

Defense Centers of Excellence
for Psychological Health and
Traumatic Brain Injury

PROGRAM EVALUATION GUIDE

MODULE 8 Analyzing Cost Data

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Overview of the Program Evaluation Guide

This Program Evaluation Guide (PEG) is developed and published by the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE). Program evaluation is an important part of the DCoE mission and helps military program administrators and leadership assess and improve service quality and outcomes. By making program evaluation an inherent part of everyday program activities, we create a culture of effectiveness to better build a sustainable, efficient and well-integrated continuum of prevention and care services for military members, their families and veterans.

The first edition of the PEG, published in July 2012, provided a standardized approach to program evaluation for psychological health and traumatic brain injury (TBI) program leaders. This version of the PEG (2nd Edition) has been updated and revised to reflect the most current needs of psychological health and TBI programs. This edition of the PEG is organized as a series of modules containing content specifically designed for use by program administrators or other staff members tasked with internal program evaluations as part of their duties within Defense Department psychological health and TBI programs. This PEG is designed for those who have limited prior knowledge and experience with the conduct of program evaluation activities.

Purpose and Use of the PEG

This PEG is one part of a collection of trainings, toolkits and support services offered by DCoE to assist personnel at the program level in developing their capabilities to conduct internal program evaluation activities. The PEG is designed for use in coordination with other training materials, such as DCoE's program evaluation and improvement webinar series, references provided in the PEG and webinar series, consultation with experts and other resources that may be available to program personnel.

The modules in this PEG are not intended to serve as a substitute for formal coursework on evaluation methods, statistics or data management. In addition, because the PEG is intended for use by a wide variety of programs, it will not provide specific guidance to programs on best practices for clinical or non-clinical services. Finally, the PEG is not intended as a manual for how evaluators who are external to a program should conduct their activities. However, the information herein will generally be useful in helping program personnel become more familiar with the evaluation process and consequently more effective in responding to external evaluation initiatives.

Analyzing Cost Data

Purpose and Use of this Module

Once data are collected, coded and stored, the program is ready to move to the next step of the evaluation process, Analyzing Data.

This module, Analyzing Cost Data, is one of three PEG modules focused on different aspects of analyzing data. It is specifically designed to assist program personnel with developing the knowledge and skills needed to carry out fundamental cost analysis and business case analysis. This module illustrates ways of measuring costs, conducting core cost calculations, and applying advanced cost analysis techniques based on financial information to support decision making by determining whether outcomes justify the resources needed to operate a program.

Because cost analyses processes will differ across every program, this module provides broadly applicable guidance on procedures used to analyze cost data as part of a program evaluation effort.



Cost Analyses

Cost-effective mission support is a priority for military and civilian health programming. Developing and implementing cost management practices equips program managers and their leadership with the tools needed to make fiscally sound decisions about how to make effective use of limited resources. Analyzing program costs alongside program outcomes helps provide objective measures for stakeholders to use in program planning and produces a strong value proposition by comparing benefits with the costs and risks of operating a program. Cost analyses help program administrators track how budgets are allocated across activities and how well the program is functioning relative to its target goals and operating budget. As detailed below, a variety of cost analysis procedures are available depending upon one's interests, including cost-effectiveness, cost-benefit, return on investment and make versus buy decisions. However, first it is important to understand some of the fundamental components used in cost analysis.

Measuring Costs

Cost refers to the value of resources used to deliver services. Cost metrics should capture the value of all inputs, or resources, used to operate a program. Cost information can be divided into several general resource categories, which may include:

- **Labor:** salaries, wages and benefits paid to employees for time spent performing program activities

- **Contracted services:** the costs for program activities provided by entities outside the program such as external consultants, data warehousing or physician services
- **Travel:** costs associated with staff travel in the performance of program activities, projects, or for education and training
- **Building and facilities:** rental or mortgage payments, building maintenance, and operating costs such as utilities, taxes, insurance and cleaning staff
- **Materials and supplies:** equipment to support program activities such as computers, phones and printers
- **Donated resources:** resources not spent out of the program's budget, but which are a part of the program's costs.

Collecting accurate cost data is at the heart of every useful cost analysis. Instituting a standard repeatable process to gather cost information is highly recommended to track costs consistently across categories, over time and across different program components or locations, as applicable. Steps to quantify program cost information include listing program activities along with resource categories used to support each activity. Assess the data available from existing sources such as time sheets, payroll accounts, bills and contracts. Collect and document the activity costs on a worksheet and calculate average costs per activity. When collecting information for contracted resources, quantify costs using actual expenditures rather than budgeted line items because budgets may not reflect the amount of monies actually spent.

Donated resources are also important to include in cost analyses because they are required to operate a program, are paid for by government funds and are not available for another use. The cost value of donated resources should be estimated as the amount of money the program would have spent for the resource had it not been donated. For example, the cost of a building can be determined by multiplying square footage by the average cost per square foot in a given area. Likewise, the cost of military personnel assigned to a program, whether full- or part-time, can be estimated by multiplying the actual personnel cost (i.e., salary plus benefits), or average salary for that person's rank, by the percent of time he or she is assigned to the program.

Core Cost Calculations

Once cost values have been recorded, it is a straightforward process to compute the overall cost of operating the program. Overall costs can be used to examine spending trends for a program from month-to-month or from year-to-year, and they can be used to forecast funding needs for future years. Provided that a program is tracking key output metrics on participants and program activities, it is also possible to calculate the program's cost per participant, cost per service and cost per outcome.

Cost per participant is a simple calculation of the total costs of operating a program divided by the number of unique program participants who participate during a given time period. This is useful for making basic comparisons for programs that serve similar purposes, such as the cost of operating a traditional office-based behavioral health treatment program versus a web-based behavioral health treatment program. However, it is important to note that such calculations are of limited value unless outcome data are included, because a cheaper program may not be the best option if the outcomes are not equivalent. In addition, these programs may serve different purposes and populations (e.g., active duty versus reserve component). Table 1, below, is an example of a cost-per-participant calculation

based on single-year cost data for Program Sierra, a hypothetical reintegration program. Template A provides a customizable worksheet for calculating cost per participant.

Table 1: Cost Per Participant Worksheet Example

	Intake	Testing	Treatment	Administration	Total
Total Cost	\$32,875	\$61,820	\$365,600	\$71,950	\$532,245
Participants	1,000	1,000	1,000	1,000	1,000
Cost Per Participant	\$32.88	\$61.82	\$365.60	\$71.95	\$532.25

Cost per participant is recorded as the ratio of the total cost values from the cost worksheet divided by the participant count. In this example, the cost to this program for delivering intervention services to 1,000 participants is \$532.25 per participant.

Cost per service can be determined by examining the total costs of providing individual service activities, including the staffing, equipment, and so forth that are required to carry out that specific activity. It can be calculated by carefully pairing different cost categories with the various service activities a program provides. For example, an inpatient behavioral health program may provide a combination of screening, education and intervention services, each of which is associated with different resources. Cost-per-service calculation serves as the foundation for cost effectiveness analyses that allows programs to portray the value of each service they provide. Table 2 below is an example of a cost-per-service calculation. A template to calculate a custom worksheet is provided in Template B.

Table 2: Cost Per Service Worksheet Example

Cost Component	Screening	Education	Intervention	Admin	Total Cost
Labor	\$12,175	\$17,350	\$59,870	\$80,360	\$169,755
Contracted Services	\$1,500	\$52,570	\$12,750	\$4,250	\$71,070
Materials/Supplies	\$1,250	\$15,980	\$4,950	\$23,090	\$45,270
Building/Facility	\$8,325	\$27,000	\$30,000	\$70,000	\$135,325
Donated Resources	\$2,500	\$20,000	\$16,030	\$18,290	\$56,820
Travel	\$2,534	\$2,575	\$2,540	\$3,500	\$11,149
Total Cost	\$28,284	\$135,475	\$126,140	\$199,490	\$489,389

Ideally costs should be listed according to cost component and type of program activity. For example, the worksheet illustrates how the total expenditures on materials and supplies

were allocated across the four key program activities: screening, education, intervention and administration. This provides a simple way for program administrators to compute cost values for each activity and each cost component category.

For Program Sierra, the cost worksheet shows the following:

- This program spent over \$169,000 on labor costs, and almost half of this amount came from administrative costs.
- The largest value of donated resources was allocated to educational activities.
- The most expensive resources were labor and facilities costs, and the most expensive activities were education, intervention and administrative, while the cost of screening was minimal.

These highlighted findings can be used to guide program refinements to ensure that resource allocation is aligned with program objectives and outcomes. Demonstrating fiscal responsibility and accountability is vital to sustainability and future resource allocation.

Cost per outcome is calculated by comparing cost savings due to program outcomes with the costs associated with operating the program. This calculation is used as a measure of effectiveness or impact and to enable program managers to demonstrate the return on investment. For example, a health promotion program could show value by demonstrating reductions in days missed of work due to illness or injury. Similarly, a behavioral health treatment program could show that its services are linked to reduced behavioral incidents and lower likelihood of separation from the military. Doing so can help identify whether or not a program is likely to deliver the intended impact and to forecast how much cost is associated with achieving the intended impact (e.g., reducing the number of lost or limited duty days per medical encounter).

There are many metrics that can be used to inform cost-effective business decisions. Outcome measures demonstrating program effectiveness, mission readiness, and fiscal management are a vital part of sustainability to support those business decisions. The example below demonstrates how quantitative metrics can demonstrate these. The formulas in Table 3 calculate No Lost Time, when an active duty service member receives services while on duty, and Lost Time, when a service member assumes a non-duty status to receive treatment (U.S. Army Center For Health Promotion And Preventive Medicine, 2002). For example, a behavioral health program compares the cost of inpatient versus outpatient care (e.g. \$2,224 and \$24,510).

Table 3: Behavioral Health Program One-month Comparative Cost of No Lost Time and Lost Time

Case	Formula
No Lost Time =	$[(\text{Daily Salary by Rank} \times .33) + \text{Average Clinic Cost}] \times \text{Total \# of Visits}$ <ul style="list-style-type: none"> ▪ Assumes 1/3 day of lost time to complete medical care and associated requirements
Outcome	<ul style="list-style-type: none"> ▪ $[(\\$170 \times .33) + \\$500] \times 4 = \mathbf{\\$2,224 \text{ (Total Cost)}}$
Lost Time =	$(\text{Daily Salary by Rank} \times \text{\# of Lost Days for Rank}) + (\text{Average Clinic Cost} \times \text{\# of Visits}) + (\text{Average Hospital Cost per Day} \times \text{\# of Bed Days})$ <ul style="list-style-type: none"> ▪ If convalescent leave (or days restricted to quarters) is known, then <u>add the qualifier below:</u> Qualifier: $\text{Daily Salary by Rank} \times \text{\# of Convalescent Leave Days}$
Outcome	<ul style="list-style-type: none"> ▪ $(\\$170 \times 3) + (\\$500 \times 6) + (\\$7000 \times 3) = \mathbf{\\$24,510 \text{ (Total Cost)}}$

By using quantitative metrics, the program can demonstrate that the impact of services reduces cost of care, reduces lost time from work, and increases mission readiness. These are vital outcome measures that demonstrate fiscal responsibility, increase the chance of sustainability, and even expansion as they demonstrate the program serves a vital need in the overall military mission.

In a 2013 study by the Armed Forces Health Surveillance Branch (previously known as the Armed Forces Health Surveillance Center) (see Figure 1 below), mental disorders accounted for more hospital bed days than any other morbidity category and for about 45 percent of all hospital bed days overall for active duty service members. Also, mental health ranked second in total medical encounters, first in hospital bed days and second in lost work time among military members during this data collection period. That translates into a significant cost for mental health care for the Defense Department and a less effective operational military force. From a cost perspective, that can mean millions of dollars and hundreds of “lost” Full Time Equivalents (or units of workload for a full-time employed person) if service members cannot maintain their readiness qualifications. This is how military leadership measures the cost of medical cases, including behavioral health, so it is important to build these data points into a program’s metrics for reporting purposes.

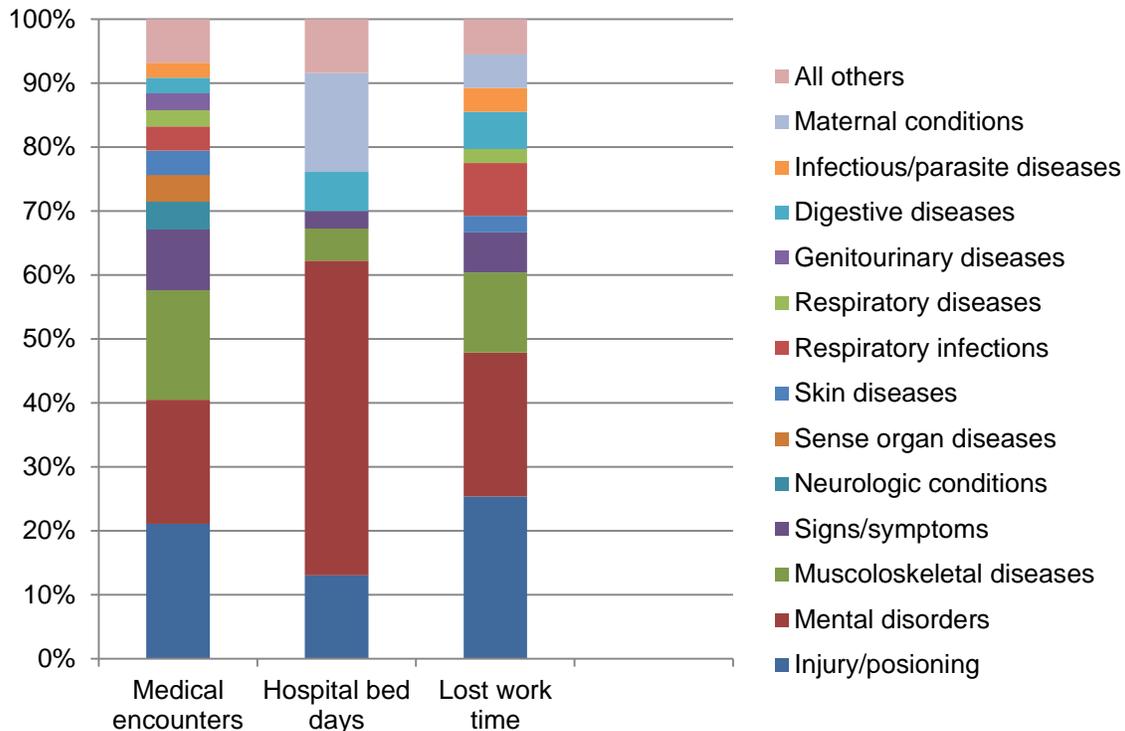


Figure 1. Proportion of Active Duty Medical Encounters by Cause

Adapted from Daniele and Lohr (2014)

There is great value in using quantitative methods to measure costs for programs. Program effectiveness can be demonstrated by measuring cost per participant, cost per service, and cost per outcome. These outcome measures can be incorporated as part of a program's processes and operating procedures on an ongoing basis to increase sustainability and fidelity. Advanced cost analysis techniques can enhance these efforts.

Advanced Cost Analysis Techniques

There are several types of more sophisticated cost analysis techniques, such as the two described below in Table 4. Cost-effectiveness and cost-benefit analysis differ only in how they calculate the outcome measure, and both can be used for making decisions about two or more courses of action (e.g., two treatment alternatives, adding a program service versus keeping the program as-is). For cost-effectiveness analysis, outcome measures are considered in discrete, non-monetary units such as life-years gained or reduction in the number of days a person is depressed. For cost-benefit analysis, the non-monetary units are converted to dollar values to determine the outcome measure used. These techniques may require consultation with a statistician or health economist. Additional information on these techniques is included in the "References" and "Selected Resources for Additional Study" sections at the end of this module (in particular, see the Health Services Research and Development webinar series).

Table 4: Cost-Effectiveness and Cost-Benefit Analysis Techniques

Analysis Technique	Cost Measure	Outcome Measure
Cost-Effectiveness Analysis	Costs of operating program in dollars	Nonmonetary outcome units (e.g., life years gained, increased resilience, reduced depression, increased learning)
Cost-Benefit Analysis	Costs of operating program in dollars	Nonmonetary outcome units are converted into dollar amounts (e.g., dollar value for depression based on costs of missed days of work and reduced productivity)

Cost-effectiveness analysis examines the costs and outcomes of alternative intervention strategies and the tradeoff between health benefits and cost of intervention. Outcomes must be captured using the same metrics on the same scale. Cost-effectiveness analysis summarizes the value of a program into a single measure that reports costs relative to outcomes for two alternatives (e.g., an alternative relative to an existing intervention). As shown in the formula below, a ratio is computed that compares the difference between the cost of the intervention and the cost of the alternative in the numerator divided by the difference between the health outcome of the intervention and the health outcome of the alternative in the denominator so that the extra cost is compared to the extra effectiveness. Cost effectiveness analyses help decision-makers to use available resources to maximize program performance and efficiency.

$$\frac{\text{Cost}_{\text{Alternative}} - \text{Cost}_{\text{Intervention}}}{\text{Outcome}_{\text{Alternative}} - \text{Outcome}_{\text{Intervention}}}$$

Cost-benefit analysis represents the program’s costs and benefits entirely in dollar terms. Cost values must be determined for each identified benefit. This is more complicated to apply to behavioral health care than cost-effectiveness analysis because it requires attaching dollar values to outcomes that are not directly measured in dollars and may not easily be converted to dollar amounts. For example, the cost of depression can be converted into a dollar amount by combining known values for days of work missed, placement on limited or light duty and decreased work productivity. Cost-benefit analysis compares the benefits and other factors objectively (i.e., quantifiable and unbiased) or subjectively (i.e., greater interpretation, opinion-based) of a course of action with associated costs (e.g., expenses, time).

$\frac{\$ \text{ Value of Benefits/Outcomes}}{\$ \text{ Cost}} = \text{Cost-Benefit Ratio}$	Compare ratios to determine the highest dollar value of Benefits/Outcomes for every \$1 in costs
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The following example in Table 5 illustrates how a program can use a cost-benefit analysis to determine if the benefits of retraining the current experienced staff outweigh other alternatives to address solving the problem of not having enough staff to meet target population needs and availability of appointments. In the example below, the information is collected and analyzed to determine the cost-benefit ratio for one option—staff retraining. The same analysis is applied to other alternatives, such as hiring contract staff or maintaining the current staff level, so a well-informed decision can be made based on the relative benefits and costs. To be clear, every situation will have its unique factors, costs, benefits and risks. The cost-benefit analysis process provides flexibility as it provides opportunities to make the best decision for a given set of circumstances.

Table 5: Retraining Staff Example

	Positives	Negatives
Objective	<ul style="list-style-type: none"> ▪ Lighter caseload for staff ▪ Increased access to care for participants ▪ Increased volume of program participants per week can be seen ▪ Improved return-to-duty time 	<ul style="list-style-type: none"> ▪ Increased salary expense ▪ Additional office equipment required ▪ Downtime to train staff/potential scheduling conflicts
Subjective	<ul style="list-style-type: none"> ▪ Increased patient satisfaction ▪ Increased professional training for staff 	<ul style="list-style-type: none"> ▪ Some staff do not support new training ▪ Long-term will have to adapt to new services

For additional information, Russell (2015) provides a detailed discussion of cost-effectiveness analysis and cost-benefit analysis in the science of health decision making. Kallen and Korteling (2013) discuss applying cost-benefit analysis to resilience training to reduce post-deployment strain, psychopathology and associated costs.

Business Case Analysis

Overall, the intended goal of a business case analysis (BCA) is to guide decision making based on costs and likely benefits weighted against risks. Table 6 below illustrates a comparison decision matrix that offers some insights to how funding decisions are being made. The least complex decision is when the costs are unequal but the benefits are equal, thus yielding the least costly alternative, which is shown in the bottom row of the table. The most complex decision is when costs are equal and identified benefits are equal, thus requiring consideration of additional factors in order to make a decision.

Table 6: Alternative Comparison Decision Matrix

Cost Comparison	Benefits Comparison	Selection Criteria
Equal	Unequal	Choose the alternative that provides the greatest benefits for given costs
	Equal	Choose an alternative based on other factors and/or analyses (e.g., ease of use, availability, etc.)
Unequal	Unequal	Choose the top alternative based on ranked order of cost-benefit ratios
	Equal	Choose the alternative that is the least costly

The following discussion describes how general BCA strategies, concepts, tools and techniques can enhance the cost-effective decision-making process.

A BCA is a structured and systematic methodology for analyzing the alternatives involved in a business decision (Morse, n.d.). BCAs may use any number of the cost analysis techniques described above and are tailored to the particular circumstances of the program. It considers processes, resources and feasible alternatives while emphasizing financial consequences of potential decisions. A BCA provides valuable guidance for planning, managing and controlling projects, programs or the life cycle of assets. In addition to the techniques described above, a BCA may also include the techniques described below.

Return on investment (ROI) analysis is commonly used when faced with a choice of where to spend or allocate funds. Organizations have used this term to determine the level of yield on funds which have been spent for goods, services or objects over a set period of time. For example, if \$100 is invested in a fund that after a year has a value of \$110, the ROI is 10 percent. If that fund instead has \$95 at the end of that year, the ROI is negative five percent. A ROI figure says nothing about uncertainty or risk; it simply calculates an expected or actual financial return. Though ROI analyses have a number of strengths, their potential weaknesses should also be considered when evaluating the effectiveness of health promotion and disease prevention programs (Cavallo, 2006).

Make versus buy analysis is commonly used when organizations consider expanding their suite of offered services. Often, program managers are faced with cost-based decisions to determine if there is a financial advantage to develop the capability to provide a service or product internally versus purchase a product or service from an external source. Two commonly used formulas are cost to buy and cost to make. The less-costly solution is selected and the higher-cost solution is discarded.

For example, Program Sierra is exploring hiring a new team of staff to provide a family counseling service “in-house” that is currently being referred to community-based providers. The example in Table 7 below illustrates the data points (both cost and non-cost factors) that need to be assessed and compared before making any recommendations.

Table 7. Make vs. Buy Case Example

Cost to Make = In-House	Cost to Buy = Community-Based Providers
<ul style="list-style-type: none"> ▪ Cost of hiring/maintaining staff ▪ Cost of new equipment ▪ Training and preparation ▪ Additional space ▪ Volume of program participants 	<ul style="list-style-type: none"> ▪ Cost of screening patients ▪ Direct costs for treatment ▪ Costs to follow up with patients ▪ Records management and communication with external providers

During the data collection phase of the BCA, use the most recent data available and a standardized, collaborative approach in order to gather and analyze the data effectively. To save time and money, use existing program documents whenever possible. Useful information that may be available to the program can include previous BCAs, budget and expenditure documents, business plans, contract proposals, summaries of program outputs and outcomes, risks and assumptions, policies and procedural documents.

For example, Table 8 below illustrates BCA considerations to address solving the problem of not having enough staff to meet target population needs and availability of appointments. Program Sierra desires to increase staff retention, improve staff morale and enhance provided services in a cost-effective manner. The program manager has identified three potentially viable courses of action to be evaluated from a cost-effective perspective: retrain current staff, hire contract staff and maintain current staff level.

Table 8: BCA Example

BCA Alternatives	Actions Required	Positives	Negatives
Retrain Current Staff	<ul style="list-style-type: none"> ▪ Adjust operating hours/ appointment times ▪ Stagger staff work hours 	<ul style="list-style-type: none"> ▪ Increase productivity ▪ Improve morale ▪ Maintain experienced staff 	<ul style="list-style-type: none"> ▪ Extended hours may increase operation cost ▪ Alternate hours of operation may affect participation ▪ Alternate work hours may impact staff
Hire Contract Staff	<ul style="list-style-type: none"> ▪ Partner with external agencies ▪ Hire full-time staff 	<ul style="list-style-type: none"> ▪ Reduce cost with contract staff (no benefits) ▪ Increase service base through community partners 	<ul style="list-style-type: none"> ▪ Increased cost of contract staff training ▪ Increased cost of full-time staff hired
Maintain Current Staff Level	<ul style="list-style-type: none"> ▪ Refer to community-based providers ▪ Maintain current lead time for appointments ▪ Maintain current retention rates 	<ul style="list-style-type: none"> ▪ Maintain experienced staff ▪ No additional staff cost ▪ No additional operating funds needed 	<ul style="list-style-type: none"> ▪ Loss of revenue for referred clients ▪ Clients will self-refer if wait times are excessive ▪ Decreased client and staff satisfaction

Criteria for success, or desired outcomes, for a BCA should be defined at the outset, as success may be interpreted differently depending on staff and stakeholders perspectives and priorities. Important criteria for a successful BCA include but are not limited to:

- **Credibility:** The business case, or the justification for a proposed undertaking on the basis of its expected commercial benefits, is believed.
- **Practical Value:** The BCA assists program managers and decision-makers with optimization of program effectiveness and efficiency, while providing clear guidance on the relative merits of two or more potential courses of action.
- **Accuracy:** It predicts what actually happens.

Think of conducting the BCA as a cycle with three parts: inputs, process and outputs. Create an outline to give the BCA a framework:

- **Inputs**
 - An executive summary is typically one to two pages and states the problem being addressed, stakeholders, methods, constraints, and a high level summary of the results.
 - An introduction and background section provide context including any documents used and previous analyses completed.
- **Process**
 - Methods and procedures describe the analysis tools used and why they were chosen.
 - Impacts, benefits, sensitivities, risks and contingencies provide the context for analysis.
- **Outputs**
 - Conclusions and recommendations are based on the results of each BCA.

As Joseph “Colt” Murphy (2012), a senior financial analyst in the Office of the Secretary of Defense, stated, “Good decisions are those that when taken on the whole and over an extended period produce better results than decisions made in an uninformed manner or using ‘gut feelings.’” Building credibility means clearly articulating and explaining why the BCA is being conducted and the methods and analysis techniques are being used.

Conclusion

At the conclusion of this module, Analyzing Cost Data, program personnel should have gained an understanding of how to measure costs associated with a program, how cost analyses are conducted, and how business case analyses are constructed to inform decision making. Using these methods as part of operations and evaluation efforts can increase accountability and sustainability, as well as demonstrate fiscal responsibility of available resources and demonstrate need for additional funding resources.

Key Takeaways

- Cost analysis and business case analysis support program leadership efforts in achieving organizational requirements for cost-effective mission support
- Analyses of program costs can inform program improvement decisions
- Building a business case analysis can give program managers data to make informed recommendations and increases the likelihood of adopting that course of action
- Leaders at all levels should analyze their costs and implement strategies to lower overall expenditures and increase efficiency

References

- Cavallo, D. (November 2006). Using Return on Investment Analysis to Evaluate Health Promotion Programs: Challenges and Opportunities. *RTI-UNC Center of Excellence Health Promotion Economics*, 1(3). Retrieved from: http://www.rti.org/sites/default/files/resources/issuebrief_3.pdf
- Daniele, D., & Lohr, E. (April 2014). Absolute and Relative Morbidity Burdens Attributable to Various Illnesses and Injuries, U.S. Armed Forces, 2013. *Medical Surveillance Monthly Report (MSMR): Annual Summary Issue*, 21(4), 3. Armed Forces Health Surveillance Center. Retrieved from: https://www.afhsc.mil/documents/pubs/msmrs/2014/v21_n04.pdf
- Kallen, V.L., & Korteling, J.E. (2013). Cost-Benefit Analysis of Military Training, North Atlantic Treaty Organization RTO-MP-SAS-095, 12.1-12.8. Retrieved from: <https://www.sto.nato.int/publications/pages/results.aspx?k=Cost-Benefit%20Analysis%20of%20Military%20Training&s=Search%20All%20STO%20Reports>
- Morse, E. Business Case Analysis (BCA). PowerPoint slides. Weapon Systems Support Directorate, Office of the Assistant Secretary of the Army, Acquisition, Logistics, and Technology. Retrieved from: https://www.google.com/?gws_rd=ssl#q=Business+Case+Analysis+Morse
- Murphy, J. (March-April 2012). Attributes of an Effective Product Support Business Case Analysis. *Defense AT&L: Product Support Issue*, XLI (2), DAU 225. Retrieved from: http://www.dau.mil/publications/DefenseATL/DATLArchivecompletepdf/DATL_Mar-April_2012.pdf
- Russell, L. (July 2015). The Science of Making Better Decisions About Health: Cost-Effectiveness and Cost-Benefit Analysis. *Population Health: Behavioral and Social Science Insights*. AHRQ Publication No.15-0002. Rockville, MD: Agency for Healthcare Research and Quality and Office of Behavioral and Social Sciences Research, National Institutes of Health. Retrieved from: <http://www.ahrq.gov/professionals/education/curriculum-tools/population-health/russell.html>
- U.S. Army Center for Health Promotion and Preventive Medicine. (November 2002). DoD Military Injury Metrics Working Group White Paper. ADA596043. Retrieved from: <http://www.denix.osd.mil/ergoworkinggroup/metrics/>

Selected Resources for Additional Study

- Administration for Children and Families, Office of Planning, Research and Evaluation (2010). *The program manager's guide to evaluation* (2nd ed.). Retrieved from: <http://www.acf.hhs.gov/programs/opre/resource/the-program-managers-guide-to-evaluation-second-edition>
- Agency for Healthcare Research and Quality: <http://www.qualitymeasures.ahrq.gov>
- American Evaluation Association: <http://www.eval.org/>
- Balakrishnan, J., & Chun, H. C. (2005). The Theory of Constraints and the Make-or-Buy Decision: An Update and Review. *Journal of Supply Chain Management: A Global Review of Purchasing & Supply*, 41 (1), 40–47.

- Centers for Disease Control and Prevention (2011). *Introduction to program evaluation for public health programs: A self-study guide*. Retrieved from: <http://www.cdc.gov/eval/guide/>
- DCoE Program Evaluation: http://www.dcoe.mil/About_DCoE/Program_Evaluation/Resources_and_Training.aspx
- Defense and Veterans Brain Injury Center: <http://dvbic.dcoe.mil/>
- Deployment Health Clinical Center: <http://www.pdhealth.mil/>
- Gold, M.R., Siegel, J.E., Russel, L.B., & Weinstein, M.C. (Eds). (1996). *Cost-effectiveness in health and medicine*. Oxford, UK: Oxford University Press.
- Taylor, Nicole. (April 1, 2016). SWOT analysis: What It Is and When to Use It. *Business News Daily*. Retrieved from: <http://www.businessnewsdaily.com/4245-swot-analysis.html>
- Hasson, H. (2010). Systematic evaluation of implementation fidelity of complex interventions in health and social care. *Implementation Science*, 5, 1-9. Retrieved from: <http://www.implementationscience.com/content/5/1/67>
- Minnesota Department of Health, Quality Improvement Toolbox: <http://www.health.state.mn.us/divs/opi/qi/toolbox/>
- National Institutes of Health Toolbox: <http://www.nihtoolbox.org/>
- Schmidt, M.J. (2002). *The business case guide* (2nd ed.). Boston, MA: Solution Matrix. Retrieved from: <https://www.business-case-analysis.com/business-case.html>
- U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (2006). *Guide to analyzing the cost-effectiveness of community public health prevention approaches* (Project No. 0208827). Retrieved from <http://aspe.hhs.gov/health/reports/06/cphpa/report.pdf>
- University of Kansas, Community Toolbox: <http://ctb.ku.edu/en>
- Yates, B. (1999). *Measuring and improving cost, cost-effectiveness, and cost-benefit for substance abuse treatment programs: A manual*. Bethesda, MD: National Institute on Drug Abuse. Retrieved from: <http://archives.drugabuse.gov/IMPCOST/IMPCOSTIndex.html>

Template A. Cost Per Participant Template

Use the template to customize a worksheet for calculating cost per participant.

	Intake	Testing	Treatment	Administration	Total
Total Cost					
Participants					
Cost Per Participant					

Template B. Cost Per Service Template

Use the template to customize a worksheet for calculating cost per service.

Cost Component	Screening	Education	Intervention	Oversight/ Administration	Total Cost	Average Cost
Labor						
Contracted Services						
Materials and Supplies						
Building/ Facility						
Donated Resources						
Travel						
Total Cost						