USER'S GUIDE

PHC MANAGEMENT ADVANCEMENT PROGRAMME

MODULE 7:
COST ANALYSIS

Prepared by

Jack Reynolds

D_R_A_F_T

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MODULE 7:

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MODULE 7: COST ANALYSIS

INTRODUCTION

1. What is Cost Analysis: An Explanation and Illustration

Cost analysis is the examination of expenditures to determine how resources have been spent. In Primary Health Care (PHC) we are concerned with the examination of PHC expenditures and usually want to know:

1) how much has been spent;

2) how does that compare with the budget;

3) what is the distribution of costs by "line items" (personnel, travel, supplies, etc.);

4) what is the distribution of costs by site or facility (how much has been spent in the Northern Health Center, the Central Health Center, etc.).

Sometimes managers also want to know other things as well:

5) what have been the trends in costs over time;

6) what will costs be in the future (projections);

7) what are the average costs of providing a service (e.g., the cost of immunizing a child);

In addition to costs, many managers are interested in revenues, and the same types of analyses described above can be applied to revenues. That is: 1) how much revenue has been generated; 2) how does actual revenue compare with budgeted projections; 3) what is the distribution of revenue by source; and so forth. At a minimum, managers are likely to want to know:

8) how much revenue has been generated from various sources and what are the projections for the future;

9) what is the difference between revenues and expenditures and when will the project break even (that is, when will revenues equal or exceed expenditures)?

Examples

Table 1 illustrates the first two of these analyses, how much has been spent and how that compares with the budget. Table 2 illustrates the third, the distribution of total costs by "line item".

Table 1

Illustration: PHC Program Costs and Budget

Description	Expenditures	Budget
Amount	$4,699.60	$4,395.00
Difference		+$304.60 overspent
Percent Spent		106.9 %

Table 1 shows how much the program has spent, $4,669.60. It also shows that the program has overspent its budget by $304.60, or put another way, by 6.9 %.

Table 2

Illustration: PHC Program Costs by Line Item

Description	Amount	Percent
Personnel	2,345.00	49.9%
Travel	345.00	7.3%
Equipment	456.00	9.7%
Supplies	332.00	7.1%
Other Direct Costs	876.00	18.6%
Indirect Costs	345.00	7.3%
Total Costs	$4,699.60	100.0%

Table 2 shows that almost half of the expenditures were for personnel costs. The next highest item was Other Direct Costs, a miscellaneous category that might include such items as utilities, maintenance, postage and rent.

Table 3 illustrates the fourth type of analysis listed, a comparison of the line item costs of two hypothetical PHC subprojects, one in the North and another in the Central region. The analysis shows that personnel costs were higher by 2,990 in the Central region, or 31.8 %. But the overall difference in costs was only 3.9 %.

The same analyses illustrated in Figures 1 and 2 could also be applied to Figure 3. That is, the percentage distribution of the expenses of each subproject could be calculated, and each subproject's budget could be compared with its expenditures.

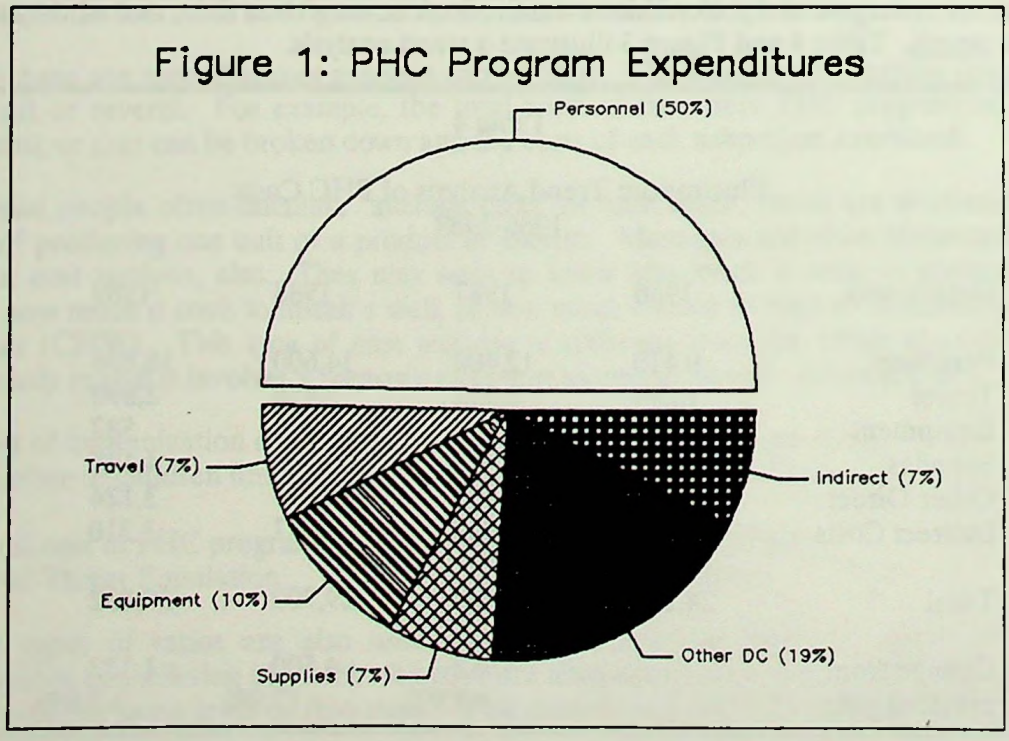
Table 3

Illustration: Costs for Two PHC Subprojects by Line Item

Description	North	Central	Variance*	Percent*
Personnel	9,410	12,400	-2,990	-31.8%
Travel	1,294	2,232	-938	-72.9%
Equipment	350		350	
Supplies	5,680	4,324	1,356	23.9%
Other Direct	3,300	2,382	918	27.8%
Indirect Costs	4,214	3,862	352	8.4%
Total	24,248	25,200	-952	-3.9

* Variance = North - Central

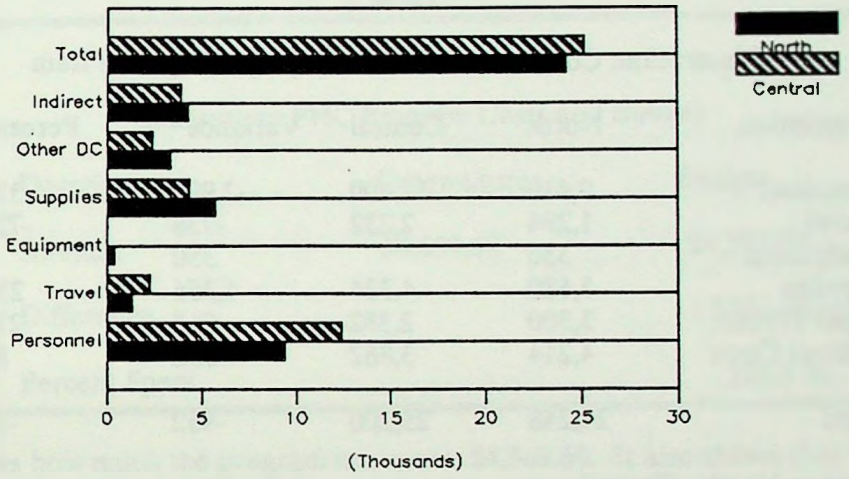
Sometimes it is easier to understand these figures if they are translated into graphs. Figures 1 and 2 illustrate some of the data from Tables 2 and 3.



This figure shows the distribution of line item expenses displayed in Table 2.

Figure 2

North and Central PHC Expenditures



This figure shows the distribution of line item expenses for the North and Central projects, from Table 3.

Sometimes managers and policymakers want to look at costs over time, that is, they want to look at trends. Table 4 and Figure 3 illustrate a trend analysis.

Table 4

Illustration: Trend Analysis of PHC Costs
1986-1989

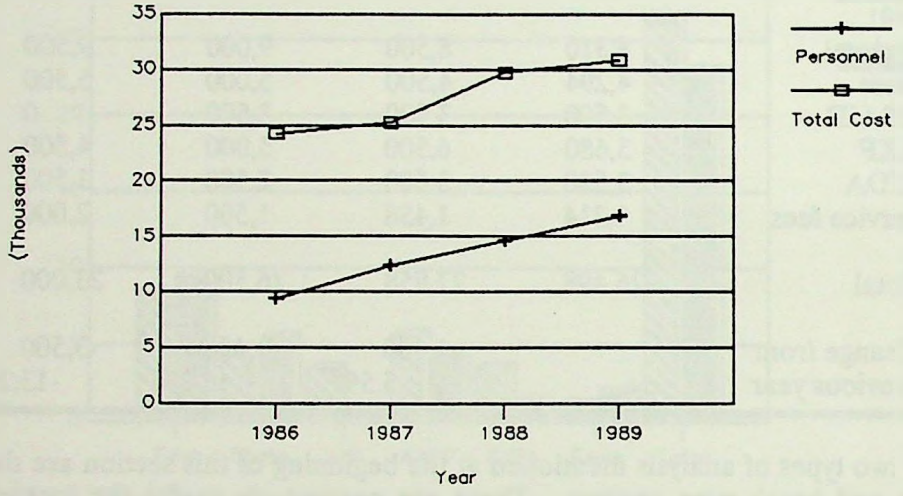
Description	1986	1987	1988	1989
Personnel	9,410	12,400	14,600	16,896
Travel	1,294	2,232	3,456	2,890
Equipment	350		1,290	587
Supplies	5,680	4,324	4,653	4,125
Other Direct	3,300	2,382	2,234	3,124
Indirect Costs	4,214	3,862	3,467	3,210
Total	24,248	25,200	29,700	30,832
Change from previous year		+952 +3.9%	+4,500 +17.9%	+1,132 +3.8%

These figures shows that costs have increased each year, but especially in 1988 when they went up almost 18 percent over the previous year. Each line item can be analyzed this way

also, to spot the cause of the increases. Figure 3 graphically shows the trend in total and personnel costs using the data from Table 4.

Figure 3

PHC Expenditures 1986—1989



Sometimes managers want to make projections of future costs. The analysis would look the same as in the last table and figure, only the dates would be in the future.

All of these are ways that cost analyses can be done. The analyst can examine the costs of one unit or several. For example, the total costs of the entire PHC programme can be analyzed, or that can be broken down and the costs of each subproject examined.

Financial people often calculate "average costs" or "unit costs", which are estimates of the costs of producing one unit of a product or service. Managers are often interested in this type of cost analysis, also. They may want to know how much it costs to immunize one child, how much it costs to install a well, or how much it costs to train a Community Health Worker (CHW). This type of cost analysis is different from the other types described previously in that it involves a measure of output as well as of cost. An example:

Cost of immunization component	$16,852	= $1.88 per child
Number of children immunized	8,954	immunized
Total cost of PHC programme	$150,896	= $3.35 per
Total Target Population	45,000	capita

These types of ratios are also used in Cost-Effectiveness Analysis, where alternative approaches to achieving the same objective are compared to see which one can achieve the most with the same level of resources.[1] This manual will not deal with Cost-Effectiveness

1. It can also be looked at the other way, that is, which approach can achieve the same level of output for the least expenditure of resources.

or Cost-Benefit analyses, which are more complicated, and which are described in another publication.[2]

Table 5

Illustration: Trend Analysis of PHC Revenues
1989-1992

Source	1989	1990	1991	1992
Federal	8,310	8,500	9,000	9,500
State	4,294	4,500	5,000	5,500
USAID	3,500	3,500	3,500	0
AKF	5,680	6,500	5,000	4,500
CIDA	3,500	3,500	2,500	1,500
Service fees	1,214	1,458	1,500	2,000
Total	26,498	27,958	26,500	23,000
Change from previous year		+1,460 +5.5%	-1,458 -5.2%	-3,500 -13.2%

The last two types of analysis mentioned at the beginning of this section are the analysis of revenues and break-even analysis. These are particularly useful for looking at project sustainability and replicability.[3]

Table 5 illustrates a hypothetical "trend" analysis of revenue spanning two years of actual revenue (1989-1990) and two of projected revenues (1991-1992). Figure 4 is a graph showing the distribution of revenues by source for two years, 1989 and 1992.

The tables show that overall revenue is expected to decline steadily, and the graph shows the differences in contributions expected from the various sources between the initial and last year. Federal and state revenues and service fees are expected to increase slightly, but donor revenues will decline substantially. The largest decline is projected for 1992, when revenues will decrease 13 percent.

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2. See, for example, Jack Reynolds and K.Celeste Gaspari, *Cost-Effectiveness Analysis. PRICOR Monograph Series: Methods Paper 2.* Bethesda: Center for Human Services, 1985.

3. Sustainability refers to the ability of the project to continue, and implies that this would be done largely without external donor assistance. Replicability refers to the feasibility of expanding or duplicating the project in other areas, usually by other organizations. It also implies that costs would be covered by that organization's revenues.

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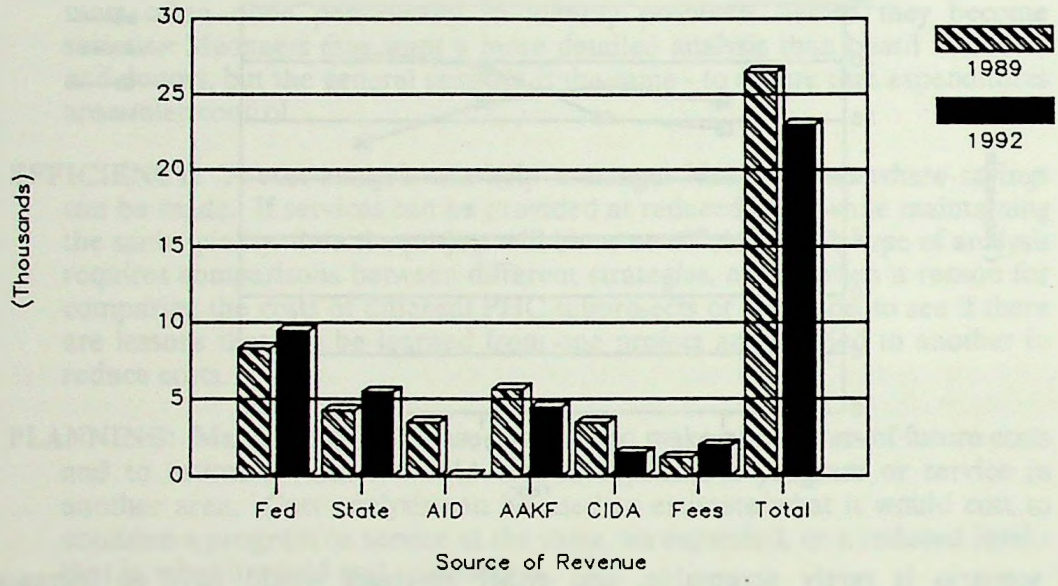
Figure 4

PHC Revenues by Source: 1989, 1992



The break-even analysis compares the revenues and expenditures for the four years and shows a surplus of 2,250 and 2,758 in the first two years, but deficits in the last two years of 3,200 and 7,832. Figure 5 shows that the project ceases to break even between 1990 and 1991, where the two lines cross. Again, the gap is projected to be substantial in 1992 when expenditures will exceed revenues by over 25 percent.

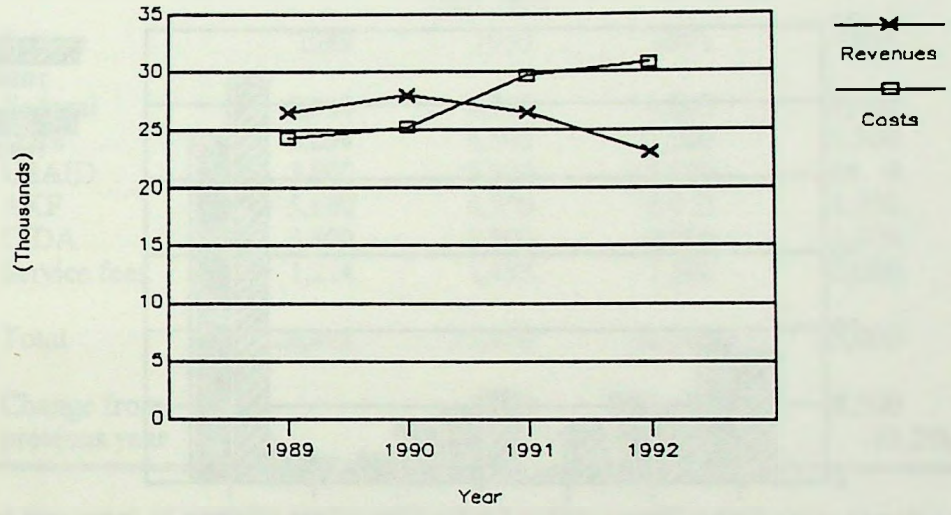
Table 6

Illustration: PHC Program Break-Even Analysis
1989-1992

Source	1989	1990	1991	1992
Revenues	26,498	27,958	26,500	23,000
Expenditures	24,248	25,200	29,700	30,832
Difference	+2,250	+2,758	-3,200	-7,832
Percent Difference (Expenditures/Revenues)	+9.3%	+10.9	-10.8	-25.4%

Figure 5

Break–Even Analysis 1989–1992



This scenario is rarely acceptable, and either revenues would have to increase or expenditures would have to be reduced. The analysis shows how much would be needed (7,832) to break even in 1992.

Summary

Cost analysis is the examination of expenditures to determine how resources have been spent. Nine types of analyses have been described:

1. The total amount of resources spent
2. Expenditures compared with budgets
3. The distribution of costs by line item
4. The distribution of costs by site or facility
5. Trends in costs over time
6. Projections of future costs
7. Average costs
8. Analysis of revenues (past and projected)
9. Break even analysis (revenues compared to expenditures)

The managers and policy-makers need to decide which of these analyses to apply. That decision depends largely on the purpose of the cost analysis, which is discussed in the following section.

2. How You Can Use Cost Analysis

There are three basic ways cost analysis can be helpful to managers.

MONITORING: This is the most common use - to monitor expenditures (and revenues) in order to make adjustments, if necessary. This type of analysis usually involves comparing actual expenditures with a budget, and is also most often done periodically to identify problems before they become serious. Managers may want a more detailed analysis than board members and donors, but the general purpose is the same - to ensure that expenditures are under control.

EFFICIENCY: A cost analysis can help a manger identify areas where savings can be made. If services can be provided at reduced costs while maintaining the same quality, then the project will be more efficient. This type of analysis requires comparisons between different strategies, and is often a reason for comparing the costs of different PHC subprojects or programs to see if there are lessons that can be learned from one project and applied to another to reduce costs.

PLANNING: Managers can also use cost data to make projections of future costs and to estimate what it would cost to replicate a program or service in another area. Cost analysis can be used to estimate what it would cost to continue a program or service at the same, an expanded, or a reduced level - that is, what it would cost to sustain it.

There is no single type of cost analysis that should be done and no standard purpose that fits all programs. Like most other management activities, it all depends on the what the user(s) want from the analysis. Since most PHC projects have a number of potential users (managers, boards, donors, communities, for example), it is entirely possible that each user would have a different objective in mind. In such a case it will be important to clarify what those objectives are, because each one might require a slightly different analytical approach. That is, multiple users could mean that multiple analyses will be required.

3. Steps in a Cost Analysis

This *User's Guide* shows managers and finance staff how to carry out a cost analysis in eight steps. The first three steps describe what the manager (user) should do to tell the finance staff what type of analysis to conduct. The remaining steps describe how the finance staff would set up the procedures and carry out the analysis.

Step 1: Specify the Objectives of the Cost Analysis

Step 2: Decide What to Cost

Step 3: Select the Types of Tables and Graphs to be Produced

Step 4: Set up Cost Coding System

Step 5: Code Income and Expense Data

Step 6: Enter Data and Compute Costs

Step 7: Analyze Cost Data

Step 8: Present/Report the Cost Analysis Findings

4. Some Limitations of Cost Analysis

This module deals with a specific type of cost, what economists would call "financial" or "accounting" costs rather than "economic" costs. The latter includes in-kind contributions, donated labor, etc. To economists, "the true cost of an activity is the value of the alternative endeavor that might have been undertaken with the same resources."[4] Measuring the true cost of PHC is very difficult. It would require, among other things, estimating the cost to the client of attending a clinic session, the cost of donated labor and materials, and the true cost of subsidized supplies. This module uses a practical approximation of true costs, which is financial costs - actual monetary expenditures, which is the type of cost information that appears in financial reports. However, suggetions are included in the module for estimating the cost of some important and typical items that do not have a monetary cost attached. For example, CHWs are often unpaid volunteers. It would be important in most cost analyses to include an estimate of the market value of their labor.

The terms cost and expenditure are used interchangeably in this module, even though they have different meanings to economists.

Most cost analyses will probably be done retrospectively, that is, the analyst will have to reconstruct costs that have already occurred in the past year or so. Often there are gaps in the records and estimates of costs will have to be made. That can be quite difficult to do. For example, many health workers carry out a variety of activities each day and do not keep track of how much time they spend on any one activity. That makes it difficult to compute the average cost of specific services. Several approaches for making estimates and allocating costs are described in this *Guide*, but the manager must accept that these are estimates and therefore, may not be completely accurate.

Some costs are difficult to predict, costs of drugs and vehicles, for example. That will make projections difficult to make. Imported goods are sometimes subject to higher or lower fluctuations than local goods. Exchange rates can vary over time, thereby artificially raising or lowering costs of the same good during a relatively short time period.

These and other common problems are discussed in the appendices and suggestions are made for dealing with them. In many cases, financial staff are familiar with these issues and can take them into account when conducting the cost analysis. The manager and policy-maker should, however, also be alert to the effects these limitations can have on the results.

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4. Kenneth E. Warner and Bryan R. Luce, *Cost-Benefit and Cost-Effectiveness Analysis in Health Care*, Ann Arbor, MI: Health Administration Press, 1982, p. 44.

5. Strengths of Cost Analysis

Even with these limitations, cost analysis can be a very useful tool for the manager and policy-maker. In the absence of certainty, even approximations can help improve decision-making. And given the strains on most PHC budgets, as well as the pressure from boards and donors to become self-sustaining, cost analysis will become an essential part of every manager's tool kit.

HOW TO USE THE COST ANALYSIS MODULE

The following section describes the procedures for designing and carrying out a cost analysis. More detailed explanations of some steps are found in the Appendices, along with some "tools" to help the manager and finance staff carry out the analysis. These tools include checklists, computer programs for entering and analyzing the cost data, and suggested procedures for allocating costs to various categories.

In many cases, especially among more sophisticated private PHC programs, the finance staff will be able to carry out the cost analysis as soon as the managers have clarified what they want analyzed and how they want the data presented. The finance staff would probably be able to set up a coding system, classify the cost data and prepare the required tables without referring to the steps in this Guide. In some cases, especially among public sector programs that do not normally track expenditures, the managers may have to call on one of the planning staff to set up a cost analysis from scratch. Those programs may find the steps and the "tools" particularly helpful and time-saving.

In any case, the user of this module should consider it a guide that can be adapted and modified to fit each local situation.

COST ANALYSIS PROCEDURES

Step 1: Specify the Objectives of the Cost Analysis (Manager)

There are three things the manager needs to specify: 1) the USER; 2) the PURPOSE; and 3) the SCOPE of the analysis. The following checklist can guide the manager in doing that.

First, who will be the **user** of the cost analysis? The manager is the most likely user, but the others listed could also be interested in the analysis. If so, it will be important that each one clarify exactly what the desired purpose and scope is.

Second, what is the **purpose** of the analysis? The three purposes listed were described in the previous section. It would help to write out the specific purpose, or purposes, as any one user could have several purposes in mind.

Finally, how broad should the **scope** of this analysis be? What geographic area will it cover (the entire country, a region, a city, several rural sites)? Some projects operate in multiple sites. Will they all be included in the analysis?

WORKSHEET for SPECIFYING OBJECTIVES

User/Audience:

___Manager _____
___Board of Directors _____
___Central Directorate _____
___Donors _____
___Other: _____

Purpose:

___Monitoring _____
___Efficiency _____
___Planning _____
___Other: _____

Scope:

___Geographic area _____
___Program/project/activity _____
___Time/Duration _____
___Expenditures &/or Revenues _____
___Other: _____

- How much programmatic detail is desired? Is it sufficient to look at the PHC program overall, or does the user want to break the costs down further: by project; by subproject; by outreach and clinical services; by specific PHC component (immunization, ORT, growth monitoring, training, supervision, etc.)? Is there a special component that the user wants to examine?

- What time frame should the analysis cover: the past year, the past five years, the next six months, the next three years?

- Should the analysis include revenues as well as costs? Or only revenues? Only costs?

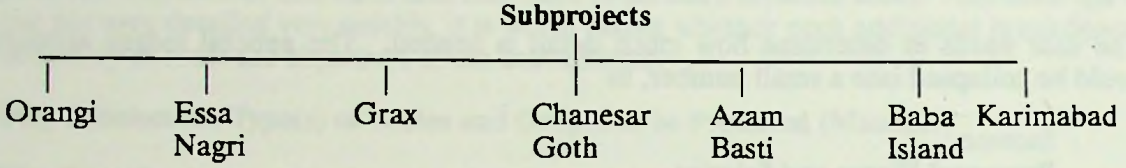
It would be helpful to write out the objective(s) in narrative form and to prepare a separate statement for each user, since each user is likely to have different objectives that will require different cost data.

Step 2: Decide What to Cost (Manager)

Here the manager needs to get specific regarding the level of detail desired. Obviously, the more detail requested, the more time, effort and expense will be involved. The simplest analysis would be of the PHC program overall, that is, the total cost of the PHC program without any breakdowns. Let us call that **Level 1.**

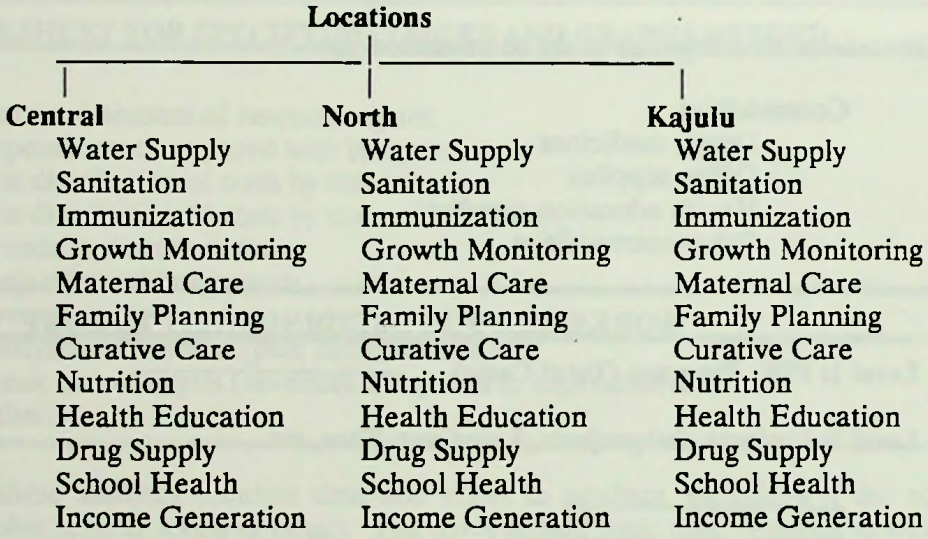
For some small projects that will be sufficient. But many PHC programs are made up of two or more "projects", "subprojects", "locations" or "sites", and the user may want to have a separate analysis of each of these. Let us call that **Level 2.** The Aga Khan University Urban PHC Project in Karachi consists of seven subprojects, or sites. An analysis of each of those, plus the overall project, would require eight separate cost analyses.

AKU Urban Project



Each PHC project (or subproject) usually offers an array of services, which we will call "components". The user may want to cost some or all of these PHC service components. Let us call that **Level 3.**

Kisumu PHC Project



The Kisumu PHC project in Kenya consists of three "locations", each of which offers several services. The user may not wish to cost all of these, of course, as the number of cost analyses increases rapidly with each level. If all three Kisumu locations and all 12 PHC services were to be costed, that would be 36 cost analyses. An alternative would be to select one or two services that are really important or to group the services, e.g., Health Center Services, Satellite Clinic Services and Community-based Services.

In addition to these direct services, the user may want to know the costs of certain support services, such as the following:

Training	Financial Management
Supervision	Monitoring/Evaluation
Planning	Research
Logistics	Community Organization

The final level of detail, call it **Level 4**, is the General Ledger Accounts. These are sometimes called "line items" (personnel, travel, equipment, etc.). Most PHC projects already have a "Chart of Accounts", and would use those categories. An example of a

detailed list is found in the Appendix and on the enclosed computer disk as ACCOUNT.WK1.

The user needs to determine how much detail is needed. The general ledger accounts could be collapsed into a small number, as

Income
Personnel Wages and Salaries
Commodities
Travel
Capital Expenditures
Other Direct Costs
Indirect Costs
Subcontracts

Or some or all categories could be expanded, as

Commodities
- Drugs, medicines
- Office supplies
- Health education supplies
- Other commodities

WORKSHEET FOR DECIDING WHAT TO COST

Level 1: PHC Program (Total Costs) _____

Level 2: Projects, Subprojects, Locations, Sites, etc.

_____
_____
_____
_____

Level 3: PHC Service Components or Managment Components

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Level 4: General Ledger Accounts

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

The preceding worksheet can be used to specify the level of detail wanted for the cost analysis. Remember that each user may need to fill out a separate sheet. And since the list can get very detailed very quickly, it is worth asking whether each additional breakdown is necessary to meet the objectives of the cost analysis.

Step 3: Select the Type(s) of Tables and Graphs to be Produced (Manager)

The Introduction to this Module described nine types of cost analyses that could be performed. The user needs to select those that are needed for this analysis. It can be very helpful to set up the "dummy tables" and graphs at this point, since that will make clear to the analyst what is expected, and ensure that the information that the user desires is produced. Appendix C 4 includes instructions for constructing dummy tables and graphs, together with a computer file of illustrative tables and graphs (MOD7ANAL.WK1).

WORKSHEET FOR SPECIFYING TABLES AND GRAPHS NEEDED

___1. The total amount of resources spent
___2. Expenditures compared with budgets
___3. The distribution of costs by line item
___4. The distribution of costs by site or facility
___5. Trends in costs over time
___6. Projections of future costs
___7. Average costs
___8. Analysis of revenues (past and projected)
___9. Break even analysis (revenues compared to expenditures)
___10. Other:

Again, each of these analyses requires time and effort to produce, especially if the cost analysis will involve several levels of detail. The users should limit their requests to those analyses that are needed to meet the cost analysis objectives.

Step 4: Set up Cost Coding System (Analyst)

At this point the finance staff can take over. The next step would be to develop or adapt a coding system for the items to be costed. For example, assume that the Kisumu PHC project manager decided to limit the analysis to the levels shown in the box on teh opposite page. The finance staff (or analyst could then assign a code to each category to make it easier to classify the expenditures into groups for summing and further analysis. If the Finance staff already have a coding system, that should be used or adapted, if at all possible. If new codes have to be developed, they should be simple and easy to remember. The above example only requires 39 separate codes (3 locations * 2 service components * 5 expense ledger accounts + 3 locations * 3 revenue sources), so consecutive numbers of 1-39 could be used as codes. This may not be easy to remember, however, and letter codes might be preferred. For example, the locations could be coded as follows:

N = N. Nyakach
C = C. Nyakach
K = Kajulu

The Service Components could be:

C = Clinical
O = Outreach

And the General Ledger Account codes could be:

Expenditures		Revenues	
P =	Personnel	F =	Service Fees
T =	Travel	D =	Donor Support
S =	Supplies	N =	Other Income
O =	Other Direct Costs		
I =	Indirect Costs		

Each transaction would then be given a three-letter code, where the first letter stands for the location, the second for the PHC component and the third for the General Ledger Account. Examples:

KCP Clinic personnel costs at Kajulu

NOT Outreach travel costs at N. Nyakach

CCF Service fees collected at the C. Nyakach clinic

Level 1: PHC Program Total Costs KISUMU PHC
PHC Program Total Revenues

Level 2: Projects, Subprojects, Locations, Sites, etc.

N. Nyakach
C. Nyakach
Kajulu

Level 3: PHC Service Components or Managment Components

Clinical Services
Outreach Services

Level 4: General Ledger Accounts

Expenditures:	Revenues:
Personnel	Service Fees
Travel	Donor Support
Supplies	Other Income
Other Direct Costs	
Indirect Costs	

Appendix C 2 includes a printout of a computer file (ACCOUNTS.WK1) - also on the enclosed disk) that describes how to develop numeric and letter codes. Appendix C 3.2

contains version 2 of the data entry worksheet (MOD7V2.WK1 - also on disk) includes an illustrative set of cost codes and a sample printout of an income and expense report organized according to those codes.

Step 5: Code Income and Expense Data (Analyst)

Before coding begins the manager and finance staff will need to meet to determine which costs will and will not be included in the analysis. Some costs (international travel to attend a PHC conference, subscriptions to computer magazines, receptions for visiting guests) may distort the cost analysis if included. However, if those costs are a reasonable input to the project (e.g., computer magazines to keep the MIS staff informed about the latest hardware and software), then they should be included.

The guiding principle should be:

are these costs relevant to the cost analysis objectives?

If they are they should be included.

Now the income and expense data can be coded. If this is a prospective analysis (to be done in the future) then the financial staff will need to set up procedures to make sure that all expenses and revenues are coded, following these codes, as they occur. This will probably require an orientation session for all PHC staff to make sure that they understand the new system, and periodic monitoring to ensure that they remember to code expenditures properly.

Unfortunately, in most cases the cost analysis will be done retrospectively and the finance staff will have to reconstruct many of the costs. Appendix B provides suggestions for allocating past and future costs.

When costs can be clearly attributed to a category, then the coding is straightforward. Examples are fuel costs for a mobile outreach van, vaccine costs for the immunization component, and computer repair costs for the MIS. Sometimes the attribution is not at all clear and then estimates will have to be made. Examples are the operating costs of an all-purpose project vehicle, PHC brochures describing services available, and project management costs.

Allocation estimates can be done by the manager and staff making educated guesses (which may be more accurate than one would expect - and definitely inexpensive and rapid) or through some sort of formal estimation survey. One of the most common allocation problems is staff time. Most PHC staff do not keep track of how they spend their time, which makes it difficult for the finance staff to allocate costs if the analysis is to include breakdowns by PHC service or management component.

One approach to time allocation is shown on the next page. First, the cost categories specified in Step 2 are listed. If there are only two categories (outreach and clinical, for example), then time should be allocated to one or the other of those two categories. In the following example five component categories have been identified: immunization, growth monitoring, administration, supervision and other.

Allocations can be done for each staff member, for classes of staff (all CHWs, all nurses), or just for those that are relevant to the cost analysis (e.g., all outreach staff).

STAFF TIME ALLOCATION WORKSHEET

1. List categories to be costed: IMM, GM, Admin, Sup, Other
2. Estimate percent of staff time spent on each activity*
3. List compensation of staff
4. Multiply 2 * 3

Staff: J. Riley Compensation: 4,600/year

	Hrs/Week	Percent	Cost
IMM	20	25.0	1,150.00
GM	10	12.5	575.00
Admin	15	18.75	862.50
Sup	10	12.5	575.00
Other	25	31.25	1,437.50
Total	80	100.0	4,600.00

* See following worksheet for a suggested procedure for collecting needed data.

The sampling period can be relatively short if the staff member follows a similar routine every day or week. Obviously, the sampling period should be as typical of the cost analysis period as possible.

Data can be collected by trained observers or reported by the staff themselves. The former is more expensive, the latter is likely to be less objective. However, given the costs involved and the relative importance of being highly accurate, self-reporting may be a practical approach.

Time allocation data can be collected on a simple form, such as the one shown below. This form is for a two-week period, but could be shorter or longer. It can be used prospectively as well as retrospectively, and it can be used by an observer or the staff themselves. The number of hours each staff member spends on each component would be filled in each day. The percent distribution could be computed by the analyst.

Additional suggestions for conducting time analyses are found in Appendix B: Cost Allocation.

TIME ANALYSIS WORKSHEET																	
Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	Percent
CODE:																	
IMM																	
GM																	
Admin																	
Sup																	
Other																	
Total																	

Step 6: Enter Data and Compute Costs (Analyst)

The data can now be entered into a journal or computer for processing. Included in this *Guide* are three versions of a data entry and tabulation program designed for PHC projects that do not have a computerized financial system that can produce the desired cost data. These programs are found on the data disk (MOD7V1.WK1, MOD7V2.WK1 and MOD7V3.WK1) complete with instructions. They are also illustrated in Appendix C.

Whether these programs or Finance staff programs are used, the data (transactions) all need to be entered (recorded) for the specified cost analysis period, tabulated according to each cost code selected, and summed.

Step 7: Analyze Cost Data (Analyst)

Assuming that the dummy tables and graphs were selected in Step 3, the analysis should be straightforward. The Introduction illustrated nine different cost analyses procedures, and includes tables and graphs. Appendix C includes a computer file (MOD7ANAL.WK1) that contains five illustrative templates that provide simple instructions for analyzing cost data. They also include pre-designed graphs and instructions for displaying them. These templates can be copied or modified so that analysts can substitute other cost data for those illustrated.

Step 8: Present/Report the Cost Analysis Findings (Analyst)

The final, obvious, step is to report the findings to the user(s). The tables and graphs included in this *Guide*, and the templates included in the computer disk, can be copied and modified to display the findings in a simple, clear manner.

APPENDICES

These appendices contain additional guidelines, tools and detailed suggestions for conducting a cost analysis. The computer files that are illustrated are included on the accompanying disk. They are all written to work on Lotus 1-2-3.

APPENDIX A:

BASIC COST ANALYSIS CONCEPTS

APPENDIX A: BASIC COST ANALYSIS CONCEPTS[5]

This appendix defines and illustrates the basic cost concepts that are needed to understand what constitutes a cost analysis. Specifically, the sections that follow describe:

- Type of costs (direct and indirect, capital and recurrent, fixed and variable, average and marginal)
- Cost-Effectiveness and Cost-benefit
- Economies of Scale, Monetary and Nonmonetary Cost Estimates and Shadow Pricing
- Inflation, Foreign Exchange and computing Present Value

TYPE OF COSTS

The true cost of a primary health care program is measured as the value that could be gained by using the resources in some other way, such as the building of a surgical unit, the implementing of a nutritional program, or the refurbishing of a hospital.

The first step in cost calculation is to identify all the resources that have been or will be expended to produce the given effect. Whether or not these resources have a monetary or nonmonetary value associated with them is immaterial in this identification phase. (In a later section, guidelines for valuing nonmonetary resources will be given.)

DIRECT, INDIRECT, AND INFRASTRUCTURE COSTS

The first way to classify costs is as direct, indirect, or infrastructure. Direct costs are directly distributable to the service. For example, the direct costs of expanding a primary health care program to include an ORT component may consist of personnel salaries, volunteer time, ORT salt packets, and transportation. Indirect costs are the costs of supporting the direct services. The expansion of the primary health care program may require the Ministry of Health to hire an additional planner to deal with the administration of the ORT activity, or the Ministry of Transportation may need to hire additional mechanics to service the program's new vehicles. Infrastructure costs are even less directly related to the program. They include the costs of roads, ports, and telephone systems that the program requires.

CAPITAL AND RECURRENT COSTS

Once costs have been categorized as direct, indirect or infrastructure, they can be classified as capital (or developmental) and recurrent (or operating). The distinction between the two types is based on life expectancy. Those resources that have a life expectancy of 1 year or more usually are called capital costs. They may include buildings, cars, trucks, beds, and medical equipment. Those resources that are purchased and used (or replaced) within 1 year's time are recurrent costs. They include such items as personnel salaries, medicine and supplies, gasoline, electricity, drugs, and food.

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5. Adapted from "Appendix A: A Guide to Calculating Costs", in Jack Reynolds and K. Celeste Gaspari, *Cost-Effectiveness Analysis, op cit.*

The distinction between capital and recurrent costs is important in PHC cost analyses because:

1. These costs are calculated in different ways (this will be described in a later section.)

2. Some donors limit their contributions to capital costs and expect the host country to be responsible for the recurrent costs.

3. In many countries there is one budgeting and accounting process for recurrent costs and another for capital costs.

FIXED AND VARIABLE COSTS

Fixed costs do not vary with program size; variable costs do. Examples of fixed costs are those of a building, salaries of permanent staff, and medical equipment. These costs are set (fixed), regardless of whether the program serves 1 person or 1,000. Variable costs include drugs, gasoline, and vehicle maintenance. These items vary with the amount of service provided. The cost of providing ORT packets is an example. The more people served, the greater the number of ORT packets distributed and the greater the resultant cost.

The distinction is particularly important when the analysis is used to estimate the costs and effects of expanding a program. Sometimes a program could be expanded inexpensively because the fixed costs would remain the same and only the variable costs would increase. For example, a primary health care program with an ORT component might be expanded from 1,000 to 1,200 persons simply by providing additional oral rehydration packets and some gasoline for the supervisors to deliver the ORT packets to the CHWs. The cost of expansion would be relatively low.

Under another alternative, expansion might require increased fixed costs. For example, new staff and a jeep might be required to serve the additional 200 people, which could increase the cost of expansion significantly. Thus, it is important to identify and measure those costs that will vary, including the costs of supervision, information systems, storage, and vehicle maintenance.

AVERAGE COSTS, MARGINAL COSTS AND ECONOMIES OF SCALE

One other distinction in calculating costs is worth mentioning at this point. The average (or per unit) cost is the total cost of a program divided by the total number of units of outcome. An example would be the total cost of an immunization component of a primary health care program (e.g. $10,000) divided by the number of children immunized (e.g. 5,000), which would produce an average cost per child immunized ($2).

A marginal cost is the increased cost of providing an additional unit of outcome. For example, if a program could immunize 5,000 children at a total cost of $10,000, any additional cost of immunizing the 5,001st child (e.g. $.40) would be the marginal cost. Hence, marginal costs are the additional resources required for immunizing an additional child. In this case, the expansion - even to one more person - would include the extra vaccine, additional medical supplies, and the amount of personnel time spent in administering the vaccine. The marginal cost calculation is particularly useful when estimating the cost of expanding a program to different levels.

Economies of Scale exist when the greater the number of children immunized the less it costs to immunize each additional child. In other words, the marginal cost per child immunized would be less than the average cost. Economies of scale usually occur when fixed costs do not increase as services are expanded. That is, the program has "excess capacity" (unused clinic beds, staff with available time, an underutilized Land Rover) that can be used at no extra cost. The extra costs of serving more people usually are limited to the variable costs (medical supplies, gasoline, etc.).

When there is little or no excess capacity (no unused beds, no available staff time, etc.) then additional fixed costs may have to be incurred to permit expansion. In this case there usually is an increase in average costs, marginal costs and total costs. This is called diseconomies of scale, since the larger the program gets, the more it costs to serve each additional child.

COST-EFFECTIVENESS AND COST-BENEFIT ANALYSES

Cost effectiveness analysis (CEA) is an analytical tool to help decisionmakers assess and compare the costs and effectiveness of alternative ways of achieving an objective. The cost-effectiveness (CE) ratio is calculated by dividing the cost of an alternative, which is usually expressed in monetary terms, by the effectiveness of that alternative, which usually is expressed in nonmonetary terms.

Cost-benefit analysis (CBA) is often confused with CEA; however, in this method, both the cost (the numerator) and the effect (the denominator) are expressed in monetary terms. For example, in computing the cost-benefit of a seat-belt program designed to save lives, the economic value of a life saved would have to be determined and then multiplied by the number of lives saved. The results would show how the benefit (in monetary terms) compares with the cost (also in monetary terms). Some analysts invert the numerator and denominator to compute a "benefit/cost ratio." Health benefits usually are difficult to express in monetary terms, which makes this type of analysis difficult to undertake.

MONETARY AND NONMONETARY COST ESTIMATES AND SHADOW PRICING

Once the cost categories have been listed for each program, activity, service, or task to be costed, the quantity of each of these inputs must be identified; i.e. the number of hours or days of personnel time, the physical quantities of supplies, the hours of use of facilities. Conversion of these inputs into some monetary unit (e.g. pesos, rupees, dollars) is a critical step in cost analysis. Many items are easily convertible to a monetary value by using the current market price for the item. For example, personnel costs of health education activities can be computed using current wages and salary rates. However, sometimes this market price does not reflect the true cost of the input, and "uncritical use of market prices can lead to large gaps between cost estimates and the true cost."[6]

Sometimes the prices of goods and services are artificially high, low, or nonexistent. Common examples of this phenomenon are the following:

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6. Warner and Luce, op. cit., p. 80.

- "Free" drugs and medical care
- Donations for drugs or medical care
- Donation of land, labor, or furniture
- Volunteers, especially community health workers.

For items such as the above, shadow prices should be calculated. Shadow prices are estimates of the true costs of goods or services. For instance, how should the value of a volunteer's time or of furniture donated to a health project be computed? The easiest method would be to assume that the costs are zero since the project paid nothing for them. In fact, this is incorrect. The social cost of these items is not zero, because if the health project had not used them, they could have been used elsewhere. The true cost of these items, their shadow prices, can be calculated in one of two ways.

1. If the project includes similar material or services that have been purchased in the market, apply these prices to the donated materials or services.

2. If no value can be assigned in this way, calculate the monetary value that would have been paid for the material or service in an alternative project.

For example, if paid employees perform tasks similar to those carried out by volunteers, then a wage rate of the paid employee can be assigned to the volunteer. Otherwise, the analyst should calculate what it would cost to substitute wage labor for the volunteer. The value of donated furniture should be calculated similarly. If no monetary figure is available, then use the market price for similar furniture.

Great care must be taken at this stage of the analysis, lest artificial inflation or deflation of the program's total cost result from uninformed estimates.

A final caveat must be added:

> ...certain costs cannot be valued in meaningful fashion - for example, pain and suffering - but the analysts' inability to take them to and through the evaluation stage is no excuse for ignoring them in the final cost-benefit calculus. Even when it is not possible to indirectly or implicitly value such costs, it is incumbent on analysts to bring the immeasurable to the fore when measured costs and benefits are being prepared.[7]

FOREIGN EXCHANGE

All costs should be calculated in the currency of the host country. However, if the program relies on imported items that must be paid for with foreign exchange, then this presents two problems. First, the official exchange rate may be artificial, and shadow prices will have to be used to compute the actual costs of imported goods. For example, one Asian country recently had an "official" exchange rate of 6:1 and a "black market" exchange rate of 76:1. Calculating the cost of imported items under the official exchange rate would result in a cost 11 times less than the real costs. In effect, the government's official exchange rate

7. Ibid., p.82.

subsidizes the health program and should be added to the project cost. This is a case where the official exchange rate does not reflect the true price of foreign exchange and a shadow price for foreign exchange should be calculated. The cost of items should then be calculated according to the shadow price of foreign exchange.

The second problem is that foreign exchange may be so limited that replication or sustainability may not be feasible. For example, government restrictions might be such that the project could not obtain enough foreign exchange to import needed drugs. Alternatively, the foreign exchange might be available, but import restrictions might limit the amount or type of items that can be imported. A cost analysis must account for these nonmonetary constraints.

ADJUSTING FOR INFLATION

Inflation is an especially important consideration when the cost analysis is projecting future costs. If the inflation rate is expected to be the same each year (say 5 %) and to be equally applicable to all items (personnel, fuel, etc.), then it is a simple matter to multiply the current costs by a standard inflation factor (e.g., 105%).

However, inflation does not usually behave that way. It may be very high for certain items (rent in an urban area, gasoline) and low for others (supplies, maintenance). It is also likely to vary over time, perhaps 3 % one year and 15 % the next. Predicting inflation is practically impossible, so the best the analyst can do is adopt the figures used by major financial institutions, such as banks, manufacturers, etc. The analyst should also use different inflation factors for different cost categories if those categories are significant in the analysis. For example, personnel costs often account for the largest expenditures. The analyst should take special care to apply a reasonable inflation rate to those costs. If commodity costs are not expected to rise, then a different rate should be applied, especially if this is a large cost item.

COMPUTING PRESENT VALUE

If a projection is to exceed 1 year, then economists usually discount costs to obtain an estimate of the present value of the projection. The rationale for computing present value is that the funds for years 2, 3, and beyond could be invested and earn interest, which would offset some of the cost. Discounting is usually applied to the total annual cost, but it can also be applied to individual items, such as fuel, medicines, etc.

The formula for computing present value is $PV = c/(1+r)^n$. Assuming an interest rate of 15 percent, the present value of fuel cost for the next three years would be computed as follows:

Year	Cost	r
1	1,250	-
2	1,563	.8696
3	1,953	.7561
TOTAL COST	4,766	
Present Value	4,086	

- Present value fuel = $1,250 + 1,563/(1+r) + 1,953/(1+r)^2$
  = $1,250 + 1,563/(1+r) + 1,953/(1.15)^2$
  = 1,250 + 1,359 + 1,477 = 4,086

Using a present value table (see table A-1), the factors for r are found by reading down the 15% column for 1 and 2 and the calculation becomes:

- Present value fuel = 1,250 + (1,563 x .8696) + (1,953 x .7561)
  = 1,250 + 1,369 + 1,477 = 4,086

Table D-3.--Present Value Table

$$PV = \frac{C}{(1+r)^n}$$

Period	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	12%	14%	15%	16%	18%	20%	24%	28%	32%	36%
1	.9901	.9804	.9709	.9615	.9524	.9434	.9346	.9259	.9174	.9091	.8929	.8772	.8696	.8621	.8475	.8333	.8065	.7813	.7576	.7353
2	.9803	.9612	.9426	.9246	.9070	.8900	.8734	.8573	.8417	.8264	.7972	.7695	.7561	.7432	.7182	.6944	.6504	.6104	.5739	.5407
3	.9706	.9423	.9151	.8890	.8638	.8396	.8163	.7938	.7722	.7513	.7118	.6750	.6575	.6407	.6086	.5787	.5245	.4768	.4348	.3975
4	.9610	.9238	.8885	.8548	.8227	.7921	.7629	.7350	.7084	.6830	.6355	.5921	.5718	.5523	.5158	.4823	.4230	.3725	.3294	.2923
5	.9515	.9057	.8626	.8219	.7835	.7473	.7130	.6806	.6499	.6209	.5674	.5194	.4972	.4761	.4371	.4019	.3411	.2910	.2495	.2149
6	.9420	.8880	.8375	.7903	.7462	.7050	.6663	.6302	.5963	.5645	.5066	.4556	.4323	.4104	.3704	.3349	.2751	.2274	.1890	.1580
7	.9327	.8706	.8131	.7599	.7107	.6651	.6227	.5835	.5470	.5132	.4523	.3996	.3759	.3538	.3139	.2791	.2218	.1776	.1432	.1162
8	.9235	.8535	.7894	.7307	.6768	.6274	.5820	.5403	.5019	.4665	.4039	.3506	.3269	.3050	.2660	.2326	.1789	.1388	.1085	.0854
9	.9143	.8368	.7664	.7026	.6446	.5919	.5439	.5002	.4604	.4241	.3606	.3075	.2843	.2630	.2255	.1938	.1443	.1084	.0822	.0628
10	.9053	.8203	.7441	.6756	.6139	.5584	.5083	.4632	.4224	.3855	.3220	.2697	.2472	.2267	.1911	.1615	.1164	.0847	.0623	.0462
11	.8963	.8043	.7224	.6496	.5847	.5268	.4751	.4289	.3875	.3505	.2875	.2366	.2149	.1954	.1619	.1346	.0938	.0662	.0472	.0340
12	.8874	.7885	.7014	.6246	.5568	.4970	.4440	.3971	.3555	.3186	.2567	.2076	.1869	.1685	.1372	.1122	.0757	.0517	.0357	.0250
13	.8787	.7730	.6810	.6006	.5303	.4688	.4150	.3677	.3262	.2897	.2292	.1821	.1625	.1452	.1163	.0935	.0610	.0404	.0271	.0184
14	.8700	.7579	.6611	.5775	.5051	.4423	.3878	.3405	.2992	.2633	.2046	.1597	.1413	.1252	.0985	.0779	.0492	.0316	.0205	.0135
15	.8613	.7430	.6419	.5553	.4810	.4173	.3624	.3152	.2745	.2394	.1827	.1401	.1229	.1079	.0835	.0649	.0397	.0247	.0155	.0099
16	.8528	.7284	.6232	.5339	.4581	.3936	.3387	.2919	.2519	.2176	.1631	.1229	.1069	.0930	.0708	.0541	.0320	.0193	.0118	.0073
17	.8444	.7142	.6050	.5134	.4363	.3714	.3166	.2703	.2311	.1978	.1456	.1078	.0929	.0802	.0600	.0451	.0258	.0150	.0089	.0054
18	.8360	.7002	.5874	.4936	.4155	.3503	.2959	.2502	.2120	.1799	.1300	.0946	.0808	.0691	.0508	.0376	.0208	.0118	.0068	.0039
19	.8277	.6864	.5703	.4746	.3957	.3305	.2765	.2317	.1945	.1635	.1161	.0829	.0703	.0596	.0431	.0313	.0168	.0092	.0051	.0029
20	.8195	.6730	.5537	.4564	.3769	.3118	.2584	.2145	.1784	.1486	.1037	.0728	.0611	.0514	.0365	.0261	.0135	.0072	.0039	.0021
25	.7798	.6095	.4776	.3751	.2953	.2330	.1842	.1460	.1160	.0923	.0588	.0378	.0304	.0245	.0160	.0105	.0046	.0021	.0010	.0005
30	.7419	.5521	.4120	.3083	.2314	.1741	.1314	.0994	.0754	.0573	.0334	.0196	.0151	.0116	.0070	.0042	.0016	.0006	.0002	.0001
40	.6717	.4529	.3066	.2083	.1420	.0972	.0668	.0460	.0318	.0221	.0107	.0053	.0037	.0026	.0013	.0007	.0002	.0001	*	*
50	.6080	.3715	.2281	.1407	.0872	.0543	.0339	.0213	.0134	.0085	.0035	.0014	.0009	.0006	.0003	.0001	*	*	*	*
60	.5504	.3048	.1697	.0951	.0535	.0303	.0173	.0099	.0057	.0033	.0011	.0004	.0002	.0001	*	*	*	*	*	*

*The factor is zero to four decimal places.

Annualization Factors for Determining Annual Cost of Facilities and Equipment for Different Periods of Depreciation and Interest Rates*

Lifetime of Assets (n)	*Interest Rates (r)*		
	5%	*10%*	*15%*
1			
2	0.5378	0.5762	0.6151
3	0.3672	0.4021	0.4380
4	0.2820	0.3155	0.3503
5	0.2310	0.2638	0.2983
6	0.1970	0.2296	0.2642
7	0.1728	0.2054	0.2403
8	0.1547	0.1874	0.2229
9	0.1407	0.1736	0.2096
10	0.1295	0.1627	0.1993
11	0.1204	0.1540	0.1911
12	0.1128	0.1468	0.1849
13	0.1065	0.1408	0.1791
14	0.1010	0.1357	0.1747
15	0.0963	0.1315	0.1710
16	0.0923	0.1278	0.1679
17	0.0887	0.1247	0.1654
18	0.0855	0.1219	0.1632
19	0.0827	0.1195	0.1613
20	0.0802	0.1175	0.1598
21	0.0780	0.1156	0.1584
22	0.0760	0.1140	0.1573
23	0.0741	0.1126	0.1563
24	0.0725	0.1113	0.1554
25	0.0710	0.1102	0.1547
26	0.0696	0.1092	0.1541
27	0.0683	0.1083	0.1535
28	0.0671	0.1075	0.1531
29	0.0660	0.1067	0.1527
30	0.0651	0.1061	0.1523

*Annualization Formula: $a(r,n) = \frac{[r(1+r)^n]}{[(1+r)^n - 1]}$

where r = interest rate and n= lifetime of asset for depreciation.

Source: Henry M. Levin, Cost-Effectiveness: A Primer (Beverly Hills: Sage Publications, 1983), p. 70.

APPENDIX B:

COST ALLOCATION

APPENDIX B: COST ALLOCATION

Unless one has a sophisticated system for classifying costs as they occur, cost allocation has to be done after the fact. Some costs are clearly attributable to a specific cost category. Examples would be Salter scales for growth monitoring, Vitamin A for blindness prevention, polio vaccines for immunization services, and the time of a family planning field worker. The more costs there are that can be assigned to a particular category, the more likely the analysis will be relatively accurate.

Unfortunately, many cost items are not so easily attributable. A common example is a multi-purpose van that is used to transport supplies to various health centers, take CHWs to in-service training sessions; provide logistic support for various PHC campaigns; and pick up visiting dignitaries at the airport. Some drivers keep track of the mileage for each of these activities. When that is done, the total costs of operating the vehicle can then be divided among those activities. That is, the costs can be allocated among the cost categories of interest.

There are several ways to allocate costs. Some are simple and can be done quickly. Others are more complicated and can be expensive and time-consuming. What is important to keep in mind is that most of these methods are estimates, and complicated procedures are not necessarily more accurate than simpler ones. If accuracy is important, the project should set up a prospective cost allocation system so that costs can be classified as they occur.

Failing that, the following steps will provide most projects with a reasonably accurate estimation of actual costs.

Step 1: List the Cost Codes to be used.

See Step 4 in the text and Appendix C 2: Income and Expense Account Worksheet for more detail on how to do this. For the purposes of this example, we will use the cost categories and codes described in Step 4 of the text. Those are:

Locations
- N = N. Nyakach
- C = C. Nyakach
- K = Kajulu

Services
- C = Clinical
- O = Outreach

General Ledger Accounts
- P = Personnel
- T = Travel
- S = Supplies
- O = Other Direct Costs
- I = Indirect Costs

Examples:

NCP = N. Nyakach, clinical, personnel costs
COT = C. Nyakach, outreach, travel costs
KOS = Kajulu, outreach, supply costs

Step 2: Separate the Costs into Direct and Indirect Categories

Direct costs are those that can be attributed (and therefore, allocated) to one or more of the principal cost categories. Indirect costs cannot be. These costs are sometimes called "overhead" costs. Figure B-1 illustrates one way to separate direct and indirect costs.[8] this step.

Figure B-1

Direct Costs	Amount	Indirect Costs	Amount
Community Nurses	2,000	Accountant	500
Community H.Wkrs	3,500	MIS specialist	800
Travel, outreach	1,245	Property taxes	345
Vaccines	250	Insurance	125
Weighing scales	144	Utilities	367
Total	7,139	Total Indirect	2,137
Total Costs	9,276	2,137/7,139 =	.29934

Step 3: Compute the Indirect Cost Rate

The direct costs are listed on the left in Figure B-1 and summed, the indirect costs are on the right, also summed. Total costs are the sum of the direct and indirect costs. It is worth noting that the total costs are not affected by the classification. The total will remain the same whether there are more or fewer costs classified as indirect. It is possible, for example, that utilities, the time of the MIS specialist, and other indirect costs could be allocated directly to the various health centers. In theory, a PHC project that did nothing but PHC, and whose staff worked only on PHC would have no indirect costs. Everything would be directly attributable to the PHC project.

The computation in the lower right-hand corner of Figure B-1 shows that indirect costs are about 30% (.29934) of direct costs. That proportion can be used in two ways: 1) to allocate indirect costs by adding a proportion of indirect costs to each direct cost item; and 2) to estimate future indirect costs when preparing budgets, assuming that there will be no significant change in the categories or amounts. This figure of 30% is sometimes called the "indirect cost rate".

Thus, one way to allocate indirect costs is to multiply the direct costs of each health center by 30 percent, and add that amount to each health center's direct costs, as shown below. If you decide to use this method, you can allocate the indirect costs now, otherwise, see Step 5.

8. It is important to keep in mind that each project will have to determine which costs it classifies as direct and indirect. There are no rigid rules as to which costs fall into each category. For more guidance on this issue see Appendix C2: Income and Expense Account Worksheet.

Category	Amount	Percent	Figure B-2 N. Nyakach	C. Nyakach	Kajulu
Direct	7,139		3,200	2,131	1,808
Indirect	2,137	.29934	958	638	541
Total	9,276		4,158	2,769	2,349

Step 4: Allocate Direct Costs

The direct costs will usually be of two types: 1) those that can be attributed solely to one direct cost category (in this example, one of the three health centers and one of the two PHC services); and 2) those that can be attributed to more than one direct cost category. Note the emphasis on direct cost. The allocation of indirect costs will be addressed in Step 5.

Step 4.1: Code all Direct Costs that Can be Attributed to a Single Cost Category.

This is the easiest allocation step, as described at the beginning of this appendix. Figure B-3 illustrates how the direct costs of staff, travel and supplies would be coded for costs attributable to outreach services at each health center.

Category		Code	Figure B-3 Nyakach	C. Nyakach	Kajulu
Personnel					
Community Nurse					
	Husein	NOP	854		
	Rahman	COP		765	
	Manji	KOP			812
CHW	Bana	NOP	123		
	Jillani	NOP	134		
	Farida	COP		112	
	Shirazi	KOP			122
	Khan	KOP			114
	Mohad	KOP			133
Travel					
	Husein	NOT	85		
	Rahman	COT		44	
	Manji	KOT			34
Supplies					
	Vaccines	COS	223		
	GM cards	NOS		65	
	Scales	KOS			222
Total			1,419	986	1,437

Step 4.2: Allocate all Remaining Direct Costs

There are two principal ways to allocate these costs: 1) equally among the cost categories; or 2) proportionately. It is easiest to do the calculations in percentages.

- Equal allocation. The total costs are divided equally among the cost categories. In this example, the costs would be allocated equally to each of the three health centers, and within each center they would be allocated equally between outreach and clinic services. Thus, if personnel costs were 3,500, they would be divided equally, among the three health centers = 1166.67 each. Within each health center they would be divided equally among clinical and outreach services = 583.33.

- Proportional allocation. The costs are divided according to some formula that allocates a greater share of the costs to one center over another. Obviously, this approach can be applied to the total costs or to each individual cost item.

The following are some of the principal ways that costs can be allocated proportionately:

- Size. The largest proportion of the costs is allocated to the largest center, on the assumption that the larger the center, the greater the costs to operate it. Example: Kajulu is twice the size of the other two centers, therefore 50% of the costs are allocated to it and 25% to each of the other centers.

- Volume. The largest proportion of the costs is allocated to the center with the highest volume (# visits, for example), on the assumption that the greater the volume of service, the greater the operating costs. Example: N. Nyakach has half the number of patient visits as the other two centers, therefore, 20% of the costs are allocate to it and 40% to each of the other two centers.

Figure B-4

Category	N. Nyakach	C. Nyakach	Kajulu
Personnel			
Nurse Supervisor	25%	25%	50%
Project Director	40%	20%	40%
Health Educator	30%	35%	35%
Code	NOP	COP	KOP
Travel			
Van, operating exp.	10%	40%	50%
Shipment: refrigerators		50%	50%
Code	NOT	COT	KOT
Supplies			
Vaccines	30%	20%	50%
Hlth Ed. Supplies	40%	40%	20%
Code	NOS	COS	KOS

- Number of Staff. The largest proportion of the costs is allocated to the center with the largest number of staff, on the assumption that the center with the largest staff has the higher volume and/or greater activity. Example: in Central Nyakach there are twice as many outreach as clinic staff, therefore, the 67 percent of the costs are allocated to outreach and 33 percent to clinic services.

- Staff time. This is a refinement of the former approach. The largest proportion of the costs is allocated to the center with the largest percentage of staff time (as measured in hours, days, personyears, etc.). Example: the Project Director spends 40 percent of her time at N. Nyakach, 20 percent at C. Nyakach and 40 percent at Kajulu. All of her costs are allocated accordingly.

- Budget. The largest proportion of the expenses is allocated to the center with the largest budget, on the assumption that actual expenses will be close to budgeted expenses. Example: Outreach at Kajulu is budgeted at 35 percent of total costs, clinic services at 65 percent. Expenses are allocated the same way.

- Direct Costs. Similar to the above. Example: after allocating all direct costs that can be attributed to a single cost category (see Step 4.1 above), the results show that the totals are as follows:

Figure B-5

Category	N. Nyakach	C. Nyakach	Kajulu	Total
Direct Costs	1,419	986	1,437	3,842
Percentage	36.9	25.7	37.4	100.0

The remaining direct costs would then be allocated according to these proportions - 36.9 percent to N. Nyakach, etc.

Although this discussion shows how to allocate the sum of the direct costs, the same procedure can be used for each transaction. That is, the cost of each nurse and CHW could be allocated to as many cost categories as necessary. That would require that each charge for personnel would be allocated first to a health center and then to outreach and clinic services.

Individual cost categories can be allocated according to the unit of measure that is typically associated with it[9].

- Personnel: Staff time. Example: proportion of staff time spent at each health center or in each PHC activity.

9. See *Estimating Costs for Cost-Effectiveness Analysis: Guidelines for Managers of Diarrhoeal Diseases Control Programmes.* CDD/SER/88.3 World Health Organization: Geneva. 1988, pp. 23-26.

- Supplies: Weight, volume, or number of units. Example: proportion of total ORS packets shipped to each health center.
- Facilities: Space or time. Example: proportion of health center space used for PHC; proportion of time facility is used for Immunization services.
- Equipment: Time. Example: proportion of time audio-visual equipment is used for PHC.
- Vehicles: Distance or time. Example: proportion of total mileage used for outreach; proportion of time vehicle is used by the PHC project.

The following illustration shows how all of the direct costs can be allocated according to one criterion, in this case, the proportion of staff time.

Figure B-6

	Total	N. Nyakach	C. Nyakach	Kajulu
Staff time	45 PY*	10 PY	15 PY	20 PY
Percent	100.0%	22.2%	33.3%	44.4%
Direct Costs Allocation	7,139	.222 * 7,139 1,586	.333 * 7,139 2,380	.444 * 7,139 3,173

Step 5: Allocate Indirect Costs

Indirect costs can also be allocated equally or proportionately, using the same criteria as described above.

Equal allocation is fairly straightforward. All of the indirect costs summed in Step 2 would be divided equally among the three health centers. Then within each health center they would be allocated equally to clinical and outreach services.

Proportional allocation would involve allocating the indirect costs according to size, volume, time, budget, or one of the other criteria described above. The example shown in Step 3 (Figure B-2) is an allocation according to direct costs. The indirect costs are divided into the same proportions as the direct costs. Figure B-7 shows a second way to make this calculation. The results are the same as shown in Figure B-2.

Figure B-7

	Total	N. Nyakach	C. Nyakach	Kajulu
Direct Costs	7,139	3,200	2,131	1,808
Percent	100.0%	44.8%	29.8	25.3%
Indirect Costs Allocation	2,137	.448 * 2,137 958	.298 * 2,137 638	.253 * 2,137 541

If the indirect costs were allocated according to staff time, as the direct costs were, the results would be as shown in Figure B-8.

Summary

Cost allocation can be done prospectively (as costs occur they are allocated to one or more cost categories) or retrospectively. Prospective allocation is likely to be more accurate, but it is also seen as time-consuming by many managers.

Figure B-8

	Total	N. Nyakach	C. Nyakach	Kajulu
Staff time	45 PY*	10 PY	15 PY	20 PY
Percent	100.0%	22.2%	33.3%	44.4%
Direct Costs	2,137	.222 * 2,137	.333 * 2,137	.444 * 2,137
Allocation		475	712	950

Retrospective allocation can be done simply by making rough estimates of what the money was spent on, but it can also be a sophisticated exercise that attempts to allocate the appropriate amount of each item to the appropriate cost category.

Step 1. In doing a retrospective allocation the first step is to decide which cost categories and codes are going to be used. All costs will have to be allocated to one or more of these categories.

Step 2. Next, the costs should be separated into direct and indirect costs.

Step 3. At this point an "indirect cost rate" can be computed and used to allocate the indirect costs to each cost category. Or another method can be used (as described in Step 5).

Step 4. The direct costs can now be allocated, either by dividing them equally among the major cost categories, or using a criterion to divide them proportionately. The allocation can be done item by item or for all of the direct costs combined.

Step 5. Finally, the indirect costs can be allocated, either equally or proportionately, as described in Step 4.

APPENDIX C

TEMPLATES, TOOLS, CHECKLISTS AND COMPUTER PROGRAMS

APPENDIX C 1

BLANK FORMS

WORKSHEET for SPECIFYING OBJECTIVES

User/Audience:

___Manager _____
___Board of Directors _____
___Central Directorate _____
___Donors _____
___Other: _____

Purpose:

___Monitoring _____
___Efficiency _____
___Planning _____
___Other: _____

Scope:

___Geographic area _____
___Program/project/activity _____
___Time/Duration _____
___Expenditures &/or Revenues _____
___Other: _____

WORKSHEET FOR DECIDING WHAT TO COST

Level 1: PHC Program (Total Costs) _____

Level 2: Projects, Subprojects, Locations, Sites, etc.

_____
_____
_____
_____

Level 3: PHC Service Components or Managment Components

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

Level 4: General Ledger Accounts

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

WORKSHEET FOR SPECIFYING TABLES AND GRAPHS NEEDED

___1. The total amount of resources spent
___2. Expenditures compared with budgets
___3. The distribution of costs by line item
___4. The distribution of costs by site or facility
___5. Trends in costs over time
___6. Projections of future costs
___7. Average costs
___8. Analysis of revenues (past and projected)
___9. Break even analysis (revenues compared to expenditures)
___10. Other:

TIME ANALYSIS WORKSHEET

Day:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	Percent
CODE:																	
IMM																	
GM																	
Admin																	
Sup																	
Other																	
Total																	

APPENDIX C 2

INCOME AND EXPENSE ACCOUNT CODING WORKSHEET

Also See Computer File:

ACCOUNTS.WK1

PHC MAP INCOME AND EXPENSE ACCOUNT WORKSHEET 19-Jul-90

PROJECT: FILE: ACCOUNT.WK1

For the Period of:

INSTRUCTIONS: Determine the level of detail you want for your cost analysis. You may need to have codes for up to four levels so that you can analyze costs (and income) for: a) the overall PHC Program; b) each project, subproject, location or site; c) PHC service component or or activity; and d) general ledger accounts.

In general, the more detail you want, the greater the amount of work required to code each expenditure. The following example shows a relatively simple coding system that requires only three letters or digits for each expenditure.

ACCOUNT CODES		Codes
Program:	NPPHC*	
Subprojects:	Chitral	C or 1
	Gilgit	G 2
Activities:	Outreach	O 1
	Clinical	C 2
	Management	M 3
Ledger Accounts		
	Personnel	P 1
	Travel & per diem	T 2
	Commodities	C 3
	Other Direct Costs	O 4
	Indirect Costs	I 5
Examples:	COT (or 112) = Chitral, Outreach, Travel	
	GMI (or 235) = Gilgit, Management, Indirect Cost	

* Code for NPPHC not necessary as their is only one PHC Program.

The system illustrated above will enable you to compute total project costs, costs of each location (Chitral and Gilgit), costs of each major activity for the overall project and by location; and cost of each major ledger item (personnel, etc.), again for the overall project, for each location, and for each activity.

Use this format and the summary of cost categories below to construct your own coding system. Then print it out and use it as a reference for entering cost data into the computer program.

Examples of codes using both letters and digits are shown below. The codes must always follow the same sequence. For example:

Program	Subproject	Component	Ledger Acct.	
X X -	X X -	X X X -	X X X	
AKU-Urban	Baba Is.	Malaria	Wages	The code would be written
U	B	MAL	P	UBMALP or
1	7	110	401	17110401

****

DETAILED ACTIVITY AND LEDGER ACCOUNT CODING OPTIONS

The following is a checklist of common PHC activities and General Ledger accounts with sugested codes. You can also use digits or make up your own coding scheme.

		Letter	Digit
ACTIVITIES	PHC Services	P	100
	Oral Rehydration Therapy	PORT	101
	Growth Monitoring/Nutrit.	PGMN	102
	Immunization	PIMM	103
	Maternal Care (ANC+Deliv)	PMC	104
	Family Planning	PFP	105
	Health Education	PHE	106
	Water & Sanitation	PWS	107
	Curative Services	PCS	108
	Tuberculosis	PTB	109
	Malaria	PMAL	110
	Acute Respiratory Infect.	PARI	111
	Management Support Services	M	200
	Planning	MPL	201
	Training	MTR	202
	Supervision	MSUP	203
	Financial	MFI	204
	Information Mgmt.	MIN	205
	Community Org.	MORG	206
	Personnel Mgmt	MPER	207
	Research	MRES	208
LEDGER ACCOUNTS			
Income		I	300
	Service fees	IF	301
	Sales of goods	IG	302
	Donor contributions	ID	303
	Contributions	IC	304
Expenses (DIRECT)		E	400
Personnel		EP	
	Wages & Salaries	EPW	401
	Fringe benefits	EPF	402
	Consultants	EPC	403
	Temporary labor	EPT	404
Commodities		EC	410
	Drugs, medicines	ECD	411
	Office supplies	ECS	412
	Health Ed supplies	ECH	413
	Other commodities	ECO	414
Travel		ET	420
	Local Travel	ETL	421
	International	ETI	422
	Per diem	ETP	423

Capital Expenditures	ECAP	430
Buildings	ECAPB	431
Vehicles	ECAPV	432
Medical equipment	ECAPM	433
Audio-visual	ECAPAV	434
Office equipment	ECAPOF	435
Other Direct Costs	EO	440 450 460
Advertising	EOA	441
Bank charges	EOBANK	442
Books, subscriptions,dues	EOBOOK	443
Conferences	EOCON	444
Data processing	EODATA	445
Depreciation	EODEP	446
Equipment rental	EOEQ	447
Freight	EOFR	448
Insurance	EOINS	449
Interest - mortgage	EOINTM	450
Interest - other	EOINTO	451
Laundry & cleaning	EOLAUN	452
Legal & Accounting	EOLEG	453
Moving & storage	EOMOV	454
Parking	EOPARK	455
Participant train.	EOTR	456
Photocopying	EOPH	457
Postage, courier	EOPOST	458
Printing	EOPRN	459
Recruiting & relocation	EOREC	460
Rent	EORENT	461
Repairs & Maint.	EOREP	462
Security	EOSEC	463
Stipends	EOSTIP	464
Taxes	EOTAX	465
Telephone, fax	EOTEL	466
Utilities	EOUTIL	467
Vehicle fuel, maint.	EOV	468
Videotaping	EOVID	469
Subcontracts (Name:)	ESUB	500
Indirect Costs	EI	600

Indirect costs will need to be determined for each project. Some PHC projects may not have indirect costs, others could have a duplicate of the direct cost codes, i.e., personnel, commodities, travel, etc. An example of "typical" indirect costs is shown below.

Personnel	EIP	610
Wages & Salaries	EIPW	611
Fringe benefits	EIPF	612
Consultants	EIPC	613
Temporary labor	EIPT	614
Commodities	EIC	620
Office supplies	EICO	621
Other commodities	EICC	622

Travel	EIT	630
Local Travel	EITL	631
International	EITI	632
Per diem	EITP	633
Capital Expenditures	EICAP	640
Buildings	EICAPB	641
Vehicles	EICAPV	642
Office equipment	EICAPO	643
Other Indirect Costs	EIO	650 660 670
Advertising	EIOAD	651
Bank charges	EIOBANK	652
Books, subscriptions,dues	EIOBOOK	653
Conferences	EIOCON	654
Data processing	EIODATA	655
Depreciation	EIODEP	656
Equipment rental	EIOEQ	657
Freight	EIOFR	658
Insurance	EIOINS	659
Interest - mortgage	EIOINTM	660
Interest - other	EIOINTO	661
Laundry & cleaning	EIOLAUN	662
Legal & Accounting	EIOLEG	663
Moving & storage	EIOMOV	664
Parking	EIOPARK	665
Participant train.	EIOTR	666
Photocopying	EIOPH	667
Postage, courier	EIOPOST	668
Printing	EIOPRN	669
Recruiting & relocation	EIOREC	670
Rent	EIORENT	671
Repairs & Maint.	EIOREP	672
Security	EIOSEC	673
Stipends	EIOSTIP	674
Taxes	EIOTAX	675
Telephone, fax	EIOTEL	676
Utilities	EIOUTIL	677
Vehicle fuel, maint.	EIOV	678
Videotaping	EIOVID	679

APPENDIX C 3.1
COST ANALYSIS WORKSHEET
VERSION 1

General Ledger Accounts Only

Also see Computer File MOD7V1.WK1

APPENDIX C 3.1: COST ANALYSIS WORKSHEET, VERSION 1:

General Ledger Accounts only

This first worksheet is designed to be used to enter transactions (income and expenditures) for a single program, project, subproject, health center, or component service. That is, it will provide a standard accounting breakdown of expenditures by general ledger accounts. This worksheet would be most useful for PHC programs that merely want an analysis of total costs broken down by such lines as personnel wages, drugs, equipment, laundry, rent, etc.

The worksheet is basically a program for entering and tabulating data. It is adapted from a program published in *Lotus* magazine[10] designed for small businesses without full-time bookkeepers or accountants. It includes several macros that make it easy to enter income and expense transactions following a set of account codes that the user can modify as desired. Other macros check for mistakes, sort income and expenditures into a summary table, and also keep a record of all transactions entered. The worksheet is not meant to replace normal accounting and bookkeeping procedures. Rather, it is designed specifically for cost analysis. In many cases, the information from routine financial reports can be entered directly into this file to start the cost analysis.

The model uses Lotus 1-2-3, version 2.01 and higher. The principal macro in the model provides a series of prompts that guide the user through the data entry process. The data (from receipts, journals, invoices, checks, etc.) can be entered in any order. When data entry is completed the macro sorts the entries into the categories shown in Figure 1 and places the total for each category in the Amount column. That is, the program adds all of the entries that have the same code and places the totals in the proper cell. For example, suppose there were 12 entries for Service Fees received. The code for this entry is IS (Income, Service). The program will add all of those entries and put the total in the "Service fees" row in the "Amount" column (cell C10).

The program also computes the total income (row 14), the total expenses (row 49), and the difference (row 51, "Net Profit"). If budget figures are inserted in column D, the program will also compute the differences between the actual and budgeted amounts and put the result in the Variance Column (E).

To use this worksheet, follow these steps.

Step 1:Modify the Account Categories and Codes

Figure 2 shows the income and expense categories and corresponding codes in the current worksheet. These are located in a "Help" screen in columns K and L. To change them, just type in new labels in each column. For example, to replace "Service fees" with "Community Contributions" just type Community Contributions in K2. Make up a code (say IC) and type that in column L2. When finished, enter the new labels from column K in Column A on the spreadsheet. The labels must match for the program to work correctly.

---

10. Stephen L. Nelson, "Keeping the Books: An Income and Expense Recorder". *Lotus*, May, 1990, pp. 52-55.

Although rows can be inserted or deleted, this requires making other changes in the program that require a working knowledge of macros. Before trying that, examine Versions 2 and 3 to see if they would fit your needs better.

Figure 1

	A	B	C	D	E
1	PHC MAP COST ANALYSIS WORKSHEET		VERSION 1	19-Jul-90	
2					
3	PROJECT NAME:			FILE: MOD7V1.WK1	
4	Income and Expense Summary for (MM/YY):				
5					
6	Description		Code	Amount	Budget	Variance
7					
8	INCOME CATEGORIES:		I		
9					
10	Service fees		IS	$235.88	$300.00	($64.12)
11	Donor support		ID	$8,545.67	$8,500.00	$45.67
12	Other income		IO	$259.00	$100.00	$159.00
13					
14	Total Income			$9,040.55	$8,900.00	$140.55
15					
16	EXPENSE CATEGORIES:		E		
17					
18	Advertising		EA	$0.00	$0.00	$0.00
19	Bank charges		EB	$10.00	$10.00	$0.00
20	Consultant fees		EC	$445.00	$500.00	($55.00)
21	Depreciation		EDE	$0.00	$0.00	$0.00
22	Drugs, medicines		EDR	$800.00	$600.00	$200.00
23	Dues & publications		EDU	$25.00	$25.00	$0.00
24	Employee benefits		EEM	$1,156.89	$1,200.00	($43.11)
25	Equipment		EEQ	$1,245.00	$1,500.00	($255.00)
26	Freight, postage, courier		EF	$124.67	$150.00	($25.33)
27	Insurance		EINS	$234.00	$250.00	($16.00)
28	Interest - mortgage		EINM	$0.00	$0.00	$0.00
29	Interest - other		EINO	$0.00	$0.00	$0.00
30	Laundary and cleaning		ELA	$35.67	$35.00	$0.67
31	Legal and professional		ELE	$0.00	$0.00	$0.00
32	Office expense		EO	$175.55	$200.00	($24.45)
33	Rent - facilities		ERF	$355.86	$400.00	($44.14)
34	Rent - other		ERO	$0.00	$0.00	$0.00
35	Repairs		EREP	$67.12	$50.00	$17.12
36	Subcontracts		ESUB	$0.00	$0.00	$0.00
37	Supplies		ESUP	$266.00	$300.00	($34.00)
37	Taxes		ETAX	$0.00	$0.00	$0.00
39	Travel and per diem		ETR	$258.00	$250.00	$8.00
40	Telephone, fax		ETEL	$45.76	$25.00	$20.76
41	Utilities		EU	$56.87	$50.00	$6.87
42	Wages, salaries		EW	$1,050.00	$1,050.00	$0.00
43	Other 1		EO1	$0.00	$0.00	$0.00
44	Other 2		EO2	$0.00	$0.00	$0.00
45	Other 3		EO3	$0.00	$0.00	$0.00
46	Other 4		EO4	$0.00	$0.00	$0.00
47	Other 5		EO5	$0.00	$0.00	$0.00
48					
49	Total Expenses			$6,351.39	$6,595.00	($243.61)
50					
51	Net Profit			$2,689.16	$2,305.00	$384.16
52					

Figure 2

	K	L
1	CATEGORY	CODE
2	Service fees	IS
3	Donor support	ID
4	Other income	IO
5	Advertising	EA
6	Bank charges	EB
7	Consultant fees	EC
8	Depreciation	EDE
9	Drugs, medicines	EDR
10	Dues & publications	EDU
11	Employee benefits	EEM
12	Equipment	EEQ
13	Freight, postage, courier	EF
14	Insurance	EINS
15	Interest - mortgage	EINM
16	Interest - other	EINO
17	Laundary and cleaning	ELA
18	Legal and professional	ELE
19	Office expense	EO
20	Rent - facilities	ERF
21	Rent - other	ERO
22	Repairs	EREP
23	Subcontracts	ESUB
24	Supplies	ESUP
25	Taxes	ETAX
26	Travel and per diem	ETR
27	Telephone, fax	ETEL
28	Utilities	EU
29	Wages, salaries	EW
30	Other 1	EO1
31	Other 2	EO2
32	Other 3	EO3
33	Other 4	EO4
34	Other 5	EO5

Step 2.Enter A Budget.

Projected income as well as expenses can be entered in Column D. You do not need to enter a budget for the program to work. If the budget isn't broken down in this much detail, you can always aggregate the subtotals later to compare with the broader budget lines.

Step 3. Enter the Transactions.

3.1 Hold down the macro key (Alt on most computers) and press r (for record) to start the macro. The macro will display the "Income & Expense Transaction Database" (see Figure 3) and will prompt you to enter the "Date & Description" of the first transaction. You can enter the date anyway you wish (July 27, 1990; 7/29/90; 29-7-1990) or ignore the date and just enter a description of the transaction (e.g., City electric, Staff salaries, MIS supplies). Figure 4 shows a number of examples.

Figure 3

	G	H	I
55	Income & Expense Transactions Database		
56	----------		
57	Date & Description	Code	Amount
58	----------		
59			
60	----------END OF TRANSACTION LIST----------		

You may also enter other descriptive data that may be important. Some examples: August telephone, Check # 234; Invoice 77, 29-7-90).

Figure 4

	G	H	I
55	Income & Expense Transactions Database		
56	----------		
57	Date & Description	Code	Amount
58	----------		
59	7/12/90 Benston Plumbing	EREP	$34.56
60	7/12/90 AKF reimbursement	ID	$45.67
61	7/12/90 Barbra Braile	EC	$245.00
62	7/15/90 Air conditioners	EEQ	$1,245.00
63	7/23/90 AKF payment	ID	$3,500.00
64	7/25/90 Service fees	IS	$85.88
65	7/30/90 July salaries	EW	$550.00
66	8/1/90 Barbra Braile	EC	$200.00
67	8/2/90 Service fees	IS	$150.00
68	8/3/90 Raffle proceeds	IO	$259.00
69	8/5/90 Center rent Aug	ERF	$355.86
70	8/12/90 Ralston Electric	EREP	$32.56
71	8/15/90 AKF Qtly payment	ID	$5,000.00
72	8/25/90 Drugs	EDR	$800.00
73	8/30/90 August salaries	EW	$500.00
74			
75	----------END OF TRANSACTION LIST----------		

3.2 After typing the description, press Enter. The macro prompts for a transaction code. Enter the appropriate code from the list in column L (example: drugs = EDR, Wages = EW). It is best to have a copy of the list handy for reference. However, the program includes a "help" macro if you need to view the codes. As the prompt says, "press Enter" instead of entering a code to view the help screen. The screen will split and show Figure 2 on the right side. Move the cursor with the up or down arrow to the appropriate code and press Enter. The macro will record this code in a temporary range and copy it to your "Income & Expense Transaction Database" when you finish entering this transaction.

The program includes an error-checking routine so that if you enter an incorrect code by mistake, it will tell you and prompt you to enter a correct code. The codes are text sensitive. You must enter capital letters if the codes are capitalized.

3.2 After pressing Enter the prompt asks for the amount of the transaction. Enter a number, with decimal points if appropriate. Both income and expense transactions should be positive amounts. A negative entry would be appropriate for transactions that reduce income or expenses (e.g., a bank credit for an error would be entered as a negative "expense"; return of a community contribution would be entered as negative "income").

Step 4:Tabulate the Data

When all entries have been completed, press Enter. The program will compute the totals for the income categories and for the expense categories. The macro will return to cell A1 at the top of the worksheet.

Step 5:Review for Mistakes and Correct Them

If you make a mistake in an entry, go to the database (cell G55 - press Alt + D to move there quickly). Make the appropriate corrections to the amount or code. You can also delete rows that are incorrect, as long as you do not delete the blank row at the bottom of the database.

Press Alt + R and Enter when finished to recalculate the totals. You can also enter new transactions by pressing Alt + R.

Step 6:Save the File

Although you can keep adding data to this file, you may want to save it at the end of each accounting period. Always save the file under a different name so that you will always have a blank worksheet to work with when you need it.

You can customize this spreadsheet. See Appendix C 3.2 for instructions.

MACROS for MOD7V1.WK1

```
\r          {snug}
            {GETLABEL "Enter date & description (Up to 35 chars): ",tmpdesc
            {IF tmpdesc=""}{tabl}{QUIT}
cde         {GETLABEL "Enter code <Press Return for helplist> :",tmp_code}
            {IF tmp_code=""}{helper}
            {IF @ISERR(@VLOOKUP(tmp_code,codes,0))}{errmsg}{BRANCH cde}
amt         {GETNUMBER "Enter income or expense amount: ",tmp_amt}
            {IF @ISERR(tmp_amt)}{errmsg}{BRANCH amt}
            /WIR~
            /Ctmp_area~~
            {CALC}/WTC{BRANCH \r}

tabl        /WTC{INDICATE WAIT}{PANELOFF}
            /DT1table1~crit1~
            /DT1TABLE2~CRIT1~
            {CALC}
            {HOME}{PANELON}{INDICATE}

helper      {RIGHT 2}
            /WWV/WWU{WINDOW}{GOTO}helplist~{RIGHT}
            /WTB{?}
            {LET tmp_code,@CELLPOINTER("contents")}
            {WINDOW}{LEFT 1}
            /WTC/WWC

snug        {GOTO}trans~{END}{DOWN 2}{UP @ROWS(database)-3}
            /WTH{DOWN @ROWS(database)-3}

errmsg      Invalid entry.  Press any key to continue.{GET key}{ESC}

\d          {GOTO}database~{UP 2}

key         ~

            tmpdesc  tmp_code tmp_amt  Code
```

APPENDIX C 3.2
COST ANALYSIS WORKSHEET
VERSION 2

User-Generated Accounts

Also see Computer File MOD7V2.WK1

APPENDIX C 3.2: COST ANALYSIS WORKSHEET, VERSION 2:

User-Generated Accounts

This worksheet is a modification of Version 1. The major difference is that the income and expenses categories and codes have been revised to classify transactions by three levels, instead of one, as in Version 1. This will enable the analyst to examine the data by: 1) location; 2) service component; and 3) general ledger accounts.

In this example, Level 1 codes were developed for the three locations of the Kisumu PHC Project:

Kajulu	K
North Nyakach	N
Central Nyakach	C

Two Level 2 codes were developed:

Outreach	O
Clinical Services	C

And five general ledger codes were selected:

Personnel	P
Travel	T
Supplies	S
Other Direct Costs	O
Indirect Costs	I

The expense categories and codes were changed on the worksheet as shown in Figure 1. The income categories and codes were not changed since we were only interested in the aggregate amounts, not the breakdowns by location. (See NOTES 1 and 2)[11]

The codes are also changed automatically in the help screen (see Figure 2). The macros work exactly as in Version 1. So, to use the worksheet, just enter budget figures in Column D (if appropriate), then hold down Alt + r to enter the transactions (see Figure 3).

Tabulate the data when done by pressing Enter, review for mistakes, correct them, and save the file - under a different name. Figure 1 is a sample printout of the completed file, showing subtotals for each General Ledger Account and for each Location and site. (See NOTE 3).

---

11. See Notes at the end of this section for information about how to customize the spreadsheet.

Figure 1

	A	B	C	D	E	F
1	PHC MAP COST ANALYSIS WORKSHEET			VERSION 2	24-Jul-90	
2						
3	PROJECT NAME:			FILE: MOD7V2.WK1		
4	Income and Expense Summary for (MM/YY):					
5						
6	Description	Code	Amount	Budget	Variance	%
7						
8	INCOME CATEGORIES:					
9						
10	Service fees	IS	$12,567.00	$10,000.00	$2,567.00	125.7%
11	Donor support	ID	$55,000.00	$50,000.00	$5,000.00	110.0%
12	Other income	IO	$5,489.00	$5,000.00	$489.00	109.8%
13						
14	Total Income		$73,056.00	$65,000.00	$8,056.00	112.4%
15						
16	EXPENSE CATEGORIES:					
17						
18	Kajulu Outreach	KO	$8,665.00	$9,900.00	765.00	87.5%
19	Personnel	KOP	$3,500.00	$4,500.00	($1,000.00)	77.8%
20	Travel	KOT	$678.00	$450.00	$228.00	150.7%
21	Supplies	KOS	$1,573.00	$1,250.00	$323.00	125.8%
22	Other Direct Costs	KOD	$1,658.00	$2,200.00	($542.00)	75.4%
23	Indirect Costs	KOI	$1,256.00	$1,500.00	($244.00)	83.7%
24	Kajulu Clinical	KC	$10,181.00	$8,300.00	$1,881.00	122.7%
25	Personnel	KCP	$3,895.00	$3,500.00	$395.00	111.3%
26	Travel	KCT	$497.00	$350.00	$147.00	142.0%
27	Supplies	KCS	$1,500.00	$900.00	$600.00	166.7%
28	Other Direct Costs	KCD	$2,500.00	$2,300.00	$200.00	108.7%
29	Indirect Costs	KCI	$1,789.00	$1,250.00	$539.00	143.1%
30	N.Nyakach Outreach	NO	$13,122.00	$13,840.00	($718.00)	94.8%
31	Personnel	NOP	$6,543.00	$6,800.00	($257.00)	96.2%
32	Travel	NOT	$436.00	$540.00	($104.00)	80.7%
33	Supplies	NOS	$1,433.00	$1,500.00	($67.00)	95.5%
34	Other Direct Costs	NOD	$3,455.00	$3,500.00	($45.00)	98.7%
35	Indirect Costs	NOI	$1,255.00	$1,500.00	($245.00)	83.7%
36	N.Nyakach Clinical	NC	$12,813.00	$13,100.00	($287.00)	97.8%
37	Personnel	NCP	$6,734.00	$5,475.00	$1,259.00	123.0%
38	Travel	NCT	$456.00	$325.00	$131.00	140.3%
39	Supplies	NCS	$357.00	$1,200.00	($843.00)	29.8%
40	Other Direct Costs	NCD	$3,589.00	$4,500.00	($911.00)	79.8%
41	Indirect Costs	NCI	$1,677.00	$1,600.00	$77.00	104.8%
42	C.Nyakach Outreach	CO	$17,825.00	$18,725.00	($900.00)	95.2%
43	Personnel	COP	$6,899.00	$8,600.00	($1,701.00)	80.2%
44	Travel	COT	$563.00	$450.00	$113.00	125.1%
45	Supplies	COS	$2,365.00	$1,675.00	$690.00	141.2%
46	Other Direct Costs	COD	$4,533.00	$5,500.00	($967.00)	82.4%
47	Indirect Costs	COI	$3,465.00	$2,500.00	$965.00	138.6%
48	C.Nyakach Clinical	CC	$23,031.00	$18,020.00	$5,011.00	127.8%
49	Personnel	CCP	$9,654.00	$8,800.00	$854.00	109.7%
50	Travel	CCT	$876.00	$350.00	$526.00	250.3%
51	Supplies	CCS	$2,546.00	$1,870.00	$676.00	136.1%
52	Other Direct Costs	CCD	$4,533.00	$3,500.00	$1,033.00	129.5%
53	Indirect Costs	CCI	$5,422.00	$3,500.00	$1,922.00	154.9%
54						
55	Total Expenses		$62,606.00	$63,865.00	($1,259.00)	98.0%
56						
57	Net Surplus (Deficit)		$10,450.00	$1,135.00	$9,315.00	920.7%
58						

Figure 2

	K	L
1	CATEGORY	CODE
2	Service fees	IS
3	Donor support	ID
4	Other income	IO
5	Kajulu Outreach	KO
6	Personnel	KOP
7	Travel	KOT
8	Supplies	KOS
9	Other Direct	KOD
10	Indirect Costs	KOI
11	Kajulu Clinical	KC
12	Personnel	KCP
13	Travel	KCT
14	Supplies	KCS
15	Other Direct	KCD
16	Indirect Costs	KCI
17	North Nyakach Outreach	NO
18	Personnel	NOP
19	Travel	NOT
20	Supplies	NOS
21	Other Direct	NOD
22	Indirect Costs	NOI
23	North Nyakach Clinical	NC
24	Personnel	NCP
25	Travel	NCT
26	Supplies	NCS
27	Other Direct	NCD
28	Indirect Costs	NCI
29	Central Nyakach Outreach	CO
30	Personnel	COP
31	Travel	COT
32	Supplies	COS
33	Other Direct	COD
34	Indirect Costs	COI
35	Central Nyakach Clinic.	CC
36	Personnel	CCP
37	Travel	CCT
38	Supplies	CCS
39	Other Direct	CCD
40	Indirect Costs	CCI

Figure 3

	G	H	I
55	Income & Expense Transactions Database		
56	----------		
57	Date & Description	Code	Amount
58	----------		
59	Jan salaries	KOP	356.00
60	Jan salaries	KCP	245.00
61	Jan salaries	NOP	315.96
62	Jan salaries	NCP	225.78
63	Jan salaries	COP	215.78
64	Jan salaries	CCP	365.00
65	Feb salaries	KOP	415.00
66	Feb salaries	KCP	246.00
67	Feb salaries	NOP	265.96
68	Feb salaries	NCP	229.78
69	Feb salaries	COP	265.78
70	Feb salaries	CCP	285.00
71			
72	------END OF TRANSACTION LIST----		

NOTES:

1. To change these codes and expense categories to something else, replace the labels on the worksheet (columns A and B) with the new expense category names and codes. That will automatically change the labels in Columns K and L, also.

2. You can insert or delete rows of expense categories and codes. It is probably not worth the effort to delete lines. Just leave some unused. To add more lines of expenses (and codes) you will need to expand those lists. Although this can be done by inserting rows, this can also affect the macro's operation. The easiest way to add rows is to use the Move command, as follows:

2.1. Determine the number of rows that need to be added.

2.2. Place the cursor on any row above the last expense category (for example, A40).

2.3. Move everything below that row down the same number of rows that are to be added. For example, if seven rows are to be added, move the block A40...F60 down seven rows to A47, and press enter (/, Worksheet, Move, {highligh area to move}, Enter, {move cursor to A47}, Enter.

Do the same thing with the help list. That is, move seven rows down from K35...L35 to K42.

This procedure enables you to avoid inserting blank lines in the macros, which would make them inoperable.

2.4. Next, copy one of the preformated lines into the blank spaces. For example, copy A39...F39 to A40...A47. Do the same in the help list. Copy K34..L34 to K35...K42.

2.5. Finally, you can type in the names of the new expense categories and the new codes. Remember to have the same names and codes in the help list and the prime worksheet.

2.6. Save the new worksheet in a separate file.

3. If you modify the expense categories by adding or deleting rows, you will need to modify the macro that computes the Location subtotals in the Amount column. After the transactions have been summed and inserted in the worksheet, the /t macro copies the @SUM formulas from column D to column C. This produces the subtotals for each category (e.g., C18, C24, etc.) after all of the transactions have been summed.

Currently, the macro goes to cells D18, D24, D30, D36, D42 and D48, where it copies the formulas to the corresponding cells in column C (i.e., C18, C24, etc.). If you insert or delete a row in the spreadsheet, you will need to change those addresses. For example, if you insert two rows above row 11, all of the expense categories will be lowered two rows. In that case, go to the /t macro (cell N43) and change the addresses as follows:

From	To
\t {GOTO}D18~/C~{LEFT}~	{GOTO}D20~/C~{LEFT}~
{GOTO}D24~/C~{LEFT}~	{GOTO}D26~/C~{LEFT}~
{GOTO}D30~/C~{LEFT}~	{GOTO}D32~/C~{LEFT}~
{GOTO}D36~/C~{LEFT}~	{GOTO}D38~/C~{LEFT}~
{GOTO}D42~/C~{LEFT}~	{GOTO}D44~/C~{LEFT}~
{GOTO}D48~/C~{LEFT}~	{GOTO}D50~/C~{LEFT}~
{HOME}{PANELON}{INDICATE}	{HOME}{PANELON}{INDICATE}

If you add or delete subtotal categories, remember to add or delete corresponding lines in the macro.

MACROS for MOD7V2.WK1

```
\r          {snug}
            {GETLABEL "Enter date & description (Up to 35 chars): ",tmpdesc
            {IF tmpdesc=""}{tabl}{QUIT}
cde         {GETLABEL "Enter code <Press Return for helplist> :",tmp_code}
            {IF tmp_code=""}{helper}
            {IF @ISERR(@VLOOKUP(tmp_code,codes,0))}{errmsg}{BRANCH cde}
amt         {GETNUMBER "Enter income or expense amount: ",tmp_amt}
            {IF @ISERR(tmp_amt)}{errmsg}{BRANCH amt}
            /WIR~
            /Ctmp_area~~
            {CALC}/WTC{BRANCH \r}

tabl        /WTC{INDICATE WAIT}{PANELOFF}
            /DT1table1~crit1~
            /DT1TABLE2~CRIT1~
            {CALC}{\s}

helper      {RIGHT 2}
            /WWV/WWU{WINDOW}{GOTO}helplist~{RIGHT}
            /WTB{?}
            {LET tmp_code,@CELLPOINTER("contents")}
            {WINDOW}{LEFT 1}
            /WTC/WWC

snug        {GOTO}trans~{END}{DOWN 2}{UP @ROWS(database)-3}
            /WTH{DOWN @ROWS(database)-3}

errmsg      Invalid entry.  Press any key to continue.{GET key}{ESC}

\d          {GOTO}database~{UP 2}

key         ~

            tmpdesc  tmp_code tmp_amt  Code


\c          {GOTO}helplist~{UP 1}          \s  {GOTO}TRANS~{DOWN 4}
                                               /DSRD.{end}{down}{right 2}~
\w          {HOME}                             P{right 1}~A~S~A~G

\t          {GOTO}D18~/C~{LEFT}~
            {GOTO}D24~/C~{LEFT}~
            {GOTO}D30~/C~{LEFT}~
            {GOTO}D36~/C~{LEFT}~
            {GOTO}D42~/C~{LEFT}~
            {GOTO}D48~/C~{LEFT}~
            {HOME}{PANELON}{INDICATE}
```

APPENDIX C 3.3
COST ANALYSIS WORKSHEET
VERSION 3

Open-ended, User-Generated Accounts

Also see Computer File MOD7V3.WK1

APPENDIX C: COST ANALYSIS WORKSHEET, VERSION 3

Open-ended, User-Generated Accounts

This is the most flexible worksheet. It does not require any pre-definition of income or expense categories and codes in the worksheet. The categories and codes need to be defined, but that can be done on a piece of paper. They do not have to be inserted in the computer program file, as with Versions 1 and 2. The biggest advantage of this version is that the codes can be as simple or complex as the user wants. They can also be modified as one goes along. For example, if a PHC project adds a service (Nutrition) or a service location (South-Central Kajulu), codes can be added without changing the program. Just make up a code for Nutrition or South-Central Kajulu and type it in when prompted.

The major disadvantage is there is no help screen or error checking when you enter codes. You can enter a non-existant code and the program will accept it. See Figure 1 for an example of transactions.

Figure 1

	A	B	C	D	E
42	PHC PROJECT INCOME AND EXPENSE WORKSHEET			24-Jul-90	
43	PROJECT:			For Period:	
44	Date	Description	Code	Amount	Subtotal
45					
46					
47	23/7/90	Plywood for shelves	FR5	64.56	
48	24/7/90	Salaries: Chris Cross	P2	342.00	
49	23/7/90	Lumber	FR5	89.65	
50	23/9/90	Furniture mart	F7	345.67	
51	12/7/90	Lumber bits	FR5	45.89	
52	12/7/90	Repair truck tires	A3	33.55	
53	30/7/90	Salaries: Martha Page	P2	456.00	
54	12/7/90	Salaries: Jon Brown	P2	345.00	
55	23/7/90	Garden supplies	TR5	10.98	
56	26/7/90	Auto repairs	A3	212.00	
57	23/7/90	Garden supplies	TR5	10.98	

Also, this program does not produce a single summary list of expense categories as in Versions 1 and 2. Rather, it produces a listing of all expenses for each category and its subtotal. See Figure 2 for an example. This is advantageous for analysis of the detailed income and expenditure transactions, however.

The worksheet is also very simple to use. There are four macros that enable you to: 1) enter transactions (Alt + R); 2) sort the entries into similar categories (Alt + S); 3) compute subtotals and a grand total (Alt + L); and 4) print the results in compressed type (Alt + E).

To use this Worksheet the steps are similar to those of Versions 1 and 2:

1. Develop the Income and Expense categories and codes. Remember, the program will accept any codes (including those illustrated in Versions 1 and 2) and no labels have to be entered into the program in pre-determined expense categories or help lists.

Figure 2

A	A	B	C	D	E
42	PHC PROJECT INCOME AND EXPENSE WORKSHEET			24-Jul-90	
43	PROJECT:			For Period:	
44	Date	Description	Code	Amount	Subtotal
45	----------	----------	----	------	--------
46					
47	12/7/90	Repair truck tires	A3	33.55	
48	26/7/90	Auto repairs	A3	212.00	
49					
50			Subtotal:		245.55
51					
52	23/9/90	Furniture mart	F7	345.67	
53					
54			Subtotal:		345.67
55					
56	12/7/90	Lumber bits	FR5	45.89	
57	23/7/90	Lumber	FR5	89.65	
58	23/7/90	Plywood for shelves	FR5	64.56	
59					
60			Subtotal:		200.10
61					
62	12/7/90	Salaries: Jon Brown	P2	345.00	
63	24/7/90	Salaries: Chris Cross	P2	342.00	
64	30/7/90	Salaries: Martha Page	P2	456.00	
65					
66			Subtotal:		1,143.00
67					
68	23/7/90	Garden supplies	TR5	10.98	
69	23/7/90	Garden supplies	TR5	10.98	
70					
71					21.96
72					
73			GRAND TOTAL:		1,956.28

2. Press Alt + R to begin data entry, just as in Versions 1 and 2. A similar transaction screen will appear, except you must enter a date separately. If you do not wish to enter a date, just enter any character (x, ', ") and enter. Enter the remaining data: description, code, amount.

3. When you finish entering the transactions, press Enter twice at the "Date" prompt. This will stop the macro. You can stop here, save the file (under a new name) and return to it later to enter more transactions.

4. When all data entry is completed for the accounting period (month, quarter, year), save the file and then press Alt + S to sort the data and compute subtotals. The transactions will be sorted by code and by date within each code. It is important to save the file first, because once the data has been sorted and tabulated, it is more difficult (but not impossible) to make corrections.

5. After the first sorting and tabulating is completed, check for errors, reload the file, make the corrections, save the file again, then run Alt + S again to resort and retabulate subtotals.

6. If you have budget figures, enter them for each category in Column F. If you would like to compute the variance between the budget and expenditures and the percent of budget expended, copy the formulas in cells G46...H46 down to the GRAND TOTAL row.

7. Print the file. Although you may want to save it in its sorted and tabulated form, it is generally best to save the file before it is sorted. This will enable you to make corrections or changes in codes later without having to rearrange the worksheet. It is relatively simple and fast to run the sort and tabulate macros again.

MACROS for MOD7V3.WK1 ****DATA ENTRY MACRO***

```
\R          {snug}
            {GETLABEL "Enter date (DD/MM/YY): ",tmp_date}
            {IF tmp_date=""}/WTC{QUIT}
            {GETLABEL "Enter description (Up to 25 chars): ",tmpdesc}
cde         {GETLABEL "Enter code:",tmp_code}
amt         {GETNUMBER "Enter income or expense amount: ",tmp_amt}
            {IF @ISERR(tmp_amt)}{errmsg}{BRANCH amt}
            /WIR~/Ctmp_area~~{CALC}/WTC{BRANCH \R}

snug        {GOTO}trans~{END}{DOWN 3}{UP @ROWS(database)-3}
            /WTH{DOWN @ROWS(database)-3}

errmsg      Invalid entry.  Press any key to continue.{GET key}{ESC}

key         ~

            tmp_date        tmpdesc tmp_code    tmp_amt

                  *** GRAND TOTAL MACRO ***
\L          {GOTO}TRANS~{right 2}{down 5}
            {end}{down}{down 4}GRAND TOTAL:~{right 2}
            @sum({left 1}{up 4}{end}{up}{right 1}.
            {left 1}{end}{down}{down 2})~~
            {left 2}{up 4}{end}{up}
GLOOP1      {let GTEST,@cellpointer("contents")}
GLOOP2      {down}{if @cellpointer("type")="b"}
            {down}{GSUM}{GOTO}TRANS~{quit}
            {if @exact(GTEST,@cellpointer("contents"))=1}{branch GLOOP2}
            /WIR{down 2}~{down}Subtotal:~{GSUM}
            {down 2}{branch GLOOP1}
GSUM        {right}{up 3}{if @cellpointer("type")="b"}{branch GSINGLE}
            {down 3}{right}@sum({left}{up 2}{end}{up}.{end}{down}{down})~
            {left 2}{return}
GSINGLE     {down 3}{right}@sum({left}{up 2}.{down})~{down 2}
            {left 2}{branch GLOOP1}
GTEST       FR5
            ==========================
                  ***PRINT ELITE COMPRESSED MACRO***
\E          {calc}{GOTO}database~
            /PPR{?}~OS{esc}S
            \027@\015~
            P66~MR240~MB4~
            QAGPOS{esc}\027@~
            MB2~QQ
                  ***SORT DATABASE MACRO***
\S          {GOTO}TRANS~{down 5}
            /DSRD.{end}{down}{right 3}~P{right 2}~A~S~A~G
            {CALC}{\L}
```

APPENDIX C 4

COST ANALYSIS PROCEDURES

Data Analysis Templates

Also see Computer File MOD7ANAL.WK1

APPENDIX C 4: COST ANALYSIS PROCEDURES

The worksheet (MOD7ANAL.WK1) includes five templates with illustrative tables and graphs covering the following:

1. Percentage distribution of income and expenditure lines;
2. Magnitude differences between lowest and other expenditures;
3. Differences between budgeted and actual expenditures and income (variance and percent differences);
4. Trend analysis of expenditures; and
5. Break-even analysis of expenditures vs. revenues.

The quickest way to examine these procedures and select the one that are desired is to load the computer program, experiment with each template by inserting new labels, expense and budget figures, and follow the directions for displaying the graphs.

Obviously, these templates can be modified. The "Line Item" labels can be changed to fit the income and expense categories actually used. They can be expanded by inserting additional rows and columns. They can also be reduced by deleting rows and columns. The graphs can be changed or modified, as well. New graphs can also be generated. This template does not include any macros, just formulas.

Table 1 shows the first template and its accompanying graph. Table 2 illustrates how the template can be expanded to show more detail and compare two subproject sites.

Table 1

COST ANALYSIS PROCEDURES FILE: MOD7ANAL.WK1 26-Jul-90

1. Examine Percentage Distribution of Line Items

Line Item	Expenses	Percent
A	B	C
Personnel	$2,345.60	49.9%
Travel	$345.00	7.3%
Equipment	$456.00	9.7%
Supplies	$332.00	7.1%
Other Costs	$876.00	18.6%
Indirect Costs	$345.00	7.3%
Total	$4,699.60	100.0%

1.1 List line items and total in Column B.
1.2 In column C divide each line item by total.
1.3 To display graph press F10.
Or press /Graph, Name, Use, PERCENT

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Figure 1

Distribution of Costs

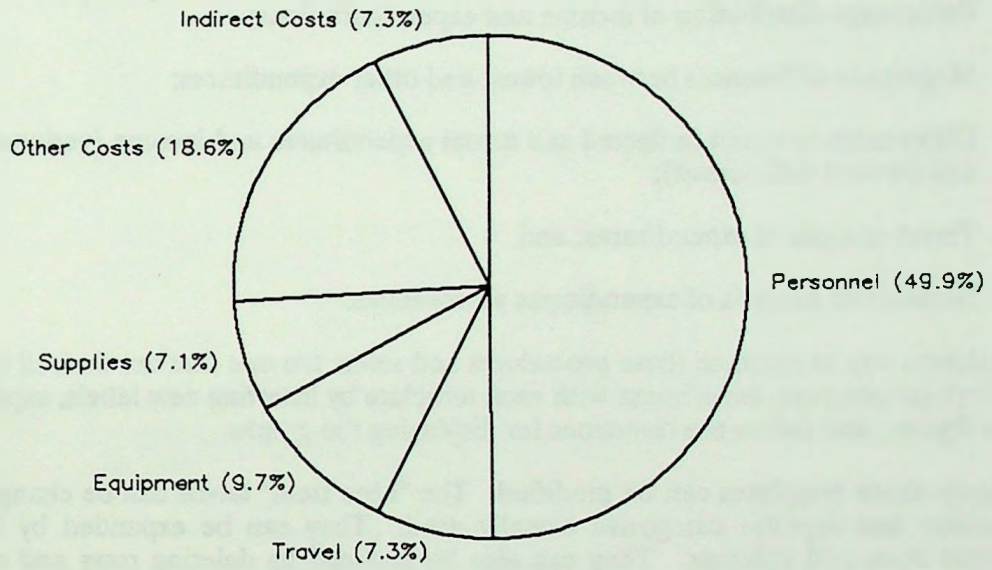

Table 2

1. Examine Percentage Distribution of Line Items

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Line Item	Expenses	Percent	Expenses	Percent
A	B	C	D	E
Bank Charges	10.00	.2%	25.00	.3%
Consultant fees	445.00	7.3%	367.00	4.6%
Drugs, medicines	800.00	13.1%	657.88	8.3%
Dues/publicat.	25.00	.4%	0.00	0.0%
Employee Ben.	1,156.89	18.9%	2,345.90	29.5%
Equipment	1,245.00	20.4%	345.88	4.3%
Freight, post.	124.67	2.0%	45.67	0.6%
Laundry, clean.	35.67	0.6%	35.00	0.4%
Office exp.	175.55	2.9%	256.00	3.2%
Rent	355.86	5.8%	355.86	4.5%
Repairs	67.12	1.1%	352.00	4.4%
Supplies	266.00	4.3%	333.00	4.2%
Travel/per diem	258.00	4.2%	56.33	0.7%
Telephone/fax	45.67	0.7%	123.88	1.6%
Utilities	56.87	0.9%	87.88	1.1%
Wages/salaries	1,050.00	17.2%	2,567.00	32.3%
Total	6,116.30	100.0%	7,954.48	100.0%

The remaining figures show the other four templates in the computer file together with their graphs.

Table 3

2. Analyze Magnitude of Differences in Lines

Line Item	Expenses	Difference
A	B	C
Pers	$2,345.60	$2,013.60
Trav	$345.00	$13.00
Eqip	$456.00	$124.00
Supp	$332.00	$0.00
ODC	$876.00	$544.00
IDC	$345.00	$13.00
Total	$4,699.60	$4,367.60

2.1. Select smallest line item amount.
2.2. In Column C subtract that amount from each line.
2.3 For Graph press / Graph, Name, Use, Diff

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Figure 2

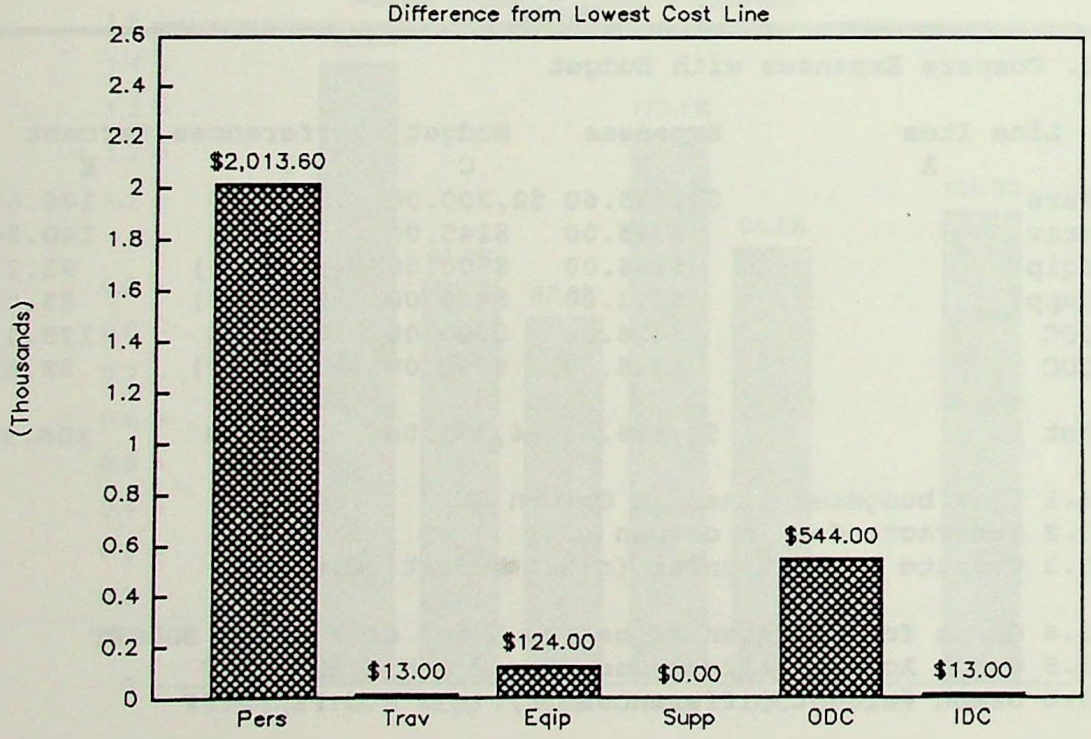

Figure 3

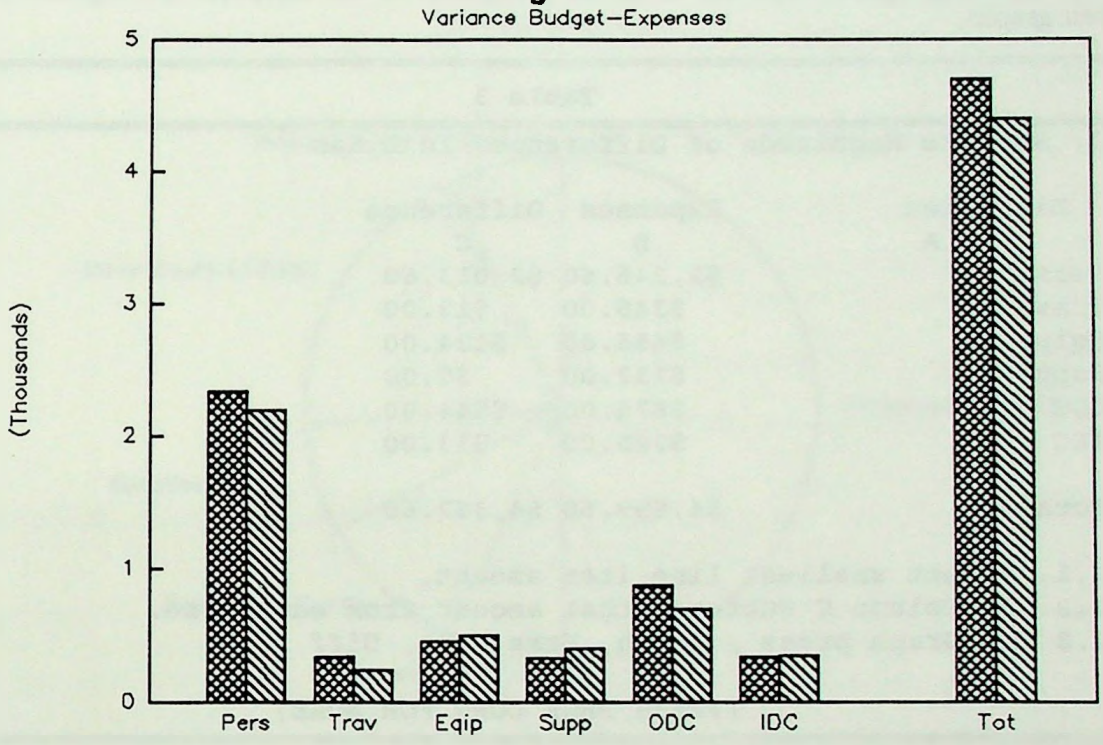

Table 4

3. Compare Expenses with Budget

Line Item	Expenses	Budget	Differencee	Percent
	A	B	C	D	E
Pers	$2,345.60	$2,200.00	$145.60	106.6%
Trav	$345.00	$245.00	$100.00	140.8%
Eqip	$456.00	$500.00	($44.00)	91.2%
Supp	$332.00	$400.00	($68.00)	83.0%
ODC	$876.00	$700.00	$176.00	125.1%
IDC	$345.00	$350.00	($5.00)	98.6%
Tot	$4,699.60	$4,395.00	$304.60	106.9%

3.1 List budgeted lines in Column C.
3.2 Subtract: C-B in column D.
3.3 Compute percent under (over) budget: C/B.

3.4 Graph for differences betwee B and C: / G N U BUDGET
3.5 Graph Actual Differences (D): / G N U BUD_DIFF
3.6 Graph Percent Differences (E): / G N U PER_DIFF

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Figure 4

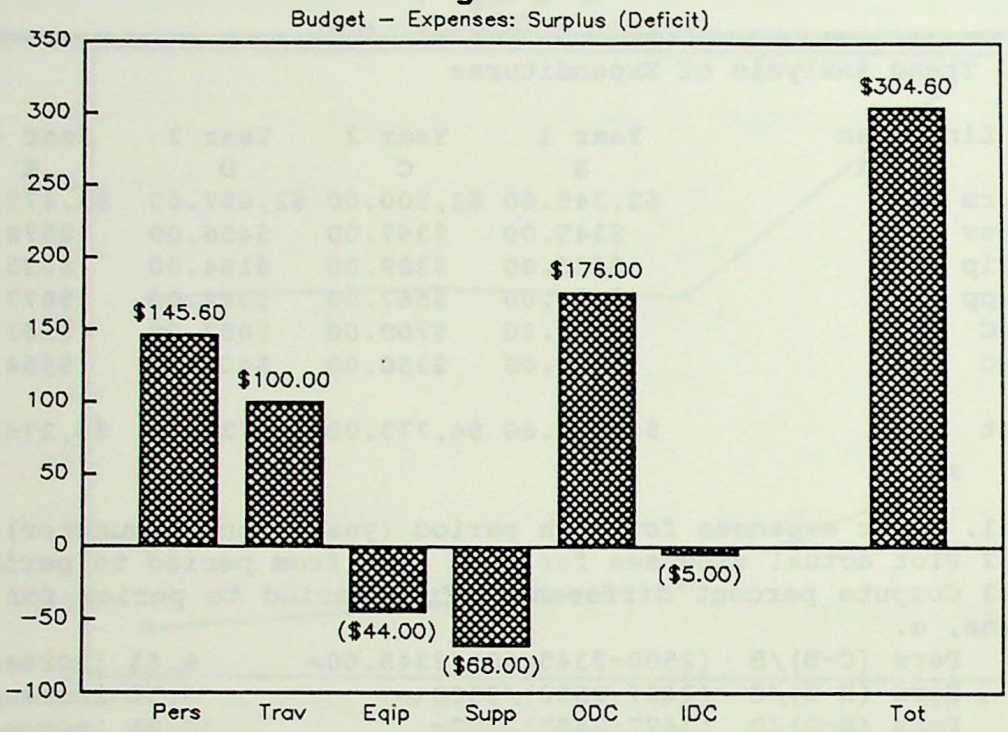

Figure 5

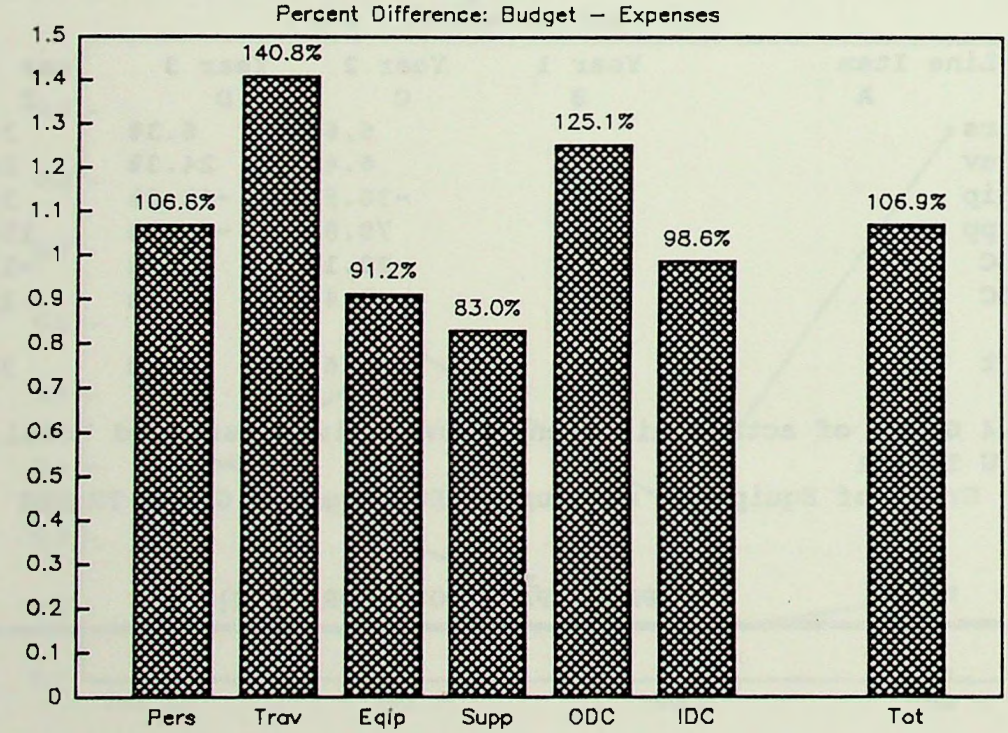

Table 5

4. Trend Analysis of Expenditures

Line Item	Year 1	Year 2	Year 3	Year 4
A	B	C	D	E
Pers	$2,345.60	$2,500.00	$2,657.00	$3,477.00
Trav	$345.00	$367.00	$456.00	$578.00
Eqip	$456.00	$289.00	$164.00	$223.00
Supp	$332.00	$567.00	$342.00	$877.00
ODC	$876.00	$700.00	$657.00	$567.00
IDC	$345.00	$350.00	$456.00	$554.00
Tot	$4,699.60	$4,773.00	$4,732.00	$6,276.00

4.1. Enter expenses for each period (year, month, quarter)
4.2 Plot actual expenses for each line from period to period.
4.3 Compute percent differences from period to period for each line, e.

Pers (C-B)/B	(2500-2345.60)/2345.60=	6.6% increase
Pers (D-C)/C	(2657-2500)/2500 =	6.3% increase
Pers (E-D)/D	(3477-2657)2657=	30.9% increase

{PRESS PAGE DOWN TO VIEW PERCENT CHANGES OVER TIME}

Line Item	Year 1	Year 2	Year 3	Year 4
A	B	C	D	E
Pers		6.6%	6.3%	30.9%
Trav		6.4%	24.3%	26.8%
Eqip		-36.6%	-43.3%	36.0%
Supp		70.8%	-39.7%	156.4%
ODC		-20.1%	-6.1%	-13.7%
IDC		1.4%	30.3%	21.5%
Tot		1.6%	-0.9%	32.6%

4.4 Graph of actual differences over time: Pers and Total: / G N U TREND1
Graph of Equipment and Supply Expenses: / G N U TREND2

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Figure 6

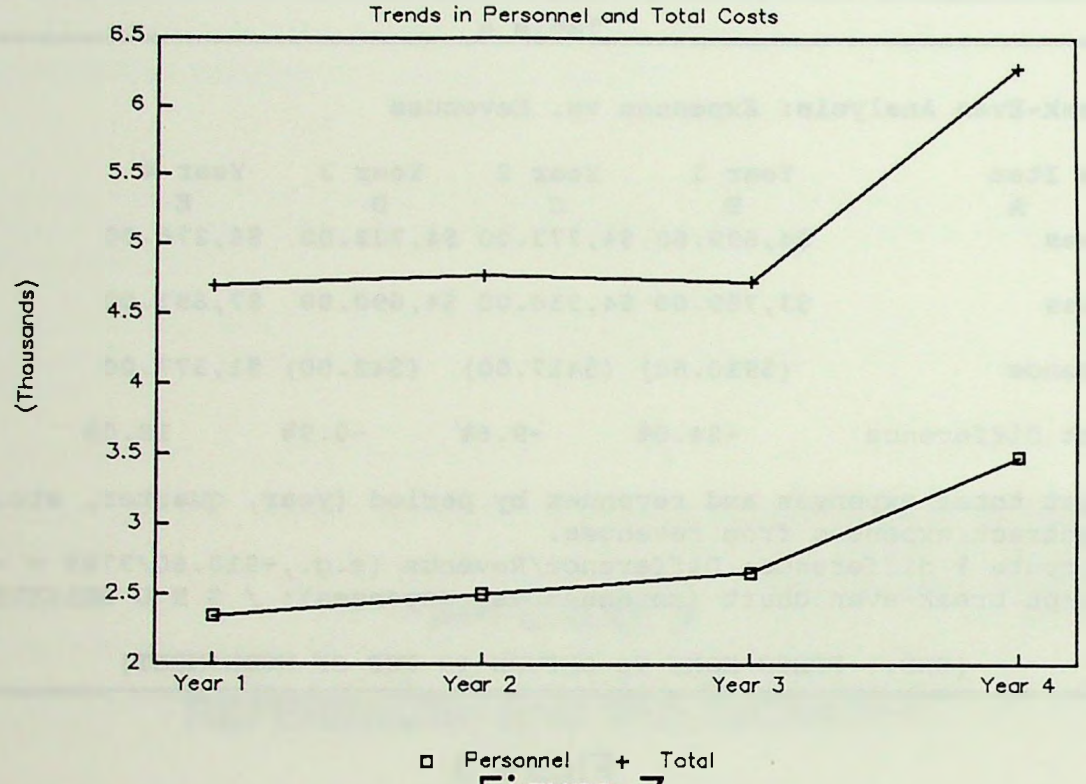

Figure 7

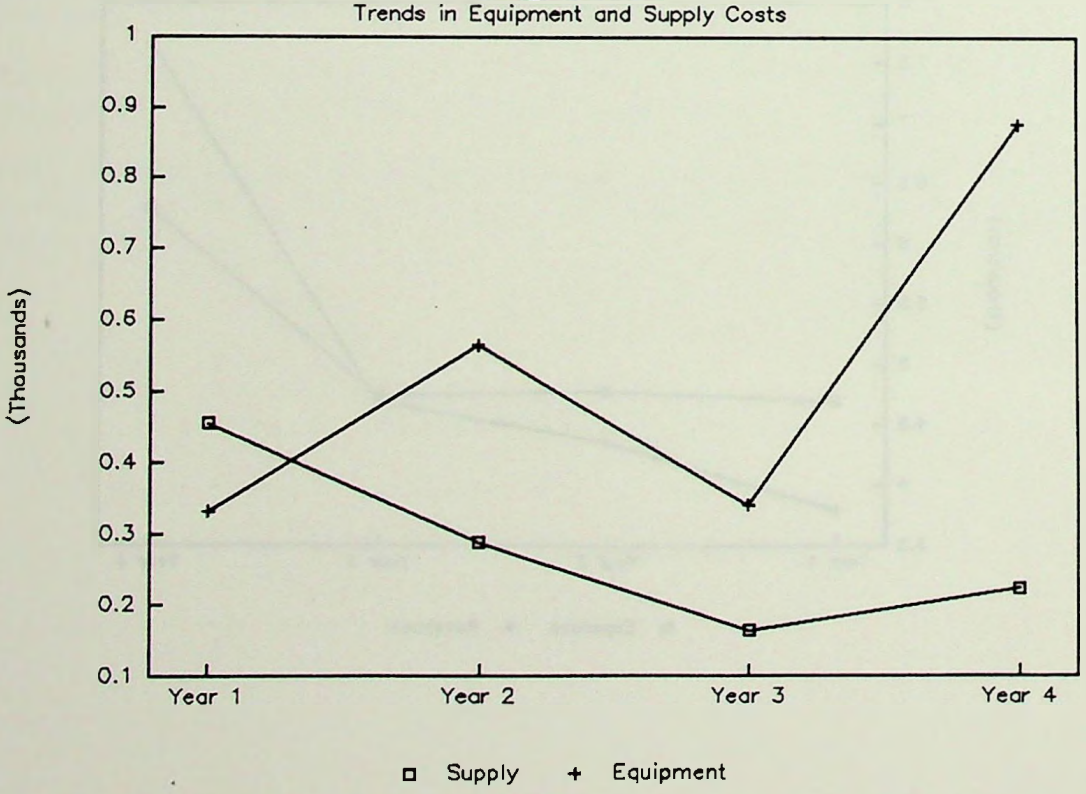

Table 6

5. Break-Even Analysis: Expenses vs. Revenues

Line Item	Year 1	Year 2	Year 3	Year 4
A	B	C	D	E
Expenses	$4,699.60	$4,773.00	$4,732.00	$6,276.00
Revenues	$3,789.00	$4,356.00	$4,690.00	$7,653.00
Difference	($910.60)	($417.00)	($42.00)	$1,377.00
Percent Difference	-24.0%	-9.6%	-0.9%	18.0%

5.1 List total expenses and revenues by period (year, quarter, etc.)
5.2 Subtract expenses from revenues.
5.3 Compute % difference: Difference/Revenue (e.g.,-910.60/3789 = -24%)
5.4 Graph break-even chart (revenues vs. expenses): / G N U BRAKEVEN

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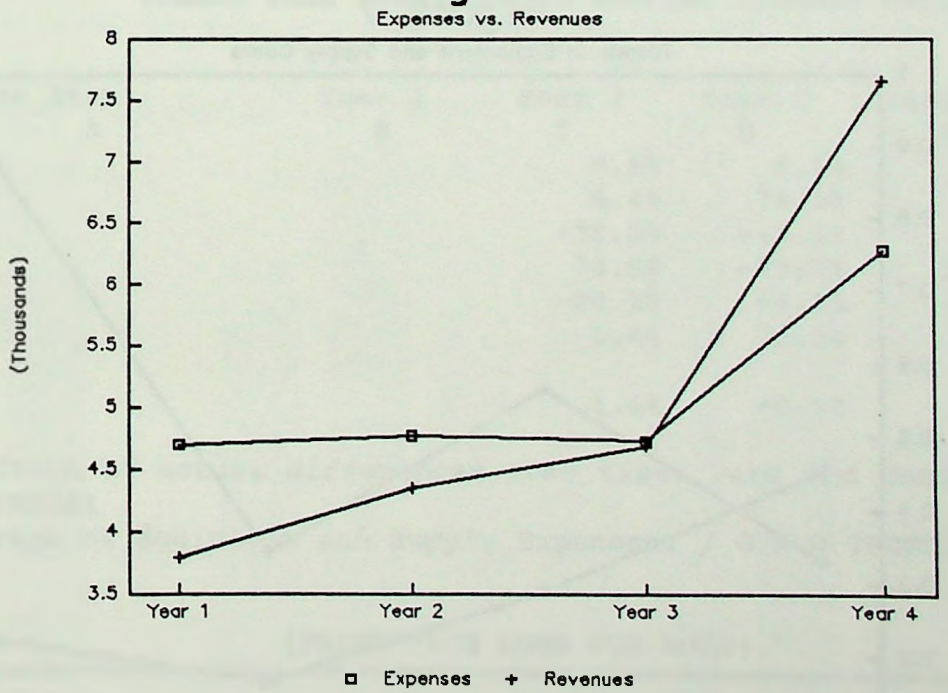
Figure 8



APPENDIX D

REFERENCES AND BIBLIOGRAPHY

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APPENDIX E: GLOSSARY

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COST(S): The value of a good or service, which is conceptually defined as the value that could be gained by using the resources in a different way. For example, the cost of drugs could be seen as the value of using the resources to purchase some other commodity or service.

AVERAGE COST(S): The mean cost per unit of outcome, computed by dividing the total cost by the number of units of outcome, also called unit cost.

CAPITAL COST(S): Costs of items which have a life expectancy of 1 year or more, usually land, buildings, vehicles, and equipment.

DIRECT COST(S): Costs that are directly attributable to a program, project, product or activity, such as the cost of gasoline used by project vehicles for project work.

ECONOMIC COST(S): The "true" costs of a product or service, which is the value of an alternative endeavor that might have been undertaken with the same resources.

ECONOMIES OF SCALE: When marginal costs are less than average costs. Often occurs as a program expands and no additional fixed costs are incurred, thus making the cost of serving one more person or produlcing one more unit less than the average cost.

FINANCIAL COST(S): See Monetary Costs.

FIXED COST(S): Costs that do not vary with program size, such as those of a building, permanent staff, medical equipment.

INDIRECT COST(S): Costs that are not directly attributable to a program, project, product or activity, but which are incurred in support of those direct activities. Overhead, fringe benefits, general and administrative expenses are typical indirect cost categories.

MARGINAL COST(S): The increased (or decreased) cost of providing one additional (or one less) unit of outcome.

MONETARY COST(S): Financial expenditures incurred in purchasing a product or service.

RECURRENT COST(S): Costs of items that are purchased and used (or replaced) within a period of 1 year or less, such as personnel salaries, medicine and supplies, gasoline, and utilities.

VARIABLE COST(S): Costs that vary with program size, such as drugs, gasoline, and vehicle maintenance.

COST ANALYSIS: The examination of expenditures to determine how resources have been spent.

COST-BENEFIT ANALYSIS: A technique for comparing the monetary costs and monetary outcomes of alternatives. In CBA, the effect (the denominator) is expressed in monetary terms; in CEA it is not.

COST-EFFECTIVENESS ANALYSIS: A technique for comparing the costs and the effectiveness of alternative ways of achieving the same objective.

COST-EFFECTIVENESS RATIO: The ratio that is derived by dividing costs by effectiveness.

COST-UTILITY ANALYSIS: A procedure that compares the costs of alternatives with the subjectively derived ratings of those alternatives; used when effectiveness cannot be measured.

EFFECTIVENESS: The degree to which program or system objectives are achieved. Usually, outcomes are compared to some standard, such as the objectives that were set originally. For example, the program reached 90 percent of its target.

EFFICIENCY: The achievement of objectives without wasting resources; the relationship of output to input. For example, in two programs that use the same amount of resources, program A, which screens 10 mothers/day, is more efficient than program B, which screens 5 mothers/day.

EXPENDITURES: The amount of money, time, or effort spent.

INCOME: Funds received from contributions, donations, allotments and/or sales of products and services.

INFLATION: An increase in the price of goods and services.

INPUT: The types or quantities of resources (labor, money, material, etc.) used in a program, project, or activity; sometimes called "effort."

PRESENT VALUE: The current value of goods or services, usually applied to costs or outcomes expected in the future. The future value is discounted at a given rate to determine the present value.

PRICE: The amount for which a product or service is sold.

REPLICATE (REPLICABILITY): The feasibility of expanding or duplicating an activity in other areas.

REVENUE: Money received. See Income.

SHADOW PRICING: Estimates of the true costs of goods and services that are applied, for example, to subsidized services, donated time and equipment, and other goods and services whose true value is not the same as the listed value.

SUSTAIN (SUSTAINABILITY): The ability of a project/program to continue, implying that this will be done largely without external donor assistance.