998. Washington, DC.

#### Cost savings of:

**\$14,000 to \$30,000** per LBW birth prevented as a result of the expansion of Medicaid prenatal care benefits to all women in poverty.

**Source:** Office of Technology Assessment. Healthy Children: Investing in the Future. OTA-H-345. 1988. Washington DC: US GPO.

**\$15,000** in direct medical costs in the first year of life for LBW infants.

**Source:** Lewit EM, Baker, LS, Corman H, Shiono PH. The direct cost of low birth weight. Future Child 1995;5:35-56.

**\$26,000 + \$2,950 for each year through age 15** for very low birthweight (VLBW) babies.

**Source:** Boyle M, Torrence G, Sinclair J, Horwood, S. "Economic evaluation of neonatal intensive care of very low birthweight infants." New England Journal of Medicine 1983;308:1330-37.

**\$6,200 + \$5,560 for each year of survival through age 15** for all LBW (including VLBW) births.

**Source:** Office of Technology Assessment. Healthy Children: Investing in the Future. OTA-A-345. Washington, DC: US Government Printing Office, February 1988.

**\$60,000 per VLBW cost in the first year**, versus \$3,600 for all births (US\$1989).

**Source:** Rogowski J. "Cost effectiveness of care for VLBW infants." Pediatrics. 1977.

**\$1000** in additional hospital costs if there is no prenatal care.

**Source:** Henderson JW. "The cost-effectiveness of prenatal care." Health Care Financing Review. 1994;15:21-32.

#### Benefit-cost ratios of:

**1.49:1** for the provision of "adequate" prenatal care to Medicaid enrollees in Missouri in 1988.

**Source:** Schramm WF. "Weighing costs and benefits of adequate prenatal care for 12,023 births in Missouri's Medicaid program, 1988." Public Health Reports. 1992;107:647-52.

**7:1** for the provision of prenatal care, in terms of neonatal intensive care costs saved.

**Source:** Morales WJ. "The cost of no prenatal care." Journal of the Florida Medical Association. 1985;72:852-55.

**3.39:1** for the prevention of low birthweight births.

**Source:** Institute of Medicine, Division of Health Promotion and Disease Prevention, Committee to Study the Prevention of Low Birthweight. Preventing Low Birthweight. Washington, DC: National Academy Press. 1985.

**4.70:1** for a comprehensive perinatal care program in San Diego (savings of \$2,821 versus program costs of \$600 per patient for 100 patients).

**Source:** Moore TR, Origel W, Key TC, Resnik R. "The perinatal and economic impact of prenatal care in a low-socioeconomic population." American Journal of Obstetrics and Gynecology. 1986;154:29-33.



**2.92:1** for a program to increase participation in the WIC program (Department of Agriculture, Supplemental Nutrition program for Women Infants and Children) in terms of newborn medical costs.

**Source:** Buescher PA, Larson, LC, Nelson MD, Lenihan AJ. "Prenatal WIC participation can reduce low birthweight and newborn medical costs: a cost-benefit analysis of WIC participation in North Carolina." Journal of the American Dietetic Association. 1993;93:163-6.

## Birth Defects

### Where to Start:

American College of Medical Genetics  
301-530-7127  
[www.faseb/genetics/acmg](http://www.faseb/genetics/acmg)

### Cost savings of:

**\$408,000** over the patient's lifetime for the prevention of spina bifida, in terms of medical care costs, resulting from insufficient folic acid fortification of food (\$US1993).

**Source:** Kelly AE, Haddix AC, Scanlon KS, Helmick CG, Mulinare J. "Worked example: cost-effectiveness of strategies to prevent neural tube defects." In Gold MR, Siegel JE, Russell LB, et al., eds. Cost effectiveness in health and medicine. New York: Oxford Univ. press, 1996:313-48.

## Fetal Alcohol Syndrome

### Cost savings of:

**\$600,000** in lifetime medical costs associated with a fetal alcohol syndrome birth.

**Source:** Bloss G. "The economic cost of FAS." Alcohol World: Health and Research. 1994;84:53-61.

## Hepatitis B screening and vaccination

### Benefit-cost ratios of:

**3.32:1** for screening of mothers and infants of infected mothers. Includes both medical and work loss costs.

**Source:** Margolis HS, Coleman PJ, Brown RE, Mast EE, Sheingold SH, Arevalo JA. "Prevention of hepatitis B virus transmission by immunization: an economic analysis of current recommendations." JAMA 1995; 274:1201-8.

## Childhood Immunization

### Benefit-cost ratios of:

*Measles-mumps-rubella vaccine*  
**16.3:1** for use of the MMR vaccination.  
**Source:** Hatziandreu EJ, Brown RE, Halpern MT. "A Cost benefit analysis of the measles-mumps-rubella (MMR) vaccine." Arlington, VA,; Batelle, 1994.

*Diphtheria and tetanus and pertussis*  
**6.21:1** for use of the DPT vaccine.  
**Source:** Hatziandreu EJ, Palmer CS, Brown RE, Halpern MT. A Cost benefit analysis of the diphtheria and tetanus and pertussis vaccine. Arlington, VA: Batelle, 1994.

## Diabetes

### Where to Start:

American Diabetes Association  
703-549-1500  
[www.diabetes.org](http://www.diabetes.org)

National Diabetes Information Clearinghouse  
301-654-3327  
[www.niddk.nih.gov](http://www.niddk.nih.gov)  
[www.cdc.gov/nccdphp/ddt](http://www.cdc.gov/nccdphp/ddt)

**Cost savings of:**

**\$2,700** per client in reduced ER, inpatient and other medical services through a program which helps diabetics keep appointments and understand health needs (the ENABLE project at the University of Maryland School of Pharmacy).

**Source:** The University of Arizona, [The Final Report of the National Community Health Advisor Study](#). Tucson, AZ: University of Arizona, 1998.

**Asthma****Where to Start:**

American Association for Respiratory Care  
972-243-2272

**Cancer****Where to Start:**

American Cancer Society  
202-661-5700  
contact: Nancy Halpern

National Foundation for Cancer Research  
301-654-1250

National Cancer Institute  
301-435-3848

**Cost savings of:**Cervical Cancer

**\$9,000** from early diagnosis (early diagnosis \$4,359 versus late \$13,359, US\$1988).

**Source:** Muller C, Mandelblatt J, Schechter CC, et al. Costs and effectiveness of cervical cancer screening in elderly women. Washington, DC: Office of Technology Assessment, US Congress, 1990.

Colorectal cancer

**\$20,000 to \$30,000**, average direct costs of treating colorectal cancer (US\$1989).

**Source:** US Preventive Services Task Force. [Guide to Clinical preventive services](#). 2<sup>nd</sup> Ed. Baltimore: Williams & Wilkins, 1996.

**Cardiovascular Disease****Where to Start:**

American College of Cardiology  
301-897-5400  
[www.acc.org](http://www.acc.org)

American Heart Association  
202-785-7900

**Nutrition****Where to Start:**

American Dietetic Association  
202-371-0500

American Society for Clinical Nutrition  
301-530-7110

**Benefit-cost ratios of:**

**10:1** for the Oxford Health Plan's nutritional program for at-risk elderly:  
**Source:** "Focus on Nutrition to Improve Disease Outcomes" [Healthcare Demand and Disease Management](#) Dec. 1997 3(12):177-182.

**2:1** from use of Medical Nutrition Therapy (MNT) in the US military's TRICARE program, in terms of the reduction in inpatient and outpatient care.  
**Source:** Shiels J, Hogan P, Haught R. [The Cost of Covering Medical Nutrition Therapy Services under TRICARE: Benefit Costs, Cost Avoidance and Savings](#). Washington, DC: DOD Health Affairs, 1998.



## Women's Health

### Where to Start:

Institute for Research on Women's Health  
202-429-2025

Center for Women Policy Studies  
202-872-1770

## HIV/AIDS

### Where to Start:

American Foundation for AIDS Research  
202-331-8600

CDC Communications Program for AIDS  
404-639-3286  
Press office: 404-639-8890

NIH - Office of AIDS Research  
301-496-0357

### Cost savings of:

**\$71,000 - \$119,000**, the lifetime medical costs of treating HIV and AIDS (US\$1996).

**Source:** Pinkerton SD, Holtgrave DR, DiFranceisco WJ, Stevenson LY, Kelly JA. "Cost-effectiveness of a community-level HIV risk reduction intervention." American Journal of Public Health. 1998;88:1239-1242.

**\$280,000**, the lifetime direct medical costs for children born with HIV (estimated lifespan of 8 years). (US\$1994)

**Source:** Bonifield SL. "A cost savings analysis of prenatal interventions." Journal of Healthcare Management. 1998;43:443-451.

### Benefit-cost ratios of:

**2.4:1** for a program of HIV risk assessment, counseling, peer education and referrals.

**Source:** Tao G, Christianson J, Finch M, Remafedi G. "The cost/effectiveness of an HIV intervention program for gay and bisexual adolescents in Minnesota." AHSR FHSR Annual Meeting. Abstracts Book. 1996;13-102.

**20:1** for a program of counseling, testing, referral and partner notification.

**Source:** Holtgrave DR, Valdiserri RO, Gerber AR, Hinman AR. "Human immunodeficiency virus counseling, testing, referral and partner notification services: a cost-benefit analysis." Archives of Internal Medicine 1993; 153:1225-30.

## Sexually Transmitted Disease

### Where to Start:

American Social Health Organization  
202-789-5950

## Other Infectious Diseases

### Where to Start:

National Foundation for Infectious Diseases 301-656-0003

### Cost savings of:

#### *Tuberculosis*

**\$20,000 per patient per year**, the average direct cost of treating a TB patient (US\$1992)

**Source:** Shulkin DJ, Brennan PJ. "The cost of caring for patients with tuberculosis: planning for a disease on the rise." American Journal of Infection Control 1995;23:1-4.

**Benefit-cost ratio of:**

**1.20:1** from screening kids for TB at both kindergarten and grade 12, and treatment with isoniazid.

**Source:** Mohle-Boetani JC, Halpern M, et al. "School-based screening for tuberculosis infection: a cost-benefit analysis." JAMA 1995;274:613-9.

**Substance Abuse****Where to Start:**

SAMSHA (Office of Administrator)  
301-443-4795  
[www.sahmsha.gov](http://www.sahmsha.gov)

Center for Substance Abuse Prevention (CSAP)  
301-443-0365

International Commission for the Prevention of Alcoholism and Drug Dependency 301-680-6719

**Cost savings of:**

**\$9000 to \$10,000** incremental lifetime medical costs for smokers versus non-smokers (US\$1990).

**Source:** Hodgson TA. "Cigarette smoking and lifetime medical expenditures." Milbank Quarterly 1992;70:81-125.

**Benefit-cost ratio of:**

**2.16:1** resulting from a six year, school-based smoking prevention program in high schools.

**Source:** Pentz MA. "Costs, benefits and cost-effectiveness of comprehensive drug abuse prevention." In Bukoski WJ, Evans RI., eds. Cost-Benefit/Cost-Effectiveness Research of Drug Abuse Prevention Implications for Programming and Policy. NIDA Research Monograph 176. US Department of Health and Human Services, National Institutes of Health, National Institute on Drug Abuse. 1998.

**Lead poisoning****Cost savings of:**

**\$1,000** cost of short-term medical treatment per patient receiving chelation therapy; **\$417,000** lifetime costs for non-treatment at an early stage (\$129,000 medical; \$288,000 special education; US\$1995). Based on the 16th Street Community Health Center project in Milwaukee.

**Source:** Center for Policy Alternatives. Community Health Workers: A Leadership Brief on Preventive Health Programs. Washington, DC, 1998.

**Elderly****Where to start:**

American Association of Retired People  
202-434-3704  
[www.aarp.org](http://www.aarp.org)

National Council on the Aging  
202-479-1200  
[www.ncoa.org](http://www.ncoa.org)

**Benefit-cost ratio of:**

**30:1 to 60:1** for influenza vaccination among the elderly, in terms of hospital costs.

**Source:** Nichol KL, Margolis KL, Wuorenma J, Von Sternberg T. "The efficacy and cost-effectiveness of a vaccination against influenza among elderly persons living in the community." New England Journal of Medicine 1994;331:778-84.



# Glossary

## Averted costs.

The costs of a disease or condition that are prevented through an intervention. For example, the medical costs associated with treating heart disease are averted costs if they are prevented through a program that reduces the incidence of heart disease.

## Benefits, dollar.

The amount of benefit resulting from an intervention, expressed in terms of dollars. Usually synonymous with averted costs, but may also include other benefits, such as income that would not be earned in the absence of an intervention.

## Benefits, intangible.

Benefits of an intervention that cannot be easily quantified, for example, an improvement in self-esteem.

## Benefits, indirect.

Benefits that are incidental to the primary benefits promoted by the intervention. For example, an intervention that aims to reduce infant mortality may incidentally decrease school drop out rates by increasing empowerment of clients, an indirect benefit.

## Clients.

Those individuals served by community health workers and CHW programs.

## Community health worker (CHW).

This term encompasses a diverse group of volunteers and professionals involved in a wide range of activities that address the needs of underserved communities, and seek to improve access to health care and social services at the community level. Other terms for CHWs include Lay Health Advocate, Promotor, Outreach Educator, Community Health Representative, and Community Health Advisor.

## Comparison group.

A group of individuals that is similar in important respects to a client group. It is used to compare to the client group in determining the effects of an intervention. Also known as a control group.

## Cost allocation.

A process or method for dividing up shared costs and assigning them to individual programs or functions within an organization. For example, the executive director represents a management resource that is shared by many functions and departments in the organization. Dividing his or her salary and assigning it to different departments is a form of cost allocation.

## Cost-benefit analysis (CBA).

A method for measuring the costs and benefits of an intervention that can be expressed in dollar terms, and calculating the ratio between them.

## Benefit-cost ratio.

The ratio of benefits to costs that represents one way to summarize the results of a cost-benefit analysis. It is typically expressed as the ratio of dollar benefits for every one dollar of costs, e.g., 2.3:1.

### Cost utility analysis (CUA).

A method for measuring the cost per unit of outcome of an intervention where quality of life is a key consideration. CUA is similar to CEA except that the unit of outcome is usually expressed in terms of quality adjusted life-years, i.e., the number of years of life gained, adjusted by the quality of life in those additional years.

### Cost-effectiveness analysis.

A method for calculating the cost per unit of some outcome of a program, for example, the cost of a mammography screening outreach divided by the number of screening exams resulting from the program.

### Cost, direct.

A cost element associated with an intervention or function which is not shared by any other intervention or function.

### Cost, indirect.

A cost that is incidental to the program costs associated with the intervention. For example, the cost to the client associated with missing work in order to obtain a screening exam is an indirect cost of a screening program.

### Cost, intangible.

A cost that is subjective and can't be measured, such as pain and suffering, is an intangible cost.

### Costs, prevalence.

Determining the prevalence costs of a disease or condition, researchers calculate the costs of all cases during a given year. For example, the medical costs of breast cancer are summed across all those who have the disease, at all different stages, during a single year.

### Discounting.

Adjusting dollar amounts in different years to account for inflation. For example, if the costs of an intervention accrue in 1998, and the dollar benefits accrue in years 1999 to 2003, expressing benefits and costs in terms of 1998 dollars requires that the benefits be discounted.

### Evaluation.

A set of methods for determining the degree of success of a program or intervention in meeting certain goals. Many different approaches can be used, ranging from simple description to controlled multivariate analysis.

### Evaluation, formative.

A type of evaluation that focuses on process and structure variables, such as staffing, policies, services delivered, and service utilization (as opposed to outcomes) to determine how well a program has been implemented. The Tool Kit considers service utilization to use an output measure.

### Foundation.

A non-profit entity that provides funding to programs that serve some public benefit, such as CHW programs.

### Health department.

Local and state health departments coordinate Medicaid and other public assistance service delivery, control state and local financing of public assistance programs, and to some degree regulate these programs (particularly state health departments). They are a key source of funding for many CHW programs.

### Healthy People 2000.

A set of national preventive health goals established by an alliance of national, state and local public and private organizations. A new set of goals, Healthy People 2010, will be released in January 2000.



## HEDIS.

The Health Plan Employer Data and Information Set (HEDIS) is a set of measures used to evaluate and compare the quality of MCOs. It contains a variety of structure, process, utilization and outcome measures.

## Impact

An impact is a long term result of an intervention or program that indicates whether or not an intervention achieved a desired effect in terms of health or well-being. An improvement in quality of life in a community is an impact.

## Intervention.

Any defined programmatic effort to remediate a problem. In the context of CHW programs, any clearly defined form of assistance to underserved populations that is meant to improve their health or well being can be considered an intervention. Can also refer to a medical treatment.

## Longitudinal study.

Any study that tracks the same individuals over time.

## Managed care organization (MCO).

Any organization, such as an HMO, that combines the health care insurance and delivery functions. An MCO is typically “at risk,” i.e., it receives a fixed budget to care for a given population, and must make up any shortfalls internally.

## Outcome.

An outcome is short or intermediate term tangible result of an intervention or program that indicates whether or not an intervention achieved a desired effect in terms of health or well-being. A decline in the incidence of LBW babies is an outcome.

## Outcome, intermediate.

An effect of an intervention on an intermediate variable that suggests but does not unambiguously demonstrate a positive impact on health or well-being. An increase in the number of at-risk pregnant women participating in a prenatal care program is an intermediate outcome.

## Outreach.

A process by which socially or medically at-risk populations are identified, communicated with, and brought more fully and appropriately into the social/medical/community safety net and provider system. Outreach is one of the many varied activities performed by CHWs.

## Per member per month (PMPM).

A per unit measure frequently used by MCOs because it relates to the monthly premium collected by the MCO for each enrollee. It is often used to describe costs in order to show how much of the premium dollars they represent. For example, an MCO with average monthly premiums of \$125 PMPM determined that its mental health treatment costs were \$6.76 PMPM.

## Provider.

Health care professionals or institutions. Often refers to physicians or hospitals.

## Secondary data.

Data that is collected not through one’s own original research, but through the original research of others, and usually obtained from published sources.

## Screening.

Conducting tests on large segments of the population in order to identify individuals with high-risk or actual incidence of diseases or conditions.