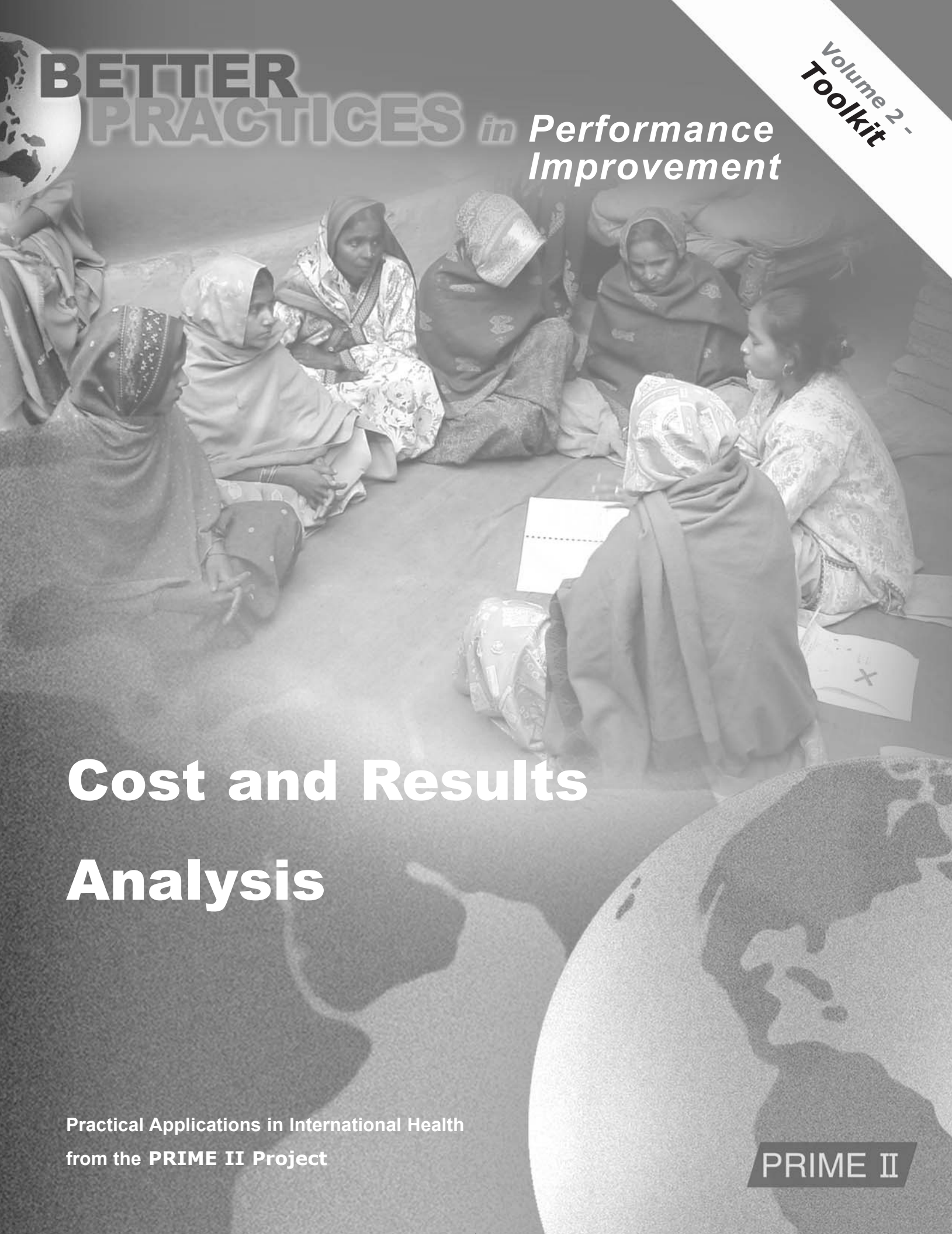

BETTER PRACTICES in Performance Improvement

Volume 2 - Toolkit

Cost and Results Analysis

Practical Applications in International Health
from the **PRIME II Project**

PRIME II

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Introduction

The PRIME II Project uses a Performance Improvement (PI) approach to design cost-effective interventions that enhance the work of primary providers of family planning and reproductive health (FP/RH) services. *Cost and Results Analysis and Performance Improvement Volume 1—Strategy* (hereafter referred to as the *Strategy*) outlined the strategic importance of PI and the need and some basic approaches for incorporating more consideration of costs into PI applications. The *Strategy* postulated that additional tools and more objective cost and results analyses of program and policy options would be needed as PRIME II considers a broader range of non-training and training interventions to improve provider performance. This *Toolkit* offers these tools and analyses.

The Cost and Results Analysis (CRA) tools presented here complement the *Strategy* and provide guidance to PRIME II staff, counterparts and others engaged in PI applications. The tools will also be useful for other purposes involving costing or CRA, such as budget planning or an end-of-project evaluation. They can help decision-makers and stakeholders obtain improved cost and CRA information to aid in selecting among priority policy or programmatic interventions.

The CRA tools may be applied in analyzing a wide variety of clinical and non-clinical FP/RH program and policy options. Collectively, they comprise a systematic approach for conducting a CRA. The degree of detail presented in individual tools assumes a more rigorous process of planning, data collection and analysis than may always be relevant or feasible for groups of stakeholders. Users should view this toolkit as a source of general guidance for better quantifying and understanding decision-making options.

To draw on a cooking analogy, the *Toolkit* is more a menu of options than a recipe. Users should choose and adapt the contents to best fit their particular circumstances. PRIME II is seeking to expand CRA as needed to yield more objective and possibly more useful information for stakeholders. In fact, PRIME II continuously seeks to find ways to streamline PI and make the process more "user-friendly." An example of this is the ongoing effort to glean guidance for a "Rapid PNA" approach from PI lessons learned over nearly 30 applications in PRIME. That same perspective will be applied to this *Toolkit* and for this reason users are encouraged to provide feedback on the document, as well as on experiences applying principles and tools in the *Toolkit*.

A variety of useful tools have already been developed and tested in the field of Cost and Results Analysis. This toolkit draws upon the work of USAID cooperating agencies, including PRIME II partners Abt Associates and EngenderHealth, Management Sciences for Health, the World Health Organization and others.

Organized into chapters, the tools consist of questions, checklists and sample spreadsheets to assist PI practitioners (and others interested in evaluation and decision support) in a step-by-step process:

Chapter 1 -
Purpose/objective decision tool

Chapter 2 -
Financial information self-assessment tool

Chapter 3 -
Resources available to conduct a Cost and Results Analysis as a step within Performance Improvement

Chapter 4 -
Scope of the Cost and Results Analysis

Chapter 5 -
Plan for conducting the Cost and Results Analysis

Chapter 6 -
Data collection instruments for Cost and Results Analysis data

Chapter 7 -
Spreadsheets for data analysis

Chapter 8 -
Formats for results reporting

In a typical PI intervention, the CRA may have to be prospective and implemented in an abbreviated manner, based on anticipated or estimated costs from a budgeting exercise for potential future activities. The basic cost elements such as personnel, transportation and per diem, materials, communications, administration and overhead may already have been established for other, similar activities that have verifiable costs. The *Strategy* described the *ingredients*, *adaptation* and *mark-up* approaches for

estimating future costs (WHO,1990). These are presented in more detail in Chapter 6, "Data collection instruments for Cost and Results Analysis data."

The tools presented here are included on an accompanying CD to facilitate their adaptation and use.

Two case studies, representative of PRIME II's work, are also provided to illustrate application of techniques presented in the CRA chapters.

Purpose/objective decision tool

Questions

The starting point for any Cost and Results Analysis has to be clear identification of the purpose or objective that can be translated into specific, measurable terms or indicators. This knowledge then helps to define the cost and results data that will be needed. Working through the following questions can help ensure this essential step is successfully completed.

What is the purpose or objective of the Cost and Results Analysis exercise?

- To make or support a policy decision?
- To change the way a clinical service is delivered or an activity such as training or supervision is organized and implemented? If so, which service or activity and how?
- To introduce or expand cost recovery?
  - If so, is there a target for the amount or percentage of cost to be recovered?
  - What has been the past experience with cost recovery?
  - Are there any recent, relevant studies of household income and expenditure patterns, particularly for health services?
- To reduce costs and/or improve efficiency of the activity or service (maintain or expand results without increasing unit cost)?
  - If so, what were the specific objectives or targets and are data available on the gap between actual and desired performance (e.g., from a Performance Needs Assessment)?
- Other

What is the geographic size and scope of the work?

- How many regions, districts, facilities, etc. are involved or affected?
- How many cadres of providers or types of services are involved or affected?
- What is the potential target area, service population, and number of providers for the service or activity?
- Should alternatives be considered for financial reasons, demonstration purposes or due to other factors?

What information is presently available?[1]

- What specific financial and program (e.g., service delivery, training, supervision) reports and information are available and where is this information located?
- How complete and timely are the reports?
- Does the available information seem adequate to support the purpose or objective of the study or exercise?

Forms 1.a-c provide formats for documenting the answers to the questions in this chapter.

[1] Chapter 2 addresses these questions in more detail. They are listed here for an initial overview.

Form 1

Instruments for purpose and objective analysis

Form 1.a – Purpose/objective decision tool		
Activity		
Person(s) completing form (names/titles)		
Date of completion		
X (if applies)	**Purpose/objective**	**Description**
	Support a policy decision	
	Modify clinical service delivery or training	
	Introduce or expand cost recovery	
	Reduce costs or improve efficiency of an activity	
	Other	

Form 1.b - Geographic size and scope of analysis	
Activity	
Person(s) completing form (names/titles)	
Date of completion	
Category	Description
Number and names of regions, districts, facilities, etc. involved or affected	Regions: Districts: Facilities: Other (specify):
Types and number of cadres and services involved or affected	Cadres: Services/activities:
Potential target area, service population, and number of providers for the service or activity	Target area: Service population: Number of providers by type:
Alternatives that may be considered for financial, demonstration, or other reason	
Other	

Form 1.c - Availability of financial and program information				
Activity				
Person(s) completing form (names/titles)				
Date of completion				
Category	Reports and information available	Completeness and timeliness	Adequacy for purpose/objective	Comments
Service delivery				
Training				
Supervision				
Financial (See also Forms 1a-c)				
Other				

Financial information self-assessment tool

Questions

Availability, completeness, accuracy and reliability of financial information must all be determined in considering whether and how to conduct a cost or Cost and Results Analysis. Considering the following questions will help in this process.

Budget information

- Does the facility/provider/training program/other have a budget?
- Can copies of the current budget and at least one previous year's budget be obtained?
- If so, for what period(s) is the information available? Do these periods for which budgets are available correspond to the ones that are needed?
- Is it possible to determine the accuracy (and other measures of utility) of the information?
  - Have there been any significant changes to the budgeting process or other financial procedures that should be considered and might affect the analysis? If so, assess their potential impact.
  - Are there economic or other environmental factors that may affect the analysis and should be considered? If so, how may they affect the analysis?

Expenses or costs[2]

- Does the facility/provider/training program/other maintain records of actual expenses?
  - If yes, what period(s) do they cover (monthly, quarterly, semi-annual, annual)?
  - Where are the records located and who is the contact person?
  - Are the records up-to-date and otherwise complete? If not, what are the specific limitations?

Revenue/income

- How much of the budgeted funds have been received for the current activity? For the current period?
- What are the sources of funding for the facility/provider/training program/other?
  - Does the information available by source account for 100% of the budget?
  - How much of the revenue or budgeted funds is received from donor sources?
  - Do the funding cycles of the sources correspond with the anticipated period to be covered by the cost or CRA?
- Does the facility/provider/training program/other charge fees for its services?
  - If so, is the fee schedule published or otherwise publicly available? (If so, obtain a copy.)
  - Have the fees been periodically updated? When were they last updated?
  - What is the relation of fees to costs?
  - How are the fee amounts determined?
  - How much revenue was generated from fees in the last reporting period? Are there trends that can be noted?
  - How is the revenue generated from fees used?
- For service delivery, is means testing applied to determine client ability to pay?
  - Who is charged fees?
  - How much are persons paying fees charged?
  - Are fees uniformly applied?
- Do fees and practices related to fees vary across facilities?

[2] It may be important to consider both expenses, which involve actual payments by the facility or other unit, as well as costs, which may be financially subsidized by another entity such as the central ministry or a donor organization, or made as an in-kind contribution of equipment, supplies or labor. The distinction here is identifying the actual costs to the facility or other unit as compared with the total costs. Another way of looking at it is to identify the costs over which the facility or other unit of analysis has control.

Client costs other than user fees paid (for service delivery)

Service utilization patterns, client satisfaction and health outcomes may be affected by a variety of cost factors besides user fees. Patients or clients may have to pay transportation costs, informal fees to providers and other health facility staff in order to be treated or receive faster treatment, fees for purchasing medications and supplies, and possibly other costs associated with seeking health services. These non-user fee costs, or economic costs, are important to consider when assessing the cost of health services to clients.

- Are data available and should they be collected on client transportation costs?
- Do clients have to pay other costs (such as food, outside drugs and supplies associated with the visit)? If so, what are these costs?

Table 1 illustrates sources and data collection techniques for a costing study of district-level maternal health services. The table is adapted from a three-country study done by the Partnerships for Health Reform (PHR) Project in Africa.

Table 1 shows how various approaches are used to collect different types of data. Using labor as an example, the purpose of data collection is to determine the amount of time providers devote to maternal health services. In the PHR study, maternal health services were defined as prenatal care, vaginal delivery, cesarean section, postabortion complication, postpartum hemorrhage and eclampsia. Data collectors used the technique of "randomized intermittent instantaneous observation" to assess the amount of time devoted to the selected services. This observation method is believed to yield more accurate results than provider interviews or recall. When activities cannot be readily observed because they occur sporadically, for example—obstetrical emergencies—recall data may be used to estimate time cost (Levin, Dmytraczenko, McEuen, 1999).

Measuring costs to clients can be accomplished through methods similar to those used to assess client satisfaction. These methods include client exit interviews and, when more confidentiality is required, visits to a sample of patients at home.

Forms 2.a-c provide formats for documenting the answers to the questions in this chapter.

Table 1

Approaches to data collection

Data sources		
	Data collection technique	**Number of providers**
Cost component		
Labor	Randomized intermittent instantaneous observation	10 facilities
	Provider interviews	10 facilities & 73 community practitioners
Salaries and benefits	Record review	10 facilities
Drugs and supplies (materials)	Provider interviews	10 facilities & 47 private midwives
Maternal health service utilization	Service record review	10 facilities
	Provider interviews	40 TBAs and 47 private midwives
Maintenance and utility costs	Record review	10 facilities
Supervisory costs	Interviews with supervisors	10 facilities
Measures of service quality		
Availability of equipment & supplies	Facility walk-through	10 facilities & 47 private midwives
Treatment protocols	Intervention observation	10 facilities
Client satisfaction	Client exit interviews	10 facilities

Source: Partnerships for Health Reform Project

Form 2

Instruments for financial information sources

Form 2.a – Budget information	
Activity	
Person(s) completing form (names/titles)	
Date of completion	
Category	**Description**
Facility/provider/training/ other activity budget available	Yes/No, brief description, copies available? Sources, already obtained?
Detail on budget type(s) and period(s) covered	
Significant changes to budgeting process or other financial procedures and their potential effects (for example, from decentralization)	
Economic or other environmental factors to be considered and their potential effects (For example, changes in exchange rates)	
Other	

Form 2.b - Expense and cost information				
Activity				
Person(s) completing form (names/titles)				
Date of completion				
Expense/cost records maintained by the facility/provider/training program/other (list records)	Period(s) covered	Reports/records up-to-date and complete	Describe any limitations of reports/records	Comments
1.				
2.				
3.				
4.				
5.				
6.				

Form 2.c – Revenue / income	
Activity	
Person(s) completing form (names/titles)	
Date of completion	
Category	**Description**
How much of budgeted funds have been received for the current activity and/or period?	Has funding been received as expected? On schedule?
Sources of funding, total amounts by source and purposes/uses/ restrictions if available (list)	
Does facility/provider/ training program/other charge fees for its services?	Yes/No If yes, published or publicly available? Have fees been periodically updated? When last? How are fees determined? What is relation of fees to costs? How much revenue is generated from fees? How is revenue from fees used?
Is means testing done to determine client ability to pay?	Yes/No If yes, who is charged fees and how much, for which services? Are fees uniformly applied?

Resources available to conduct a Cost and Results Analysis as a step within Performance Improvement

Questions

Does the activity/country program/etc., have personnel, funding and logistical support for a CRA that includes office and/or fieldwork for planning, data collection, analysis and reporting? If so, specify:

- Personnel
  - What PRIME II regional/country/HQ staff or consultants are available to assist?
  - Who is responsible for recording and tracking expenses in the counterpart organization or activity?
    - Where is s/he based?
    - Is s/he available/willing/permitted to assist in a CRA?
    - How capable do you believe the person is in carrying out her/his functions to assist with the CRA?
- Funding
  - What funding is available and from what sources? Give as much detail as possible.
- Logistical support
  - Cost-sharing and in-kind support (e.g., staff time, transportation, office space, computer and communications) can all contribute to making a costing or CRA feasible by reducing financial requirements. These factors can also make carrying out the exercise more complex and challenging to manage. How much will collaboration and cost-sharing contribute to the complexity of the CRA in this case? (What is the benefit of collaboration?)

How much time can be allocated for a cost-effective analysis?

- Are there internal or external deadlines that apply?

Form 3 provides a format for documenting the answers to these questions.

Form 3

Availability of resources for conducting a Cost and Results Analysis

Availability of resources for conducting a Cost and Results Analysis	
Activity	
Person(s) completing form (names/titles)	
Date of completion	
Resource category	**Description/comments**
Personnel	List number (names, if possible), type, organizational affiliation and location of personnel available to assist with the CRA. Indicate percentage of time or number of days available. What are the capacities and who will take the lead?
Funding	What funding is available (potential sources and amounts) to support a CRA?
Logistical support	Cost-sharing and in-kind support (e.g., transportation, office space, computer and communications support)

Scope of the Cost and Results Analysis

Questions/discussion

Based on the findings from the first three sections, determine the scope of the costing or CRA to be done, taking into account:

- The costing/CRA purpose and objectives
- Availability of financial and [anticipated] results information
- Resources available for costing/CRA

As noted in the *Strategy*, options for the scope of the CRA component of a PI application can extend along a wide continuum.

Determining the scope of a CRA tends to be situation-specific, but a general rule of thumb is to fit the scope of the CRA to the overall context. Some of the key decisions to be made and steps to be taken are to:

- Determine the scope of the CRA
- Decide on the time period
- Select a sample
- Prepare a workplan

As explained in the *Strategy*, costs may be classified by inputs or by functions. A useful way to clarify what you are intending to cost is to examine the activities and sub-activities included in each function, deciding which ones need to be included in the costing.

Form 4 provides a format for documenting this information.

Form 4

Instruments on scope of the Cost and Results Analysis

Scope of the Cost and Results Analysis	
Activity	
Person(s) completing form (names/titles)	
Date of completion	
Function	**Activities/sub-activities to be costed (list)**
Service delivery	
Training	
Supervision	
Management	
Monitoring and evaluation	
Logistics/transport	

Adapted from Cost Analysis in Primary Health Care: A Training Manual for Program Managers, WHO, 1990.

Plan for conducting the Cost and Results Analysis

Discussion

Including the preparatory steps covered in Chapter 3, here is a list of the major steps that comprise a workplan for a CRA.

- Set the scope of the CRA

In general it is good to be as comprehensive as possible in terms of inputs, functions, levels and sources of funds or revenue. Decisions on excluding certain functions or activities can be made during the process and after review of initial information. The defined focus of the analysis may also help to determine which elements might be excluded.

- Decide on the time period

A full year is the usual period for a study, since this helps avoid seasonal distortions. The most recent year with adequate data should be chosen. If a CRA or cost-effectiveness analysis (CEA) is being done, it is important that the cost and results data cover the same period. Limitations on availability or quality of results data could compromise a CRA or cost-effectiveness study even if adequate cost data are available. If the financial year is not the same as the calendar year, it may be necessary to see if disaggregated data are available so that calculations can be made for the same period. Where possible, it may be desirable to analyze costs and results, or anticipated results, for more than one year to obtain a better perspective of the longer-term pattern.

- Select a sample

Sampling involves using a set of techniques to extrapolate from a small number of measurements or data to a larger group or population. Among the types of samples are *random, systematic, cluster* and *stratified*. Each has advantages and disadvantages in terms of expertise required, time and cost, accuracy in representing the entire population from which the sample is drawn, and other specific features.

In certain situations where there are cost or feasibility barriers to other sampling techniques a less scientific technique, known as *judgment* sampling, may be used. This sampling technique involves selecting a reasonably typical study sample from the larger population using one's best judgment. The approach is not ideal, but may produce reasonably reliable data.

Table 2 describes the alternative sampling methods and their advantages and disadvantages, and also suggests some examples where the methods might be applied.

- Prepare a workplan

The workplan should detail each step of the activities, sub-activities, dates and persons responsible. The workplan should take into account the information from Form 4, as well as the information from other preceding chapters, in order to avoid excluding steps.

- Prepare or adapt instruments (checklists, spreadsheets, interview forms, etc.)

The checklists, spreadsheets and interview forms included or referenced here are all available to be used or adapted. These examples are not exhaustive. Readers are encouraged to evaluate other publicly available tools such as CAT, CORE, the *Mother-Baby Package Costing Spreadsheet*, and *Cost analysis in primary health care: A training manual for programme managers.*[3] Readers may also want to consider developing simple customized tools using Excel or Lotus spreadsheets. These tools and their accompanying guides contain much information that will be helpful in developing customized applications.

[3] CAT is a facility-level service delivery costing tool developed by PRIME II partner EngenderHealth. CAT consists of a series of spreadsheets that compile direct costs of service delivery. CORE (Cost and Revenue Analysis Tool) is a spreadsheet-based tool developed by Management Sciences for Health for analyzing the costs of and revenues from family planning services. The *Mother-Baby Package Costing Spreadsheet* and *Cost analysis in primary health care: A training manual for programme managers* are spreadsheet-based publications of the World Health Organization designed to assist policymakers and program managers in analyzing program costs. Another such WHO publication is *Estimating costs for cost-effectiveness analysis: Guidelines for managers of diarrhoeal diseases control programs.*

Table 2

Common sampling methods			
Method	Steps/description	Advantages	Disadvantages
Random sampling	1. List and number all elements of the study population (assumes no subgroups of particular interest—e.g., health centers in a district) 2. Determine sample size (for statistical significance) 3. Select required number of units by using a table of random numbers from a numbered list	Reliable and statistically significant	Not feasible unless you can list and number all elements or units of the entire population
Systematic sampling	Similar to, but simpler than random sampling Appropriate with larger numbers in population (e.g., patients attending a hospital) 1. Obtain a list of all units from which the sample is to be selected ("n") 2. Decide on the size of the sample ("s") 3. Calculate the ration of sample size to population (s/n)=k, so select every "k^{th}" item on the list, starting at any point in the list	Easier than random sampling when there are large numbers in the population Reliable and statistically significant	Not feasible unless you can list and number all elements or units of the entire population
Cluster sampling	Similar to, but simpler than random (or stratified) sampling Example: to study health center costs of an FP/RH service country-wide 1. Randomly select a sample (cluster) of districts and examine the costs only in those districts 2. Either select all the units (health centers) in the cluster or a random sample of them	Logistically easier and less costly than pure random sampling	Less valid results than pure random sampling
Stratified sampling	Used when you want to examine units with particular characteristics (e.g., rural or urban) for comparison later 1. Divide total population (e.g., health centers) into subgroups (rural and urban) 2. Do random, systematic or clustered sampling in each subgroup	Enables examination and comparison of subgroups with particular characteristics	Requires additional steps and possibly additional costs
Judgment sampling	Use your best judgment to select a reasonably typical group of units for study due to barriers to statistical sampling methods	Less formal and more practical; easier to do	Less ability to generalize for entire population

Adapted from Creese and Parker, WHO, 1990.

Although some of PRIME II's work involves costing or scaling up service delivery (e.g., postabortion care or family planning services), the focus is often on training or non-training interventions such as alternative training or supervision models to improve provider performance. These factors must be considered in determining which instruments to use or adapt and how to develop or adapt them.

The same basic inputs and cost elements (i.e., labor and labor-related costs, supplies and equipment, facilities and utilities, transport and so forth) will apply in a variety of situations, whether the focus is service delivery, training, supervision, consumer/community involvement or other topics within PRIME II's technical leadership areas. To the extent that some inputs or elements will not apply, it may be possible to simply leave entries for those elements blank when completing forms or spreadsheets. Labels can be changed relatively easily. A key consideration is to be clear and consistent about definitions of terms for cost elements in the instruments using commonly accepted definitions. These definitions need to be part of the training of data collectors if data collection personnel are needed beyond the core team.

- Locate information sources (at multiple levels)

Existing expenditure records are often incomplete and outdated. It may be necessary to assemble data from a variety of sources, supplemented by interviews with selected key stakeholders to obtain adequate, relatively complete expenditure data. Although expenditures may be estimated from budgets, actual expenditure figures are much preferred due to the variances between budgets and expenditures. (For more discussion see Box 1, "Reasons for Budget and Expense/Result Variances," in the *Strategy*).

Sources may include expenditure reports for health facilities, training institutions, regional or district health administrations, central ministry offices or other entities. Details of personnel costs, including salaries and benefits, for public sector employees may be obtained from the ministry of health (MOH), or even from the ministry of labor or civil service. Identifying particular individuals and their earnings may be more complicated and sensitive. Important factors to keep in mind are to be as inclusive as possible of the salary, allowances and other personnel costs such as pensions, and to be sure to confirm whether figures given are gross or net amounts (i.e., before or after deductions).

Another consideration (also mentioned in the *Strategy* in the glossary of costing and health finance terms) is the Pareto Rule. This rule of thumb, also known as the 80/20 rule, suggests that costing efforts should focus on the functions or cost elements that have the most impact on resource use. Following this rule will inform decisions on how much time and effort to devote to locating cost data sources.

- Identify and train data collectors and collect the data (both costs and results, if applicable)

The scope of the CRA, both in terms of geographic area to be covered and sample size, will help determine the number of data collectors needed. Generally it is preferable to utilize local personnel who have relevant experience with similar data collection efforts. Data collectors may include personnel from counterpart institutions such as the MOH, or from research institutions such as universities or specialized institutes. A useful idea may be to hire a local coordinator to recruit and train the data collectors and supervise the data collection and analysis.

Whenever possible, involve the local coordinator and/or data collectors in reviewing and pre-testing the data collection instruments. Their familiarity with local practices and terms can aid in revision of the instruments to maximize the quality and quantity of data collected. Their involvement in review and pre-testing will also increase their knowledge of the instruments and "buy-in" to collecting the desired data. Their familiarity with local languages can facilitate communication with stakeholders, including local leaders, when certain data may be needed; for example, reasons for service utilization or household expenditure patterns.

Training of data collectors should include at least the following:

- Overview/context of the activity
- Background and purpose of the cost/CRA
- Review and discussion of instruments
- Review of logistics plans (schedule, assignments, transportation, per diem, supplies, copies of instruments, instructions, etc.)

- Discussion
- Wrap-up and closure

The order of data collection is generally to start at the central level and then proceed to the regional, district and facility levels. This order is useful both in terms of protocol (obtaining stakeholder agreement at higher levels before proceeding to lower levels) and in identifying how to organize and focus data collection efforts at each level.

- Compile, clean and analyze the data

Once the cost data are collected, they must be compiled, compared, cleaned and combined to assess the gross results of the data collection. This process should include a determination of the completeness, adequacy and quality of the data and presentation of the data in summary format to permit analysis. If gaps are identified, it may be necessary to conduct supplemental data collection or to make decisions about whether to retain a particular cost element. It is common to face such challenges in conducting a CRA and a guiding principle should be to have data collection methods be as comparable and transparent as possible.

- Prepare results for presentation; write narrative report

Cost and Results Analysis will convert the cost and program/activity data into unit costs and compare any alternative activities, service delivery approaches or other interventions. The discussion in the narrative report should include qualitative as well as quantitative factors.[4]

Checklists 1-3 provide formats for documenting the information discussed in this chapter.

[4] One of the points made relative to the CBA methodology developed and used in the PRIME Project is that it includes ratings of qualitative as well as quantitative factors. The qualitative factors include variables such as political and capacity-related feasibility of options. While this *Toolkit* focuses on improving quantitative (mainly cost) analysis to make it more objective, PI practitioners should also keep in mind the qualitative aspects of PI option decisions.

Instruments for a Cost and Results Analysis workplan

Checklist 1

Costing-related data to be collected at the central level (source/data)

Central MOH activity/program unit

☐ Structure of the program—e.g., the number of regions, districts, health centers, etc. and their general characteristics (for sampling purposes)*

☐ Advice on the nature of information likely to be available at regional and district levels and how to obtain it

☐ Other information to assist with the analysis

- ☐ The focus program or activity budget and expenditure records
- ☐ Sources of funds (contributors)
- ☐ Sources of inputs (imports/domestic)

Ministry of Health – Divisions of Finance (F), Supplies (S), Personnel (P), Management Services (MS) and Planning (PL)

☐ Information for use in calculating costs at all levels

- ☐ Building prices (either total structure or per unit area) (MS/PL)*
- ☐ Vehicle prices (F/S)*
- ☐ Staff salaries by grade (P)*
- ☐ Drug prices (S)
- ☐ Government mileage rates (F)

Planning or Finance Ministry

☐ Information for use in calculating costs at all levels

- ☐ Discount rate/inflation rate
- ☐ Exchange rates for currencies used for purchasing imports
- ☐ National minimum wage
- ☐ National per capita income

** Information that is desirable to get before going into the field*
Adapted from WHO Programme for Control of Diarrhoeal Diseases, Estimating costs for cost-effectiveness analysis: guidelines for managers of diarrhoeal diseases control programmes,1988.

Checklist 2

Costing-related data to be collected at the regional/district level (source/data)

Regional/district health office

☐ Cost of related program/activity training and non-training events carried out over the past three years

- ☐ Tuition costs (total), number of participants, per diems or food and lodging, transport, faculty, other

☐ Cost of the region/district program/activity office or if there is no office the cost of all non-specialized general staff functions

- ☐ Staff, transport, operating expenses, vehicles, buildings

☐ Data for allocating regional/district costs to health centers, training institutions or other facilities

- ☐ The number of districts in the region
- ☐ The number of facilities by type in the region (as relevant to the analysis)

☐ Data for allocating costs to the program/activity (if a specialized office exists)

- ☐ The number of workers in the program/activity office
- ☐ The number of workers in the department or building operating at a similar level as the program/activity workers

☐ Data for allocating costs to the program/activity (if a specialized office does not exist)

- ☐ The total number of visits/participants/etc. to health centers or other related facilities in the district/regions
- ☐ The number of program/activity-related visits/participants/etc. in the district/region

Costs of health centers/training facilities/other relevant institution(s): Check how much of the information on costs of the facilities is available (see Checklist 3). Salary and general operating expenses are most likely to be available.

Adapted from WHO Programme for Control of Diarrhoeal Diseases, Estimating costs for cost-effectiveness analysis: guidelines for managers of diarrhoeal diseases control programmes,1988.

Checklist 3

Costing-related data to be collected at the health center/training institution/other level (source/data)

Expenditure records

☐ Gross annual salaries, allowances and benefits of all workers at the facility

☐ Annual cost of operating the facility— electricity, water, telephone, postage, printing, office equipment repair, office supplies, building maintenance and repair, housekeeping supplies, general patient/training/etc. supplies

☐ Total payments made on each vehicle during the year: fuel, oil, tires, batteries, spare parts, repairs, insurance, registration

☐ Bus, rail and air fares and per diem allowances

Inventory records

☐ Annual consumption of specialized supplies or materials directly associated with the program or activity (e.g., drugs, sutures, etc., in the case of costing a specific clinical service)

Observation and measurement

☐ Type of buildings and estimated size (if necessary to calculate building cost)

☐ Vehicle types used

Log books

☐ Distance traveled by each vehicle (only necessary if expenditure data on vehicle running costs are not available)

Interviews with health staff or drivers and mechanics

☐ For supplies/drugs/materials/etc. that are used for both the target program/activity and other purposes, an estimate of what proportion of the total consumption is for the target program/activity

☐ Expected useful life of each vehicle, its fuel consumption or running costs (calculate per kilometer if distance traveled information is available)

☐ The amount of spare capacity that exists with resources (staff, transport, building): in other words, how much more of the target program/activity could be done if each of the inputs was held constant

Health center/training facility/other statistics or registration books

☐ Volume of target program/activity services delivered, number of clients or participants

Adapted from WHO Programme for Control of Diarrhoeal Diseases, Estimating costs for cost-effectiveness analysis: guidelines for managers of diarrhoeal diseases control programmes, 1988.

Discussion

A variety of types of data collection instruments are needed for most CRA studies.

PRIME II assists clients and counterparts in conducting what have previously been called cost-benefit analyses (CBAs) within the PI approach. This often requires estimating costs of future activities and performing the task fairly quickly. One way of costing a new or future activity is by preparing a budget. To do this requires you to:

- Describe the proposed activity in as much detail as possible
- Examine what resources already exist and determine whether there is sufficient capacity to take on additional activities (is there unused or spare capacity?)
- Determine the additional (incremental or "marginal") resources required, not neglecting the operation and maintenance costs of existing capital items[5]

Costs should include both *financial costs* (where money is spent directly) and *economic costs* (where resources used have a value, but there is no direct spending of money, e.g., for donated goods or services). It may also be useful to gather cost data related to *household* or *user costs* for accessing health services (transportation, fees for services, medications, etc.). Another cost category is *opportunity costs* for service providers being trained (services not delivered due to participation in training and/or income foregone due to participation in an activity). In estimating future costs, there is generally greater flexibility to consider a longer period over which results may be achieved.

As mentioned in the Introduction, there are three approaches one can take to estimate costs of future activities: *ingredients*, *adaptation* and *mark-up* (see Table 3).

Although these are presented as separate approaches, it is important to note that they are not mutually exclusive and may often be combined to achieve the most accurate results.

Table 3

Approaches for estimating costs of future activities

Approach	Characteristics	Advantages	Disadvantages
Ingredients	Detail resources Prepare each year	For new/changing programs	May be tedious Some costs left out
Adaptation	Base on similar programs	Good when programs are very similar	Need to consider differences (costs, outcomes)
Mark-up	Increase estimates from recent past	Relatively easy	Past costs adequate and accurate?

Adapted from Creese and Parker, 1990.

[5] Creese and Parker, 1990

The decision on which approach or mix of approaches to take may be based upon the characteristics of the programs and any time or financial constraints. Both the Adaptation and Mark-up approaches are based on past experience with the same or similar programs. They use an established budget and cost history as a starting point from which differences are analyzed and adjustments made. Care must be taken to consider any inaccuracies or limitations that would reduce the utility of existing budgets and cost reports as a starting point when applying the Adaptation and Mark-up approaches.

The Ingredients approach is the most detailed of the three approaches and should be tried first when possible. This approach is likely to yield more accurate results due to its higher level of program-specific detail. The Ingredients approach details the scope of work and elements of the activity to be costed, and is useful when planning or analyzing a new or changing program where experience with other programs may have limited relevance.

Cost analysis tool

PRIME II partner EngenderHealth has developed a manual for analyzing the direct costs of delivering reproductive health services. *Cost Analysis Tool: Simplifying Cost Analysis for Managers and Staff of Health Services* (CAT) includes a diskette with a set of Excel spreadsheet files. Intended for use by managers and service providers at individual facilities, CAT contains easy-to-follow instructions for manual or computerized application. While designed for costing facility-based service delivery, CAT could also be adapted for costing other activities, such as training or supervision.

Managers and providers are encouraged to use CAT whenever there are changes in:

- Cost of supplies (e.g., due to inflation or availability of supplies)
- Staff salaries (e.g., due to salary increase or changes in staffing)
- Services offered (e.g., reorganization or introduction of new services)
- Client load[6]

The CAT manual cites a number of reasons for focusing on direct costs, rather than all costs, including indirect:

- Some indirect costs may be lowered simply by promoting the rational use of site resources, such as staffing, administrative supplies, communications equipment, emergency transport, etc., all without the additional investment in time and effort to calculate indirect costs per service
- Direct costs are related to the provision of specific services; they are less complicated to calculate than indirect costs
- Information about the facility's indirect costs may not be available at the facility level; for example, in a government system
- In facilities using the cost information to set user fees, many clients may not be willing or able to pay fees that cover direct costs, let alone pay for any additional indirect costs per service
- In health care settings, the costs of providing different services can vary widely; for example, between a vaccination (outpatient care) and major surgery (inpatient care). It is difficult to assess an indirect cost per service that is fair to all clients and at the same time encourages access to both preventive and curative care.[7]

EngenderHealth is working within PRIME II on applications of CAT to postabortion care and other reproductive health services. Due to the fact that CAT only records direct costs, supplemental instruments or methods, such as CORE or the *Mother-Baby Package*, may be needed to capture indirect costs; if those costs should also be considered.

CAT consists of three worksheets:

- Worksheet 1: Calculation of staff time for services or clinical procedures
- Worksheet 2: Calculation of cost per minute of clinic staff time
- Worksheet 3: Calculation of service or clinical procedure-specific costs

The CAT spreadsheets, like many software tools, can be modified to change labels, formulas or features to suit specific situations.

Application of the CAT worksheets/spreadsheets takes about three days in a facility. The CORE and *Mother-Baby Package* costing spreadsheets are more sophisticated costing tools that can be used by themselves or in combination with CAT or other tools. A CORE cost analysis involving the central level and several facilities can take about four weeks. A district-specific study using the *Mother-Baby Package* can require up to three months.

CAT Worksheets 1.a-e, 2 and 3.a-e provide formats for collecting and calculating client costs of service delivery. These worksheets can be adapted as needed, or they can serve as a template for creating other tools.

The *Mother-Baby Package* was developed by WHO to help countries determine the local costs of implementing 18 maternal and neonatal health

[6] EngenderHealth, 2001

[7] EngenderHealth, 2001

services considered essential for reducing maternal and neonatal morbidity and mortality. Table 4 shows this list of services. The spreadsheets that accompany the *Mother-Baby Package* are based on the detailed clinical protocols for implementing the services in the package and allow flexibility for adjustments in the protocols to reflect local conditions and practices.

The WHO model allows users to estimate costs of implementing the entire *Mother-Baby Package*, and also to estimate costs for:

- Individual interventions
- Different types of inputs (drugs, salaries, etc.) and costs (recurrent and capital)
- Per facility
- Per capita, per birth, etc., and
- Foreign exchange requirements[8]

Data required for use of the *Mother-Baby Package* costing model fit into three categories:

- Demographic and epidemiological information
- Information about current treatment practice and the standard treatment guidelines that are to be adopted with the implementation of the *Mother-Baby Package*
- Cost of different inputs (drug prices, salaries of medical and support personnel, building, equipment and supply costs).[9]

Although the Mother-Baby Package, like CAT and CORE, is designed for costing of RH clinical services, the principles and tools from all three may be adapted and applied to cost and results analyses of non-clinical activities such as supervision, RH training and other program and policy options.

PRIME II's work requires applications for costing both clinical and non-clinical activities. For example, private-sector midwives and others providing services included in the *Mother-Baby Package* need to know the cost of their services in order to set prices for recovering user fees, understanding the amount of fees recovered as a percentage of costs and planning revenues for sustainability.

[8] *Mother-Baby Package*, p. 5.
[9] Ibid, p. 8.

Worksheet 1

Calculation of staff time for services or clinical procedures

Steps in service provision

1.a - Staff time—Admission, counseling and examination			
Location	**Activity**	**Individual response**	**Time (minutes)**
	Register client	Receptionist	
	Collect payment	Cashier	
	Take medical history	Nurse Physician	
	Prepare room and client	Support staff Nurse	
	Conduct physical examination	Physician* Nurse	
	Laboratory—Register client	Receptionist Cashier	
	Laboratory—Conduct test(s)	Lab technician	
	Provide preprocedure information and counseling	Support staff Nurse	
	Prepare examination room after each client	Nurse Support staff	
	Schedule procedure (this may be scheduled for the same day, or for another day)	Receptionist Nurse	
Daily tasks in procedure room			
	Prepare procedure room at beginning of day _____ minutes for _____ clients	Support staff Nurse	
	Clean and prepare examination equipment _____ minutes for _____ clients	Nurse Support staff	
	Clean room at end of day _____ minutes for _____ clients	Support staff Nurse	
	Overall staff supervision	Supervisor	

**Actual involvement by a physician in this activity varies by national and local protocols.*
Source: EngenderHealth

Worksheet 1 (continued)

1.b - Staff time—Surgical or medical procedure			
Location	**Activity**	**Individual response**	**Time (minutes)**
	Register client	Receptionist	
	Prepare client and take vital signs	Physician Nurse	
	Provide preoperative drugs	Anesthetist Physician Nurse	
	Repeat examination, review laboratory tests, and obtain informed consent	Physician Nurse	
Preprocedure			
	Prepare equipment and materials _____ minutes for _____ clients	Nurse Support staff	
	Perform scrub (surgical team)	Physician OR Nurse	
During procedure			
	Give anesthesia (General and/or local)	Anesthetist Physician	
	Clinical procedure _____ minutes each procedure and _____ minutes between clients for cleaning and preparation (total _____ minutes)	Physician OR Nurse Runner nurse Support staff	
	Clean up procedure room _____ minutes weekly for _____ clients	Support staff Nurse	
Postprocedure care			
	Rest in recovery room _____ minutes for _____ clients	Nurse Support staff	
	Provide postprocedure instructions	Physician Nurse	
	Schedule follow-up visit	Receptionist	
	Discharge patient	Physician	
	Clean up recovery room and equipment _____ minutes daily for _____ clients	Nurse Support staff	
	Overall staff supervision	Supervisor	

Source: EngenderHealth

Worksheet 1 (continued)

1.c - Staff time—First follow-up visit			
Location	**Activity**	**Individual responsible**	**Time (minutes)**
	Register patient	Receptionist	
	Review records	Physician Nurse	
	Remove stitches or check postprocedure condition	Physician Nurse	
	Clean up review room and equipment _____ minutes daily for _____ clients	Support staff Nurse	
	Overall staff supervision	Supervisor	

1.d - Staff time—Second follow-up visit			
Location	**Activity**	**Individual responsible**	**Time (minutes)**
	Register patient	Receptionist	
	Review records	Physician Nurse	
	Remove stitches or check postprocedure condition	Physician Nurse	
	Clean up review room and equipment _____ minutes daily for _____ clients	Support staff Nurse	
	Overall staff supervision	Supervisor	

1.e - Total amount of staff time for a service or clinical procedure (Sum of totals listed in Worksheets 1a-d)	
Staff	**Total time (in minutes)**
Physician	
Nurse	
Receptionist	
Support staff	
OR nurse	
Runner nurse	
Lab technician	
Supervisor	
Cashier	
Others (1)	
Others (2)	
Others (3)	

Source: EngenderHealth

Worksheet 2

Calculation of cost per minute of clinic staff time

A	B	C	D	E	F	G
Staff position	**Annual salary and fringe benefits**	**Number of working days per year**	**Cost per day (B/C)**	**Number of working hours per day**	**Number of working minutes per day (E x 60)**	**Cost per minute (D/F)**
Physician-sessional			#DIV/0!		0	#DIV/0!
Nurse			#DIV/0!		0	#DIV/0!
Receptionist			#DIV/0!		0	#DIV/0!
Support staff			#DIV/0!		0	#DIV/0!
OR nurse			#DIV/0!		0	#DIV/0!
Runner nurse			#DIV/0!		0	#DIV/0!
Lab technician			#DIV/0!		0	#DIV/0!
Supervisor			#DIV/0!		0	#DIV/0!
Cashier			#DIV/0!		0	#DIV/0!
Others (1)			#DIV/0!		0	#DIV/0!
Others (2)			#DIV/0!		0	#DIV/0!
Others (3)			#DIV/0!		0	#DIV/0!

Source: EngenderHealth

Worksheet 3

Calculation of costs

3.a - Calculation of service or clinical procedure-specific costs			
	A	B	C
Staff position	**Time spent**	**Cost per minute**	**Total cost per client (A x B)**
Physician-sessional	0	#DIV/0!	#DIV/0!
Nurse	0	#DIV/0!	#DIV/0!
Receptionist	0	#DIV/0!	#DIV/0!
Support staff	0	#DIV/0!	#DIV/0!
OR nurse	0	#DIV/0!	#DIV/0!
Runner nurse	0	#DIV/0!	#DIV/0!
Lab technician	0	#DIV/0!	#DIV/0!
Supervisor	0	#DIV/0!	#DIV/0!
Cashier	0	#DIV/0!	#DIV/0!
Others (1)	0	#DIV/0!	#DIV/0!
Others (2)	0	#DIV/0!	#DIV/0!
Others (3)	0	#DIV/0!	#DIV/0!
Total cost of staff time			#DIV/0!

Source: EngenderHealth

Worksheet 3 (continued)

3.b - Calculation of service or clinical procedure-specific costs				
	A	B	C	D
Supply Item	Amount in unit	Unit cost	Amount used per client	Cost per client (C/A) x B
Chromatic catgut				#VALUE!
Plain catgut				#VALUE!
Silk No.2 or No. 0				#VALUE!
Cotton wool				#VALUE!
Absorbent cotton gauze (plain)				#VALUE!
Strapping (tape)				#DIV/0!
Disposable syringes 2 cc				#DIV/0!
Disposable syringes 5 cc				#DIV/0!
Disposable syringes 10 cc				#DIV/0!
Disposable syringes 20 cc				#DIV/0!
Disposable needles				#DIV/0!
Nondisposable surgeon's gloves				#DIV/0!
Disposable gloves				#DIV/0!
1% Xylocain without epinephrine				#DIV/0!
Atropine injection (0.5 mg dose)				#DIV/0!
Tincture of iodine				#DIV/0!
Glove powder				#DIV/0!
Autoclaving tape				#DIV/0!
Surgical spirit (methylated spirit)				#DIV/0!
Antiseptic solution				#DIV/0!
Urine dipstick				#DIV/0!
Paracetamol (acetaminophen)				#DIV/0!
Surgical blades				#DIV/0!
Soap				#DIV/0!
Bleach / chlorine solution				#DIV/0!
Diazepam 5 mg				#DIV/0!
Falope rings				#DIV/0!
Disinfectant solution				#DIV/0!
Microscopic slides				#DIV/0!
Condoms				#DIV/0!

Worksheet 3 (continued)

Silk sutures 2.0				#DIV/0!
IUD				#DIV/0!
Sanitary pad				#DIV/0!
DMPA or Net En				#DIV/0!
Alcohol				#DIV/0!
Norplant implants				#DIV/0!
Trocar				#DIV/0!
Hand towel				#DIV/0!
IV fluid (5% dextrose)				#DIV/0!
Adrenaline injection				#DIV/0!
Hydrocortisone injection				#DIV/0!
Sofra-Tule (Vaseline gauze)				#DIV/0!
Oxygen gas				#DIV/0!
Halothen gas				#DIV/0!
Nitrous oxide gas				#DIV/0!
IV ketamine				#DIV/0!
Thiopentine				#DIV/0!
				#DIV/0!
				#DIV/0!
				#DIV/0!
Total Cost of Supplies				#VALUE!

Source: EngenderHealth

Worksheet 3 (continued)

3.c - Total costs (calculated based on Worksheets 3a-b)	
Total cost of staff time	#DIV/0!
Total cost of supplies	#VALUE!
Total cost of laboratory tests (Add only costs that are not already included above)	
Total daily inpatient costs (Staff time, etc.) Cost per day _____ x number of days _____	
Other (describe):	
Total direct variable costs	#DIV/0!

Source: EngenderHealth

Table 4

Elements of the WHO Mother-Baby Package

	Abbreviation used in the model
Care provided during pregnancy	
Prenatal care	Prenatal care
Treatment of severe anemia	Anemia, severe
Treatment of syphilis	STI-Syphilis
Treatment of other STIs such as gonorrhea and chlamydia	STI-Other
Management of abortion complications	Abortion complications
Care provided during and after delivery process	
Delivery by a skilled birth attendant (clean and safe delivery and routine newborn care)	Normal delivery
Management of eclampsia	Eclampsia
Management of postpartum hemorrhage	Hemorrhage
Management of obstructed labor/Caesarean section	Obstructed labor
Management of sepsis	Sepsis
Management of basic neonatal complications	Neonatal complications
Postpartum care	Postpartum care
Postpartum family planning	
Condom	FP-Condom
Depo-Provera	FP-Depo-Provera
IUD	FP-IUD
Norplant	FP-Norplant
Oral contraceptives	FP-Pill
Sterilization	FP-Sterilization

Source: WHO, 1998

Chapter 7

Spreadsheets for data analysis

Discussion

Once financial data have been collected by line item, type of activity, funding source and geographic unit, the instruments included in this section can help to compile, analyze and compare the data.

Instruments

Here are some sample spreadsheets for consolidating and analyzing financial and programmatic data. Forms 5.a-e and the accompanying questions are adapted from Creese and Parker, 1990:

Form 5.a—Comparison of budget and expenditure

Form 5.b— Expenditures by source of support (contributors)

Form 5.c—Expenditures by type of currency

Form 5.d—Expenditures by function (activity)

Form 5.e—Expenditures by level

Form 5

Data analysis tools

Form 5.a - Comparison of budget and expenditure

Input	Budget (Currency)	Expenditure (Currency)	Cost profile (Expenditures as % of total)
Capital			
Vehicles			#VALUE!
Equipment			#DIV/O!
Buildings, space			#DIV/O!
Training, nonrecurrent (pre-service)			
Curriculum design			#DIV/O!
Field testing and revision			#DIV/O!
Implementation			#DIV/O!
Monitoring and evaluation			#DIV/O!
Other			#DIV/O!
Social mobilization, nonrecurrent			#DIV/O!
SUBTOTAL, CAPITAL	0	0	#DIV/O!
Recurrent			
Personnel			#VALUE!
Supplies			#DIV/O!
Vehicles, operation and maintenance			#DIV/O!
Buildings, operation and maintenance			#DIV/O!
Training, recurrent (in-service)			
Curriculum design			#DIV/O!
Field testing and revision			#DIV/O!
Implementation			#DIV/O!
Monitoring and evaluation			#DIV/O!
Other			#DIV/O!
Social mobilization (recurrent)			#DIV/O!
Other operating costs			#DIV/O!
SUBTOTAL, RECURRENT	0	0	#DIV/O!
TOTAL	0	0	

Adapted from Cost Analysis in Primary Health Care; A training manual for programme managers, WHO, 1990.

Form 5 (continued)

Form 5.b – Expenditure by source of support (contributor)								
	Ministry of Health		**Other governmental departments**		**Donors**		**Total**	
Input	**Currency**	**%**	**Currency**	**%**	**Currency**	**%**	**Currency**	**%**
Capital								
Vehicles							0	
Equipment							0	
Buildings, space							0	
Training, nonrecurrent (pre-service)							0	
Curriculum design							0	
Field testing and revision							0	
Implementation							0	
Monitoring and evaluation							0	
Social mobilization, nonrecurrent							0	
SUBTOTAL, CAPITAL	0		0		0		0	
Recurrent								
Personnel							0	
Supplies							0	
Vehicles, operation and maintenance							0	
Buildings, operation and maintenance							0	
Training, recurrent (in-service)							0	
Curriculum design							0	
Field testing and revision							0	
Implementation							0	
Monitoring and evaluation							0	
Social mobilization, recurrent							0	
Other operating inputs, recurrent							0	
SUBTOTAL, RECURRENT	0		0		0		0	
TOTAL								

Adapted from Cost Analysis in Primary Health Care: A training manual for programme managers, WHO, 1990.

Form 5 (continued)

Form 5.c – Expenditures by type of currency (Foreign exchange and local currency)								
	Ministry of Health		Other governmental departments		Donors		Total	
Currency input	Currency	%	Currency	%	Currency	%	Currency	%
Foreign exchange								
Capital inputs								
Recurrent inputs								
Total								
Local currency								
Capital inputs								
Recurrent inputs								
Total								
Grand total								

Adapted from Cost Analysis in Primary Health Care: A training manual for programme managers, WHO, 1990.

Form 5 (continued)

Form 5.d – Expenditures by function (activity)								
	Training		**Management**		**Service delivery**		**Social mobilization**	
Input	**Currency**	**%**	**Currency**	**%**	**Currency**	**%**	**Currency**	**%**
Capital								
Vehicles							0	
Equipment							0	
Buildings, space							0	
Training, nonrecurrent (pre-service)							0	
Curriculum design							0	
Field testing and revision							0	
Implementation							0	
Monitoring and evaluation							0	
Social mobilization, nonrecurrent							0	
SUBTOTAL, CAPITAL	0		0		0		0	
Recurrent								
Personnel							0	
Supplies							0	
Vehicles, operation and maintenance							0	
Buildings, operation and maintenance							0	
Training, recurrent (in-service)							0	
Curriculum design							0	
Field testing and revision							0	
Implementation							0	
Monitoring and evaluation							0	
Social mobilization, recurrent							0	
Other operating inputs, recurrent							0	
SUBTOTAL, RECURRENT	0		0		0		0	
TOTAL								

Adapted from Cost Analysis in Primary Health Care: A training manual for programme managers, WHO, 1990.

Form 5 (continued)

Form 5.e – Expenditures by level

Input	National administration		Regional administration		District administration		Health center		Hospital		Total	
	Currency	%	Currency	%	Currency	%	Currency	%	Currency	%	Currency	%
Capital												
Vehicles												
Equipment												
Buildings, space												
Training, nonrecurrent (pre-service)												
Curriculum design												
Field testing and revision												
Implementation												
Monitoring and evaluation												
Social mobilization, nonrecurrent												
SUBTOTAL, CAPITAL												
Recurrent												
Personnel												
Supplies												
Vehicles, operation and maintenance												
Buildings, operation and maintenance												
Training, recurrent (in-service)												
Curriculum design												
Field testing and revision												
Implementation												
Monitoring and evaluation												
Social mobilization. recurrent												
Other operating costs												
SUBTOTAL, RECURRENT												
TOTAL												

Adapted from Cost Analysis in Primary Health Care: A training manual for programme managers, WHO, 1990.

Discussion

One of the main formats for CRA results reporting is cost per unit of a service delivered or other activity, or unit cost. Since unit cost is a function of both total cost and number of units, one facility or activity with higher total costs may still have lower unit costs than another due to the higher volume of services it provides. These principles are illustrated in the case studies in the Appendix.

Instruments/techniques

The *Strategy* describes and compares different types of ratios based on unit costs that can together be classified as forms of CRA. These include:

Cost-benefit analysis (CBA)

In CBA, neither the cost, nor the benefit variable is fixed, and both the benefit variable (numerator) and cost variable (denominator) are expressed in monetary terms. CBA thus compares the monetary cost and monetary benefit of alternatives, typically in the form of a benefits-to-costs ratio. CBA is often used in describing analyses that would more correctly be classified as cost-effectiveness analysis (CEA) or cost-utility analysis (CUA). Put simply, a CBA would aid in deciding whether a particular activity is worth doing at all (i.e., whether the cost of the activity is at least offset by its savings or financial gain). For example, if a performance improvement activity had benefits of $60,000 and costs of $20,000, the CBA or benefit-to-cost ratio (BCR) would be as follows:

$$\text{BCR} = \frac{\text{program benefits}}{\text{program costs}} = \frac{\$60{,}000}{\$20{,}000} = 3, \text{ or } 3 \text{ to } 1$$

In this example, the net benefits of the activity are $40,000 ($60,000-$20,000). This same example will be used to illustrate return on investment (ROI).

Cost-effectiveness analysis (CEA)

CEA is applied to determine the costs and effectiveness of alternative ways of achieving the same objective. A cost-effectiveness ratio is expressed as cost divided by unit of effectiveness for each alternative intervention. The result or effectiveness value is not expressed in monetary terms, rather in units of results. An example from child health might be "cost per fully immunized child."

CEA can help to identify the most efficient way of achieving a specific objective. CEA gives guidance on how to use funds most efficiently where a specified output (or "desired performance" in PI terms) must be achieved. For example, if a MOH wants to know which of two training and learner support approaches will contribute the most to improved provider performance, they can test the two approaches and collect cost and results data. Approach A costs $50,000 and results in 50 providers performing to standard one year later. Approach B also costs $50,000, but results in only 40 providers performing to standard one year later. The CEA for each approach would be as follows:

$$\text{CEA for Approach A} = \frac{\text{program costs}}{\text{units of results}} = \frac{\$50{,}000}{50}$$

= $1,000 per provider performing to standard

$$\text{CEA for Approach B} = \frac{\text{program costs}}{\text{units of results}} = \frac{\$50{,}000}{40}$$

= 1,250 per provider performing to standard

The CEA shows Approach A to be the more effective, costing $250 less than Approach B for each provider performing to standard. Approaches A and B could also be assessed prospectively in the context of application of the PI approach. To do this would require analyzing the estimated rather than actual costs of each approach, along with the estimated results.

Cost-utility analysis (CUA)

CUA compares the cost of alternatives with the subjectively determined ratings (benefits or effectiveness) of those alternatives. CUA may be used when effectiveness cannot be objectively measured due to lack of data, lack of resources for special studies, or other factors such as time constraints. An alternative form of CUA applies the concepts of disability adjusted life years (DALYs) or quality adjusted life years (QALYs), developed by the World Bank and others in the early-to-mid-1990s, in attempting to provide more objective denominators

for CUA, particularly for sector-level analysis and policy support. DALYs and QALYs apply population-based formulas to estimate years-of-life-saved, with weighting for quality-of-life factors such as disability, in measuring the impact of alternative health interventions. (See the Glossary in the *Strategy* for definitions of these terms.)

Return on investment (ROI)

ROI is similar to a benefit-to-cost ratio, where both benefits and costs are shown as monetary values, except that ROI is expressed as a percentage. Using the example where program benefits are $60,000 and program costs are $20,000, ROI is calculated as follows:

$$\text{ROI (\%)} = \frac{\text{net program benefits}}{\text{program costs}} \times 100$$

$$= \frac{\$60{,}000 - \$20{,}000}{\$20{,}000} \times 100 = \frac{2}{1} \times 100$$

$$= 200\%$$

(Note: net program benefits = program benefits—program costs)

The example shows that the activity being evaluated has a 200% return on investment.

These examples of CRA techniques, also shown in the *Strategy*, illustrate some of the ways in which cost and results/programmatic data can be combined for comparison using ratios and other decision support tools.

Such ratios should be part of a narrative report that discusses the numbers in the ratios, the strengths and weaknesses of the data and the implications of the results for decisions being considered. The narrative report should also include discussion of political, social or institutional capacity factors that are more difficult to quantify than cost data, but which could affect the feasibility of options.

In closing, as was explained in the Introduction, this document is designed to familiarize the reader with methods and tools for conducting a CRA, with the focus being on the cost part of that equation. At the same time, it is necessary to point out that there is no "one way" of conducting a CRA. The selection and adaptation of tools will have to be highly situation specific.

Though there are challenges to obtaining reliable cost figures for international RH activities, the cost elements may be relatively easier to define and measure than results. This is especially true when one is talking about improving provider performance, as the PRIME II Project seeks to do. Improved provider performance is defined in terms of increased capacity (e.g., new skills acquired and put into practice) or productivity (e.g., numbers of services provided) and in terms of the quality of the services provided. Quality of service can be defined in terms of compliance with protocols in delivering services, client satisfaction and perhaps by other means.

The case studies in the Appendices illustrate how cost and results data can be linked for analysis and reporting.

To obtain the best CRA results, PI and costing personnel should coordinate closely with monitoring and evaluation specialists to review planned indicators and data sources, and to review and interpret results.

PRIME II's PI unit offers support to PRIME II field and headquarters staff and counterparts in adapting and applying these tools, and documenting lessons learned.

Introduction

The following case studies illustrate techniques from this CRA *Toolkit*. They represent the variety of work that PRIME II is doing through its technical leadership areas (TLAs) and reflect some of the differences among regions and countries. Some details have been omitted or simplified for purposes of illustration.

Nearly all of PRIME II's work involves more than one TLA. The classifications assigned in the titles of each case study are based on the TLA that is the primary focus. The RTL and PI TLAs can be thought of as cross-cutting, process-oriented sets of activities that improve capacity-building and delivery of FP/RH services, rather than the specific technical content areas such as postabortion care (PAC), HIV/AIDS, female genital cutting (FGC), prevention and treatment of postpartum hemorrhage (PPH) family planning and others.

These case studies and this *Toolkit* focus on the costing part of CRA rather than the results. The PRIME II Monitoring and Evaluation Unit has developed several documents that provide guidance on PRIME II's Performance Monitoring Plan (PMP) and how one should go about selecting indicators and collecting data to measure baseline and progress toward targets.[10]

[10] *PRIME II Performance Monitoring Plan Guidelines*, 2000.

Case study 1 in Cost and Results Analysis

Aquaria MOH training and learning options

Aquaria is a country that wants to increase the number of community health officers (CHOs) in rural areas by training up to 1,000 new CHOs over the next two years.

The MOH wants to pursue lower cost, more performance-oriented approaches for both pre-service and in-service training. It will conduct a CRA of alternative designs for conducting pre-service training in order to assess their efficiency and ability to produce the numbers of CHOs it needs.

The MOH is considering two alternative pre-service training designs. It will compare these designs with each other and with the current approach as part of the intervention selection process. Including the current approach, the alternative pre-service training designs are:

Current—All CHOs come to the capital city, Rattan, for a ten-week residential training program. The ten-week program includes mostly didactic and limited practical training, the latter mostly in the form of role playing where students take turns as patients presenting with different clinical conditions.

Option 1—This option reduces the course time from ten to eight weeks. A four-week residential didactic session in Rattan is followed by a three-week placement in the CHO's nearest district health center, then one week of on-the-job training in the CHO's community with support from the public health nurse (PHN) from the district health center. PHNs supervise CHOs and they will use this week for direct coaching and mentoring of the CHO. This approach reduces the amount of background/ theory information in the course and increases opportunities to practically apply new knowledge and skills in a structured, supportive environment.

Option 2—This option reduces the course from ten to six weeks, beginning with a three-week residential didactic session, followed by a two-week placement in the district health center, then one week of on-the-job training in the CHO's community with support from a public health nurse (PHN). The rationale for Option 2 is similar to Option 1. It further expands on the potential to target and improve training and reduce costs and duration of training, while aiming to maintain or expand training impact and performance.

Per-diem costs would be reduced in Options 1 and 2 because the per diem rate in the district health center locations is lower than in Rattan ($20 per day as opposed to $50 per day). CHOs will receive a $10 per day stipend while working in communities with the PHN and stay at the community health compound. From previous training cycles, classroom-training costs are estimated at $200 per day for facilitator time, facility and material costs.

Each option is assumed to train 50 CHOs per cycle, with cycles scheduled one after the other throughout the year. By reducing the classroom time, it will be possible to more quickly train groups of CHOs to meet the scaling up targets set by the MOH.

Based on the options and information presented, Table 5 illustrates a simple CRA of the current approach and two pre-service training options being considered by the Aquaria MOH. The example focuses on costs, with numbers of CHOs trained as the principal result.[11] While it is important to evaluate the effectiveness of each option, to simplify the case, the effectiveness results are assumed to be the same for each option

Discussion

Option 2 comes closest to meeting the target of training 1,000 new CHOs over the next two years who are able to perform to standard. Option 2 would produce 870 new trained CHOs over two years, and costs less than half as much per trained CHO as the current training approach, and 25% less than Option 1. These results are possible because Option 2 is the least expensive of the options and it allows more cycles of training per year, both factors that reduce the unit cost. Based on the information provided and the analysis in the table, the Aquaria MOH decided to implement Option 2.

Since the figure of 870 trained CHOs for Option 2 is still below the target of 1,000, it might be possible for other modifications to be made in the training design—for example, in the duration of the training or number of participants per cycle—to come closer

[11] Determining effectiveness of the alternative training and learning approaches would require evaluation aside from the cost analysis; however, the literature generally favors a mix of learning approaches over classroom-only training.

to the target number. Another alternative is for the MOH to consider having more than one course running concurrently, assuming facilities and trainers are available. This could be done to reach the target of 1,000; otherwise a reduced target might be adopted by the stakeholders. One reason for considering such a change is that targets set should be feasible.

As noted previously, this case study does not address the issue of training effectiveness and impact on performance. While there is evidence in the literature to support selecting a mix of training and learning approaches, if time and resources permit the MOH may want to pilot test the effectiveness of Option 2 in comparison to the current approach prior to adopting it as a long-term approach. This would give an opportunity to verify that Option 2 training can produce CHOs who perform at least as well as or better than those trained through the current approach.[12]

Other alternatives or combinations may also be possible and should be considered based on their merits. While CRA as described here emphasizes quantitative analysis of options, qualitative, social, political and other variables must also be considered. It is possible that a particular option may appear most desirable based on a CRA but may not be feasible, acceptable or preferred for other reasons. Informed stakeholders can contribute these perspectives and determine what weight to give CRA as compared with other types of analysis.

Another aspect of CRA analysis not included in the case study, but which may be considered, is economic or opportunity cost. As applied to this case study, opportunity cost would be the impact on service delivery of spending more time in training—particularly classroom training. This impact could be qualified in terms of the missed volume of services that might have been provided if the new CHOs entered duty earlier. It might also be expressed in terms of the salaries and benefits paid to the CHO trainees during training (if applicable).

[12] Although training, and particularly pre-service training, can be an important factor in preparing someone to perform, once they are deployed all of the performance factors contribute to enabling desired performance.

Table 5

Cost and Results Analysis example–
training and learning options
Aquaria case study

	Cost	Current (control)	Option 1	Option 2
Duration of training		10 weeks	8 weeks	6 weeks
Composition*		10:0:0	4:3:1	3:2:1
Number trained per cycle		50	50	50
Cost elements				
Travel				
	$10/day	2 days/person x 50 persons x $10/day = $1,000	5 days/person x 50 persons x $10/day = $2,500	5 days/person x 50 persons x $10/day = $2,500
Per diem				
Classroom	$50/day	7 days/week x 10 weeks x $50/day x 50 persons = $175,000	7 days/week x 4 weeks x $50/day x 50 persons = $70,000	7 days/week x 3 weeks x $50/day x 50 persons = $52,500
Health center	$20/day	$0	7 days/week x 3 weeks x $20/day x 50 persons = $21,000	7 days/week x 3 weeks x $20/day x 50 persons = $14,000
Community with PHN	$10/day	$0	7 days/week x 1 week x $10/day x 50 persons = $3,500	7 days/week x 1 week x $10/day x 50 persons = $3,500
Classroom venue				
	$200/day	5 days/week x 10 weeks x $200/day = $10,000	5 days/week x 4 weeks x $200/day = $4,000	5 days/week x 3 weeks x $200/day = $3,000
Total cost per cycle		$186,000	$101,000	$75,500
Linking costs and results				
Cost per CHO trained		$3,720	$2,020	$1,510
Training cycles per year		5.2	6.5	8.7
Number of CHOs trained per year based on number of cycles		5.2 x 50 = 260	6.5 x 50 = 325	8.7 x 50 = 435

** Composition refers to the organization of the training into Classroom, Health Center, and Community with PHN. Thus, 10:0:0 = 10 weeks in the classroom, 0 weeks at a health center, and 0 weeks in the community with a PHN, and so forth.*

Case study 2 in Cost and Results Analysis

Utopia MOH supportive supervision with self-assessment and peer support

The Republic of Utopia has a predominantly rural population, much of whom are subsistence farmers and live in difficult-to-reach areas. Health facilities exist in many areas and providers have been trained, but utilization of services is low. Health indicators such as maternal and infant mortality and family planning prevalence remain below target levels. The MOH wants to examine the reasons for the under-performance of the health system and asked PRIME II to assist in Region 2 in Republic of Utopia.

PRIME II assisted the MOH to conduct a performance needs assessment (PNA).

The Performance Gap Analysis indicated that although health workers were generally clinically competent, they were not motivated to perform well. Observations revealed inadequate client-provider interaction, and client exit interviews supported this finding, which could contribute to low utilization of services. In addition, supervisory visits were only planned once every six months and often did not take place according to the schedule. When supervisors conducted the visits, they were administrative in nature with supervisors checking on service statistics, required reporting, and supplies. Supervisors did not involve the local providers in problem solving or provide other support for improving the services.

After discussing the root causes of the performance gaps, the stakeholders in Region 2 decided that a priority was to implement a more supportive supervision system, complemented by written job descriptions for supervisors and service providers that clearly spell out their clinical and non-clinical duties. PRIME II agreed to work with the MOH and authorities in Region 2 to design and implement the interventions and evaluate their effects and impacts.

PRIME II is assisting the stakeholders to compare the costs and results of ongoing supervision with more supportive approaches. The team will collect and evaluate data on the different supportive supervision models over one year in three pilot areas. One of these areas will serve as a control, using the existing supervision approach. The other two areas will receive different sets of supervision approaches, identified as Option 1 and Option 2.

Results will be evaluated using tools such as client exit interviews to assess any changes in client satisfaction. The team will also collect service delivery data before and after the supervision-related intervention to examine possible impacts on volume of services delivered. USAID, PRIME II and the MOH felt that increasing volumes of priority services would be a reasonable proxy measure for anticipated improvements in health outcomes over the longer term.

The MOH/Region 2/PRIME II team designed the following interventions:

- Review of and revisions to the job descriptions for the physicians, nurses and auxiliary nurses staffing the health posts and health centers
- Development of a five-day training curriculum on supportive supervision for the physician and nurse supervisors, and planned to restructure the system to make the supervision visits quarterly instead of once each six months
- Introduction to self-assessment by staff at each facility, with self-assessment results to be reviewed with the supervisor during the supervision visits
- Introduction to peer support activities in one of the three areas

The design plan is for 10 supervisors and 60 providers per area to participate in the activity. Per diem costs for supervisory training are estimated at $50 per day per supervisor, with $20 for participants' travel costs. Per diem during supervisory visits (assumed without overnight stay) is estimated at $30 per day per person. From previous training cycles, classroom training costs are estimated at $200 per day for facilitator time, facility and material costs.

Peer support concepts and tools are being introduced at regular monthly area staff meetings for providers and their supervisors; therefore, peer support has no associated training costs, just the cost of monthly peer visits. In the area with peer support, once per quarter, 20 of the providers (one from each facility) will make a visit to a nearby facility to observe clinic

activities, and have a peer support meeting with an assigned partner.

Tables 6 and 7 summarize the information provided and, for purposes of calculation, give post-intervention result targets as well as baseline data. The costs of PRIME II technical assistance and MOH staff time in revising job descriptions and developing the supervision and peer support curricula and other materials are not included, since the technical assistance is nonrecurrent and externally funded, and MOH salaries can be viewed as a fixed or "sunk" cost.

Discussion

The data in Table 6 show that the current approach costs the least, but Table 7 also produces the least results in terms of higher volumes of priority RH services provided and increase in satisfied clients. Option 1 produces more results with more costs, and Option 2 produces the most results for the most costs. The gap between the current supervision approach as compared with Options 1 and 2 is significant in both cost and results. Keeping the current approach would not increase costs, but would also produce minimal results and has high unit costs for increases in service volume and client satisfaction.

In deciding among the options, the Utopia MOH has to determine how it wants to balance the tradeoffs between additional costs and additional increases in service volume and client satisfaction. Given its concerns about poor RH indicators and low utilization of services, the MOH may decide to make the additional investment of $4,000 in Option 2 in order to achieve the additional gains in service volume (from 46% to 56%) and in client satisfaction (from 50% to 65%).

In creatively analyzing the options, the MOH may find that it is possible to integrate the Peer Support component of Option 2 into an existing monthly or quarterly meeting in a way that would eliminate the costs of the monthly peer visits. If this were possible, it would make Option 2 clearly the preferred option. (As a short exercise, you may wish to recalculate the costs and unit costs of Option 2 taking this modification into account.)

What other factors should be considered?

Table 6

Costs and Results Analysis example—supportive supervision with self-assessment and peer support
Utopia case study

Costs		Current (control)	Option 1 SS, including self-assessment	Option 2 SS + peer support
Cost of supervision training				
Duration of training		0	5 days	5 days
Number trained		0	10 persons	10 persons
Travel	$20/day (2 days)	$0	10 persons x 2 days x $20/day = $400	10 persons x 2 days x $20/day = $400
Per diem (overnight)	$50/day	$0	6 days x $50/day x 10 persons = $3,000	6 days x $50/day x 10 persons = $3,000
Classroom	$200/day	$0	5 days x $200/day = $1,000	5 days x $200/day = $1,000
Subtotal		$0	$4,400	$4,400
Cost of supervisory visits				
Facility visits		20 facilities/area 2 visits/facility/ year	20 facilities/area 2 visits/facility/ year	20 facilities/area 2 visits/facility/ year
Travel	$20/day	20 facilities x 2 visits x $20/day = $800	20 facilities x 4 visits x $20/day = $1,600	20 facilities x 4 visits x $20/day = $1,600
Per diem (day only)	$30/day	20 facilities x 2 visits x $30/day = $1,200	20 facilities x 4 visits x $30/day = $2,400	20 facilities x 4 visits x $30/day = $2,400
Subtotal		$2,000	$4,000	$4,000
Cost of monthly peer visits				
Travel	$20/day	$0	$0	20 providers x 4 visits x $20/day = $1,600
Per diem	$30/day	$0	$0	20 providers x 4 visits x $30/day = $2,400
Subtotal		$0	$0	$4,000
Total costs		$2,000	$8,400	$12,400

Table 7

Analysis of results of supportive supervision with self-assessment and peer support

Results						
	Current		Option 1		Option 2	
Volume of RH priority services provided	Baseline: 13,000	After 1 year: 13,200	Baseline: 12,000	After 1 year: 17,500	Baseline: 12,500	After 1 year: 19,500
	(1.5% increase)		(45.8% increase)		(56% increase)	
Percentage of satisfied clients	Baseline: 20%	After 1 year: 23%	Baseline: 15%	After 1 year: 55%	Baseline: 20%	After 1 year: 85%
	(15% increase)*		(267% increase)		(325% increase)	
Linking costs and results						
Cost of interventions per increased unit of RH priority service	$2,000/200 = $10		$8,400/5,500 = $1.53		$12,400/7,000 = $1.77	
Cost per percentage increase in client satisfaction	$2,000/15% = $133 per 1% increase		$8,400/267% = $31 per 1% increase		$12,400/325% = $38 per 1% increase	

**These increases can be expressed in either percentages or points. The percentages are increases for the options as shown, 15%, 267% and 325%, respectively. The corresponding point increases for the options (not shown) are 3, 40 and 65 points, respectively.*