

PN-ABG-073

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**ANE BUREAU
GUIDANCE FOR
COSTING OF
HEALTH SERVICE
DELIVERY PROJECTS**

BACKGROUND AND GUIDANCE

REACH



John Snow, Inc.

Resources for Child Health

Agency for International Development
Contract No. DPE-5927-C-00-5068-00

PNHGG-073

**BACKGROUND FOR THE
ANE BUREAU GUIDANCE FOR
COSTING OF HEALTH SERVICE DELIVERY PROJECTS
(THE BACKGROUND)**

October 1987

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AID contract no. DPE-5927-C-00-5068-00

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I. INTRODUCTION

This document is designed as a reference for Agency for International Development (AID) health and project officers in the following areas:

1. the role of economic and financial analyses in AID health project design;
2. the current state of the art in costing of health service delivery projects and AID's experience in health project economic and financial analyses;
3. possible models for the development of The Asia/Near East (ANE) Bureau Guidance for Costing of Health Service Delivery Projects; and
4. the management of consultants who perform AID economic and financial analyses.

The methods and criteria used to analyze this information are summarized in Appendix A.

II. OBJECTIVES OF ECONOMIC AND FINANCIAL ANALYSES IN AID HEALTH PROJECT DESIGN

In the health sector, AID has provided significant financial support for the development of primary health care projects in developing countries. As economic conditions have deteriorated in many of developing countries over the past decade, governments have not been able to afford the costs of operating health projects once AID support has ended. Therefore, the sustainability of health projects is being jeopardized by the inability of governments to support these projects once they have been established.

Economic and financial analyses are used by AID in project design in order to accomplish several objectives. Economic analysis is used to assess the costs and effectiveness of the proposed investment to determine if it is a sound allocation of resources. Financial analysis is used to determine the financial requirements of a proposed project. The foundation of both types of analyses, therefore, is the estimation of project costs.

AID has an established set of guidelines to assist consultants in the completing economic and financial analyses. These generic Project Paper Guidelines (dated September 30, 1982) are used for designing all AID projects, including those in health. The guidelines are theoretical, however, and offer few practical directions for determining the costs of a health project or how to complete economic and financial analyses beyond the traditional cost benefit analysis. Rather than helping to design projects, most economic and financial analyses were undertaken in large part to meet

Agency project design requirements and/or to justify programmatic decisions already made by the design team.

A principal recommendation that emerged from the ANE Bureau's 1986 meeting of health, population, and nutrition field officers was to intensify regional efforts to improve the economic and financial sustainability of AID-sponsored projects. One of the ways that the ANE Bureau has responded to this interest is to request that the Resources for Child Health Project (REACH) develop a comprehensive and standardized method for costing of health service delivery projects. The ANE Bureau Guidance for Costing Health Service Delivery Projects (hereafter referred to as The Guidance) will serve as a foundation for AID project economic and financial analyses performed in the future.

III. REVIEW OF VARIOUS APPROACHES TO COSTING HEALTH SERVICE DELIVERY PROJECTS

To develop recommendations concerning a method for costing of AID health service delivery projects, REACH reviewed and evaluated four types of information:

1. existing guidelines and computer models that have been used to assess the costs of health services projects;
2. interviews with health economists who have performed economic analyses for AID health projects;
3. economic and financial analyses in selected AID Project Identification Documents (PIDs) and Project Papers (PPs); and
4. cost-effectiveness and other costing studies undertaken as part of health projects.

The methods and criteria used to analyze this information are summarized in Appendix A.

A. Guidelines Computer Models, and Books for Costing Health Projects

Nine guidelines/computer models and three books for costing health projects were reviewed. The findings of the twelve approaches are summarized in Appendix B. These nine guidelines and computer models can be divided into two categories: 1) guidelines written specifically to aid health program managers in program evaluation; and 2) computer models designed for planning resource allocation decisions. The guidelines and computer models differ with respect to their project designers and target audiences, which include health program managers, program evaluators, or program planners. Furthermore, each was developed to answer a different set of cost questions.

In general, the costing guidelines provide a step-by-step description of how to assess the total resource costs of various programs. Two of the computer models have been adapted to a Lotus 1-2-3 spreadsheet so as to make them accessible for analysis on personal computers.

The following sections provides greater detail on the guidelines and computer models that were reviewed. The three textbooks included in the sample provided theoretical material only and are listed and described in Appendix B.

1. Characterization of Costs

Most of the nine models characterize costs in terms of capital, one-time investment costs and operating/recurrent costs. Only two (*Cost of an Oral Rehydration Therapy Program* and *CosTab*) used replacement costs as a separate category as a substitute for depreciation (see Table 1). Startup costs (e.g., initial stocks of drugs and training) were either specifically or implicitly included in four models: *EPI Costing Guidelines* (Creese, WHO), *Short Guidelines for Costing Primary Health Care Projects in Developing Countries* (Bitran et. al.), *Proposed Extension To EPI Planning Framework* (UNICEF/PAHO), *A Simplified Costing Format for Primary Health Care Activities* (Turner and Warren, WASH), and *CosTab* (Temple, World Bank). The most comprehensive range of cost categories was found in the *CosTab* computer model. Table 2 illustrates the cost elements included in each of the nine models as further subdivisions of types of costs. This table was difficult to construct because of the wide range in terminology used in these models for the same cost element. Where meaning was decipherably different, the cost element was assigned. Every model included salaries as a separate category except the UNICEF/Pan American Health Organization model, which did not specify elements but merely supplied a framework. Vehicles, equipment, supplies and transportation costs were the next most widely included cost categories. Management, utilities, and land were infrequently considered; only *The Cost of an Oral Rehydration Program: A Manual for Managers* (Shepard et. al.) includes management as a cost category.

The most detailed models were *CosTab* and *The General Guidelines for Assessment of Costing of Primary Health Care* (Grosse), because of the range of categories and the completeness of the model.

2. Definitions Used in Costing Models

A costing framework is defined here as an analytic tool which is used to identify, collect, and calculate the costs of project inputs. These data on cost can then feed into the economic and financial analyses which are an integral part of AID project design.

Full project costing evaluates all of the inputs used in a health service project, including direct and indirect costs. *Direct costs* are those costs which are directly traceable to the service delivery objective. *Indirect costs* are those costs which are associated with the objectives other than just the service delivery objective, and therefore not directly traceable to it. Procurement of contraceptives, for example, would be a direct cost of a family planning program, but management of a family planning clinic would be an indirect cost.

Full cost accounting includes all the resources used for a given objective and includes both direct and indirect costs. Two advantages of full cost accounting are that it is a flexible approach which can be adapted to a wide variety of projects and that it evaluates a wide range of costs.

Costing methods divide costs not only into direct and indirect, fixed and variable, but also into operating, investment, replacement, and startup costs. *Investment costs* (one-time) include the initial construction of buildings or purchases of equipment, supplies and vehicles. *Operating* (or recurrent) costs refer to those which result from ongoing program activities such as use of supplies. *Replacement* costs are incurred over a project's life when capital goods (i.e., vehicles, large equipment and buildings) expend their useful lives and must be purchased again. In this way, replacement costs are treated as recurring investments. Alternatively, if the value of these items are depreciated over their useful lives, then these annual depreciation costs are considered operating costs of products. *Startup* costs are those peculiar to the first year of a project and can include initial training, technical assistance, and unusual levels of investment which are made to get a project underway and which do not recur. The cost data collected for the project will also facilitate the preparation of project financial and economic analyses. Because economic analyses require that the real economic costs of programs be measured, shadow prices must be used to adjust for possible distortions in wages or exchange rates.

Consultants who participate in project design teams for AID are usually required to examine a variety of economic and financial questions. The quality of these analyses alternatively depends on the availability and quality of data. To date, the quality of cost data used for project economic and financial analyses has varied, resulting in analyses which are not of a uniform standard. AID's Child Survival Program has focused attention on the routine collection of output and impact data. The ANE Bureau Guidance for Costing Health Service Delivery Projects addresses the cost side. Both data sets are necessary in order to carry out meaningful analyses.

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Table I
Broad Characterization of Costs in Guidelines/Computer Models
for Costing Health Projects Reviewed

Model	Direct/ indirect costs	Fixed/ variable costs	Capital/one-time investment costs	Operating/ recurrent costs	Replacement costs	Startup costs
1. <u>EPI Costing Guidelines</u> (Crease, WHO)			X	X		(X)
2. <u>Cost of an ORT Program: Manual</u> (Shepard, et. al.)			X	X	(X)	
3. <u>Short Guidelines for Costing Selected Primary Health Care Projects in Developing Countries</u> (Bitran, et. al.)			X	X		
4. <u>Proposed Extension to EPI Planning Framework</u> (UNICEF/PAHO)	X		X	X		X
5. <u>General Guidelines on Assess- ment of Costs and Coverage for AID Projects</u> (Grace)	(X)		X	X		
6. <u>A Simplified Costing Format for Primary Health Care Activities</u> (Turner and Warner, WASH Project)				X		X
7. <u>Health Financing Planning Model</u> (Barrett and So, WB)			X	X		
8. <u>Micro Computer Health Finance Model</u> (Abt Associates)		X		X		
9. <u>CosTab</u> (Temple, World Bank)	X	(X)	X	X	(X)	X

(X) = Not a specific cost category but addressed in the method

Table 2
Specific Cost Elements Used in Guidelines/Computer Models
for Costing Health Projects Reviewed

Cost Element	Guideline/Models								
	1 Creese WHO	2 Shepard et. al.	3 Bitran et. al.	4* UNICEF/ PAHO	5 Grosse	6 Turner & Warner, WASH Project	7 Barnum & So, World Bank	8 Abt Assoc.	9 Temple, World Bank
Salaries - Health worker - Administrator	X X	X X	X		X X	X	X X		X X
Facilities		X			X	X			X
Land					X	X	X		X
Transportation (vehicle operations)	X	X	X		X				X
Utilities			X		X				X
Other					X	X			
Construction		(X)	X		X				X
Vehicles	X	(X)	X		X	X		(X)	X
Equipment	X		X		X	X		(X)	X
Training	X	X	X		X		X		X
Supplies	X	X	X		X	X		X	X
Supervision		X	X		X				X
Maintenance/ repair or facilities	X		X		X	X			X
Management		X							X

* Cost elements not specified

B. Costing Frameworks Used in AID Project Design

1. Interviews With Economists Involved in AID Health Projects

From interviews with consultants who participated in AID project design teams, several conclusions about the role of economic and financial analyses during the project design process can be drawn (see Table C-1 in Appendix C for a summary of the interview results). First, the most detailed analyses were the result of considerable preparation on the part of the consultant and equal levels of support from the Mission and the host country government. In very few cases were Ministry counterparts involved in data collection.

Second, the economic and financial analyses were rarely integrated into AID project design. In most cases, the analyses were performed after the project budget and technical elements had been finalized. The reason was frequently that the design team leader was not interested in the economic implications of the design, or that the economic consultant's trip did not coincide with the schedule of the rest of the design team. It appears, therefore, that the organization of the project design process influences the degree to which economic information is integrated into the overall project.

Third, because of delays in drafting the Project Paper or the Project Agreement, several analyses were excluded from final project documents because they were thought to be dated or no longer relevant. In addition, the economic information produced may have been too technical and not easily understood and therefore not integrated into the final document.

2. Economic and Financial Analyses in AID Project Identification Documents (PIDs) and Project Papers (PPs)

The quality of economic and financial analyses performed for AID project design varies greatly (see Table C-2 in Appendix C for a comparison of analyses performed in conjunction with seven AID projects).

In general, consultants for the seven projects were required to perform cost-benefit or cost-effectiveness analyses to justify the proposed project design. Only two of the seven analyses dealt with the issue of recurrent costs and the affordability of the project over the long run. These analyses were used to justify the design of a project but did not contribute to determining the least costly approach to the project.

In addition, the costing of the AID health projects varied tremendously, not only in terms of the cost categories used but also in terms of the data sources and methodology of calculating costs. There was little comparability among cost definitions or analyses. For example, some analyses measured full resource costs while others focused on partial costs.

C. Cost-Effectiveness and Other Costing Studies Undertaken as Part of Health Projects

Twenty (20) cost-effectiveness and costing studies were also surveyed (see Table D-1 in Appendix D for a summary of these). Twelve cost-effectiveness (or cost-benefit) studies were analyzed. Of these, six evaluated immunization programs, and five examined diarrheal disease control programs. The cost-benefit study evaluated a malaria-control program. The remaining eight costing studies examined a vitamin A project, integrated health services projects, and UNICEF's GOBI (Growth monitoring, Oral rehydration therapy, Breastfeeding, and Immunization) activities. Only one of these studies calculated the future costs of a planned program (UNICEF GOBI) according to different goals of the program; the bulk of the studies were evaluations of on-going or terminated projects.

1. Costing Approaches

The most striking comparison to be made among these 20 studies was the lack of a standard method of classifying costs between capital (or investment) and recurrent (or operating) costs. Typically, but not always, other types of distinctions were made, such as between variable and fixed costs; project and nonproject costs, short- and long-run average costs, material and operational costs, direct and indirect costs, and functional cost categories (e.g., training, personnel). (Table D-1 in Appendix D summarizes the major characteristics of the cost accounting approaches used in these studies.) Few studies itemized the costs of training, supervision, management or media, and these were either subsumed under other categories or ignored.

The variability in the classification of costs included in the studies became greater when subcategories of costs were examined. The number of separate cost entries included in various studies ranged from 4 to 19. The cost items included most commonly were personnel, transportation, equipment, buildings, supplies, media, maintenance, and vehicles. However, there was no standard definition of the types of resource costs that were included under each of these headings, no standard method for calculating them and no guidance on where the data were obtained. Thus, for example, some studies included direct and indirect costs of personnel and others did not. Measures of recurrent transportation costs were not dealt with uniformly: some studies included only the cost of fuel, while others included maintenance and freight charges for supplies.

There was no standard method for determining the full resource costs of particular cost items, such as vaccines or oral rehydration salts (ORS), nor did these estimates take into account wastage or actual use of supplies in a standard way. The methods used to calculate costs varied especially with regard to indirect costs and imputed costs for future programs. The following observations were made:

- a. **Allocation of joint costs:** In general, two methods were used for allocating joint costs of programs (personnel cost devoted to a specific health activity or supply cost attributed to health service delivery). One method estimated the proportion of a health worker's time for immunization or diarrheal disease control, and multiplied total personnel costs by this percentage (Brenzel). The

second method was to allocate a percentage of total resource costs of some components (for supplies and personnel, for example) by the proportion of visits to a health center for a particular activity (Shepard, et. al.).

- b. **Depreciation of capital investment costs:** No uniform method for determining the useful life of buildings, vehicles, and other capital equipment was used. Moreover, the depreciated rates vary according to use, quality of the product, and environmental factors such as climate, among other things.
- c. **Cost projections:** Several of the studies based cost information on a sample of health facilities and then projected these costs to national level expenditures. The methods of projection, however, varied. One method was based on population size, and another was based on the proportion of activity borne by any one level of the health system.
- d. **Shadow pricing:** This term refers to making an adjustment in prices of input and foreign exchange when these diverge from free market values. Shadow prices were used in cost-effectiveness studies, but they were used for different inputs. As a consequence, the studies varied as to whether the economic or financial costs were measured.
- e. **Startup costs:** These costs were not distinguished in the 20 studies reviewed.

The cost information calculated in each of the 20 studies was used to perform a range of comparative analyses. These included comparison across implementation strategies (4); comparison among program costs at different types of health facilities (1); additional costs of adding additional services (2); changes in costs of expanding the program to a wider service population (3); comparison between the cost of preventing and treating a disease (2); comparison between costs and benefits of a program (12); and cost comparisons between achieving different goals of the program (1).

2. Source of Funding

About one-half of the studies reported costs by source of funding, and most of these separated costs between government contributions and donors' support. One study examined private and public contributions to the treatment and prevention of diarrheal disease (Shepard, et. al.). Only one study attempted to measure the affordability of the project to the government, by comparing the cost of expanding the service to a greater population to the average (historical) level of government expenditure for health. (*The Mali Rural Health Project: Its costs and Financing*, Shepard, 1982).

3. Data Sources

Cost data were obtained from a variety of sources, the most predominant being financial reports (ledgers), invoices, and records of public expenditures. Several studies based their cost information

on a sample of health facilities implementing the project (Creese), and some used these estimates to project total national costs for the program.(Shepard, et. al., 1987).

IV. POSSIBLE MODELS FOR THE GUIDANCE

REACH reviewed a total of 12 guidelines, computer models, and textbooks for costing health projects; seven AID project economic and financial analyses and eight interviews with AID consultants; and 20 cost- effectiveness and costing studies. Although the overriding observation of this survey is that there is a wide variability in the quality of costing exercises and presentation of results, several of these methods could be useful in the development of **The Guidance**. Some of the most useful aspects of the analyses reviewed in terms of their scope, format, methodology, and applicability to a wide range of health service projects, are discussed below.

A. Costing Approaches

Several of the methods reviewed contained comprehensive costing approaches, but that in the World Bank's *CosTab* computer model (Temple) was by far the most comprehensive. This computer model presents aggregated and disaggregated costs by expenditure categories, functional project components, and financial source by year of the program. *CosTab* separates foreign exchange and local currency expenditures. Furthermore, it includes cost items such as customs charges on supply shipments, which are often overlooked during the planning phase of projects and can result in great financial burdens to the host government. In addition, *CosTab* specifies the financing plan for a project, in terms of government taxes and donor support by disbursement category.

In addition, *The General Guidelines on Assessment of Costs and Coverage* (Grosse) provide the most detail on relevant subcategories for costs of health projects. The terminology used in these guidelines is sufficiently broad and is able to be applied to different types of programs. The authors recommend that similar terminology and cost categorization be used in **The Guidance**.

The Short Guidelines for Costing Selected Primary Health Care Projects (Bitran et. al.) also details cost subcategories and points out differences between the categories relevant for program planning those relevant for program evaluation.

B. Cost Estimation

Because of the wide range in methods used to calculate costs presented in the costing studies and in AID Project Papers, **The Guidance** should focus on developing a standard set of rules of thumb for calculating costs. *CosTab* clearly identifies cost elements and rules of thumb for calculation, and these methods should be adopted in **The Guidance**. Several of the costing studies reviewed provided detailed explanations of cost calculations, such as *The Cost-effectiveness of Immunization Strategies in the Islamic Republic of Mauritania* (Brenzel, 1986).

C. Identification of Sources of Funding

To project the affordability of programs in the future, identification of sources of funding is an important element. *CosTab* provides a basic framework which outlines sources of funds.

D. Data Sources

The Guidance should recommend preferred data sources for calculating costs. Several of the studies and methods reviewed in *The Background*, including *CosTab*, the *WHO EPI Costing Guidelines* (Creese) and the Shepard *ORT Manual*, provide good suggestions for data collection in the field. Of these, the *CosTab* computer model contains the most comprehensive description and identification of cost categories.

E. Conclusions

The overall conclusion of this survey is that no uniform method is available to AID and its contractors for costing health service projects. Moreover, the currently available methods for costing health programs show a wide range in purpose and applicability to project design. Only two of the 9 guidelines and computer models reviewed examine the tradeoffs between certain program goals and cost recovery: an examination which is key to useful project design and an important element and point of project economic analysis (Abt Associates; Barnum and So, World Bank.) Few of the models address planning for future costs.

Another conclusion of this document is that the quality and scope of economic and financial analyses performed for AID project design in the past has varied widely. A review of several of these analyses and interviews with consultants involved in the preparation of such analyses suggests the following. First, economic and financial information often was not used to select among alternative designs, but was used only to justify the design already chosen. Second, better project design occurred when the consultant and the design team leader understood the value and role of economic analysis. Third, AID Mission assistance in providing a range of materials and data on the program inputs to the project design team greatly enhanced the preparation of the consultant.

The review of AID economic and financial analyses indicates that the outcome of such analyses strongly depends on the quality of available data. In general, economists have had to rely on secondary sources of information, such as aggregate budgets which do not provide sufficient detail on the costs of particular program components. Additional data could have been gathered through site visits by the design team. Therefore, The Guidance should present suggestions on what information needs to be collected and on how to use these data in a meaningful way.

Finally, the review of cost-effectiveness and costing studies in this document demonstrates that there is no consistent method of defining costs, of identifying and calculating full resource costs, of identifying the most relevant types of cost comparisons to undertake, and of presenting cost information in the most useful manner.

V. RECOMMENDATIONS FOR THE GUIDANCE

The ANE Bureau Guidance for Costing of Health Service Delivery Projects should attempt to standardize the following aspects of costing of health services projects:

1. **The Guidance should define and specify the costing terminology to be used by AID and consultants (investment, capital, startup, recurrent, operational, replacement, fixed, or variable costs). Costs should be separated into the major categories of *investment* and *recurrent* costs over the life of the project, and startup costs should be determined and planned as a proportion of total projected costs. Annualization should be the preferred method for dealing with replacement costs.**
2. **The Guidance should identify and define the most useful costing subcategories for planning, monitoring, and evaluating a project. The types of subcategories chosen will depend, in part, on the specific types of financial and economic questions that need to be answered for the analysis.**
3. **The Guidance should divide costs into resource and functional categories. Some examples of resource categories to be included are the following:**

Investment Costs

- o construction
- o furniture
- o equipment and large supplies
- o vehicles
- o initial stocks of drugs, oral rehydration salts (ORS), vaccines, and contraceptives
- o technical assistance
- o research and evaluation
- o training
- o media production
- o general

Recurrent costs

- o salaries
- o per diem and travel expenses
- o building operation, maintenance, and annualization
- o equipment operation, maintenance, and annualization

- o vehicle operation, maintenance and annualization
 - o replenishment of stocks of drugs, ORS, vaccines, contraceptives
 - o supplies
 - o training
 - o media
 - o general
4. **The Guidance should specify general rules of thumb for calculating economic costs:**
 - a) annualization of capital goods;
 - b) appropriate consideration of inflation and exchange rates, including anticipated changes in both;
 - c) allocation of joint costs by proportion of time or proportion of activity;
 - d) estimation of salary costs for donated labor or goods;
 - e) consistency in the use of a single currency to specify costs, i.e., U.S. dollars;
 - f) acceptable alternatives for projecting costs based on small samples to regional or national levels;
 - g) estimation and magnitude of startup costs of a future program;
 - h) methods for estimating real resource use, taking into account wastage, for example.
 5. **The Guidance should identify preferred data sources for cost information. The Guidance should also address data limitations in the field and serve as a reference to the consultant about how to find needed information. This might include obtaining informed judgment in a systematic manner when objective data are unavailable.**
 6. **The Guidance should recommend an adequate recurrent cost analysis that also identifies the long-term recurrent cost implications of the planned project to the government;**
 7. **The Guidance should propose a standard format for reporting costs and provide sample tables. Costs should be reported by year, by source, by local or foreign exchange and by type of cost;**

8. A set of economic and financial questions needs to be developed to assist consultants in undertaking economic and financial analyses during project design.
9. The specific economic and financial questions relevant to the design and financial sustainability of the proposed project should be determined before the consultancy is requested.
10. The economist should be present near the beginning of the design process, so that choices about the design can be supported by economic information.

VI. RECOMMENDATIONS CONCERNING THE USE OF CONSULTANTS IN COSTING AID PROJECTS

A. Draft Partial Scope of Work for Consultants Costing AID Health Projects

The task of assessing the costs of AID health service delivery projects is an activity that must be undertaken by consultants who will perform either the financial or economic analyses (or both) for AID project design. The following partial scope of work is meant to be included in the larger and more specific scope of work for each consultant performing such analyses.

1. The consultant, in collaboration with the USAID health or program officer, Ministry of Health counterparts, and other members of the design team, should identify the timing and area of implementation of the health project to be costed, as well as the individual components of the project. This information should provide the basis for determining the quantity and type of project inputs for costing.
2. The consultant should use the format presented in **The ANE Bureau Guidance for Costing of Health Service Delivery Projects** to collect and present cost information. **The Guidance** should serve as a reference document during the costing exercise.
3. The consultant should assess the full costs of the proposed health project (both direct and indirect costs). Costs should be tabulated by resource and functional categories, and by recurrent and investment costs. In addition, the startup costs of the project should be determined for a specific time period. Taxes and the foreign exchange burden of the project design should be addressed.
4. In collaboration with the AID Mission, the consultant should describe the financing of the project by source of funds.
5. All cost data sources, foreign exchange rates, and inflation rates should be well documented and described throughout the analysis. When project-specific costs

cannot be determined in-country, the consultant can use international estimates or costs from similar countries and health projects.

6. The consultant should present the cost findings and their implications to USAID and Ministry counterparts prior to departure from the country.

B. Recruitment and Management of Consultants

Recruiting a consultant responsible for the economic aspects of project design can be difficult, because such individuals are often in high demand. It is important, therefore, to begin recruiting for economic and financial analysts as early as possible and in concert with the rest of the project design team. The consultant for the economic analysis should be involved with the design team early, preferably at the Project Identification Document (PID) and Project Paper (PP) stages of project development rather than at the end of the planning exercise merely to justify the project design.

Management of consultants is crucial to their contribution to the project design process, to their performance in the field, and to their satisfying the needs of AID. If consultants are hired directly by the AID Mission, they should be fully briefed at the start of their work. If the consultants are hired by a management firm, USAID should make clear to the firm that the consultants should be briefed by someone at AID/Washington or should be provided background documents prior to arriving in-country for work. The most successful economic and financial analyses reviewed for *The Guidance* were performed by consultants who thought they had been adequately briefed and prepared prior to commencing work. Missions should also arrange for the availability of computing technology for consultants to facilitate their producing the economic and financial analyses. Consultants should be encouraged to bring along with them, if possible, computing technology that is compatible with the AID Mission and local facilities.

APPENDIXES

- Appendix A Methods Used To Prepare The Background**
- Appendix B Summary of Guidelines, Computer Models, and
Books for Costing Health Projects Reviewed**
- Appendix C Summary of Costing Frameworks Used in AID
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Review**

APPENDIX A
METHODS USED TO PREPARE THE BACKGROUND

APPENDIX A

METHODS USED TO PREPARE THE BACKGROUND

A. Review of Existing Guidelines, Computer Models, and Books for Costing Health Projects

Preparation of **The Background** involved a review of the current literature on the costing of health projects and of computer models developed for costing health projects. A total of 12 guidelines, models, and textbooks were reviewed with the following questions in mind:

- 1) For which type of audience are the methods intended?
- 2) What are the questions that the methods are intending to answer?
- 3) What is the assumed level of sophistication or intended level of involvement of the user of the method?
- 4) Does the method have an interesting or useful approach which could be adapted in **The Guidance**?
- 5) For what phase of the project design process are the methods intended and what time frame is used for estimating resource requirements?
- 6) Are the methods theoretical or practical?
- 7) Do the methods identify sources of financing?

Additional details on these guidelines, models and books, are presented in Appendix B.

B. Review of Economic and Financial Analyses in Selected AID Projects

Agency for International Development (AID) Project Identification Documents (PIDs) and Project Papers (PPs) were reviewed through interviews with economists on the design teams and qualitative assessments of the analyses themselves.

1. Interviews With Economists Involved in AID Projects

Between February 1 and February 17, 1987, a total of eight interviews were conducted with five economists who participated in a variety of health project design teams (e.g., immunization, oral rehydration therapy) their experience with PIDs and PPs and their availability for interview. The

interviews lasted approximately 20 minutes for each project design document. Because this analysis is not intended to be a critical review of project or individual performance, the economists and projects are not named.

2. Economic and Financial Analyses in AID Project Identification Papers (PIDs) and Project Papers (PPs)

The economic and financial analyses in PIDs and PPs were reviewed to identify the types of analyses performed and the outstanding feature(s) of each analysis. The results of a largely qualitative assessment of the seven documents reviewed are summarized in Table C-2 of Appendix C.

The seven documents reviewed were prepared in conjunction with the following projects:

- o Bangladesh Polichikitsak Project
- o Cameroon Maternal and Child Health Project
- o India Integrated Maternal and Child Nutrition Project
- o Indonesia Expanded Programme on Immunization
- o Nepal Integrated Rural Health/Family Planning Services Project
- o Pakistan Training of Health Workers Project
- o (Peru) ROCAP/ORT, Growth Monitoring, and Education Project
- o Zaire Sante Pour Tous Project

To preserve anonymity, the projects listed are not described by name. Four of the projects were integrated child survival projects, and two were designed to extend the scope of a previous, on-going project. Four of the projects were found in the Asia-Near East Region. The PPs reviewed were written between 1978 and 1985, with over half of the documents written after 1982.

The economic and financial analyses in PIDs and PPs were evaluated in terms of the cost accounting framework used, the type of analysis performed, the level of detail, and data collection efforts. For further details, see Table C-2 in Appendix C.

C: Cost-Effectiveness and Other Costing Studies Reviewed

In addition to AID experience in costing health projects, 20 cost-effectiveness and cost studies performed by individuals or other development organizations were reviewed: 6 cost-effectiveness evaluations of immunization programs; 8 costing studies for country-specific projects (integrated primary health care projects or focused disease control projects); and one cost projection of UNICEF's GOBI (Growth monitoring, Oral rehydration therapy, Breastfeeding, and Immunization) activities. The purpose of this review was to be able to draw upon a wider range of experience and to incorporate the strengths of these analyses into The Guidance. Because the economic analyses included in PIDs and PPs often did not provide enough detail about what types of costs were included and how they were calculated, these studies will provide valuable costing information for develop-

ment of The Guidance.

The 20 cost-effectiveness and costing studies reviewed are listed in the bibliography in Appendix D. All of these studies were analyzed with respect to the same criteria listed for the economic and financial analyses in AID PIDs and PPs, but with special focus on how cost information was categorized and presented. Table D-1 in Appendix D compares the studies with respect to seven features including focus, major cost categories, and data collection efforts.

APPENDIX B

**SUMMARY OF GUIDELINES, COMPUTER MODELS, AND
BOOKS FOR COSTING HEALTH PROJECTS REVIEWED**

**Table B-1 Comparison of Guidelines, Computer Models, and
Books for Costing Health Projects Reviewed**

APPENDIX B

SUMMARY OF GUIDELINES, COMPUTER MODELS, AND BOOKS FOR COSTING HEALTH PROJECTS

The nine guidelines/computer models and three books on costing health projects that were reviewed are summarized briefly below. Table B-1 below compares the 12 approaches with respect to 1) audience, 2) questions to answer, 3) level of sophistication, 4) key characteristics, 5) range of costs, and 6) purpose.

1. **Expanded Programme on Immunization Costing Guidelines**, Andrew L. Cresse, Health Economist, World Health Organization, EPI/GEN/79/5.

These guidelines were developed by the World Health Organization (WHO) to illustrate to Expanded Programme on Immunization (EPI) managers in the field how to assess the cost-effectiveness of existing and possible alternative immunization programs. The guidelines first show how to measure the costs of an EPI, using a costing sample of immunization clinics or health centers. The guidelines then show how one can use cost information in combination with the number of immunizations given and the proportion of the eligible population vaccinated assess the cost-effectiveness of programs. Cost-effectiveness is measured as the cost per fully vaccinated child less than 1 year of age. The guidelines provide a step-by-step method of costing of EPI programs and avoid using economic theory and complex calculations. Therefore, these guidelines can be used in the field by a wide audience.

2. **The Cost of an Oral Rehydration Therapy Program: A Manual for Managers**, by Donald S. Shepard, Stephen J. Lerman, and Richard A. Cash, Institute for Health Research, Harvard School of Public Health, November 18, 1987.

This manual has been developed as a field guide for managers of Control of Diarrheal Disease (CDD) Programs for the World Health Organization. The manual describes procedures for assessing the costs of diarrheal disease control programs which have been integrated into primary health care systems run by the host country government. The procedures described in this manual, like those in the *EPI Costing Guidelines* described above are clear and simple to follow, avoiding complicated descriptions of economic theory or analysis. The manual includes illustrative examples of different types of calculations and work sheets upon which to complete calculations.

This manual also contains a section on the application of the analysis to several managerial questions: 1) What cost components account for the greatest proportion of total cost and where can the program save costs?; 2) What would the costs of control area be if services were extended to a larger population or wider service area?; 3) How can two diarrheal disease control programs be compared in different areas?; 4) How does an oral rehydration therapy (ORT) program compare with other health interventions?; and 5) What is the cost-effectiveness of an ORT program? Cost-effectiveness is

measured in terms of cost per case treated with ORT or cost per death averted from diarrheal disease.

3. **Short Guidelines for Costing Selected Primary Health Care Projects in Developing Countries**, by Ricardo Bitran, Health Economist, Abt Associates, Inc. (for the Resources for Child Health Project (REACH), 1986).

These guidelines provide a general framework for assessing the investment, operating, and capital replacement costs of various primary health projects both prior to their completion and afterwards. Health projects included are growth monitoring, rural water and sanitation, ORT, breastfeeding, and immunization. The guidelines are easy to understand and provide simple formulas for calculating costs. Nevertheless, they only provide a listing of cost categories to include in the overall calculations and do not provide information about how to collect information or what to do in cases where information are not available. These guidelines were developed for Save the Children.

4. **Proposed Extension to EPI Planning Framework**, by David Parker, UNICEF in collaboration with the Pan American Health Organization, 1987

The *EPI Planning Framework* was developed as part of a collaborative effort between UNICEF and the Pan American Health Organization (PAHO) to standardize cost information for immunization programs in Latin America. The purpose of the framework is to aid in determining the resource requirements of donors and governments. The framework attempts to allow systematic identification of resource requirements, as well as a clear presentation of the relationship between inputs and outputs of immunization programs. In addition, the framework was designed to link the management functions of planning, budgeting, and monitoring of the EPI to program evaluation and analysis of donor support.

The framework is composed of a series of tables which lead the user from an estimation of program costs, to an assessment of financial planning, and to an analysis of recurrent costs. The tables emphasize three major categorizations of program costs: financial and nonfinancial, external and national, capital and recurrent.

Although the *Proposed Extension to EPI Planning Framework* was developed to be used in all Latin American countries with an EPI, the approach is flexible and can be adapted to each country's particular context. The level of detail will vary among countries depending on the nature of the national program, the availability and quality of cost information, and whether the framework is being used for planning, monitoring, or evaluation.

The standardized format has been field-tested in several Latin American countries, including Guatemala, Ecuador, Bolivia, Jamaica, and Peru, during International Coordinating Committee meetings for the EPI. As a result of this field-testing, the framework is continually being revised to improve its use.

5. General Guidelines on the Assessment of Costs and Coverage for AID Primary Health Care Projects, by R.N. Grosse and staff, Appendix A, "Low-Cost Integrative Health Services: Interim Report," April 1979.

This framework was developed largely as a result of the conclusions of a larger study which stated, "while not a substantive finding, a major conclusion of the study is that the field of health services cost analysis seems inadequately understood and practiced. This is not a matter that can be rectified by the design of forms and instructions for field managers, though this may play a useful role... Cost analysis is the organization of information so that the resource implications of alternative future decisions can be reasonably projected. Relevant costs are those which would flow as the consequence of a decision. Estimating these requires an understanding of the "world" with and without a particular set of decisions, or under alternative decisions. What to include and exclude, how to set values, the use of "shadow prices", treatment of capital expenditures, indirect costs, discounting, inflation and international comparisons, variations of costs with the scale or duration of the activity, all these questions and more need to be assessed explicitly and with care."

This framework divides costs into four categories: 1) one-time costs, 2) recurrent costs, 3) direct costs, and 4) indirect costs. Each of these broad categories is further subdivided into seven cost items: personnel, facilities, land, resources specific to services categories, transportation and communication resources, utilities, and other resources. These guidelines also identify which types of costs to include under each category. For example, one-time personnel costs would include the costs of initial training programs; recurrent facilities costs would encompass rent, operation, and maintenance of buildings used for service delivery.

The objective of this costing exercise is to estimate the costs of all resources used in the development and implementation of health projects, including both explicit and implicit costs.

6. A Simplified Costing Format for Primary Health Care Activities, by J. Ellis Turner and Dennis B. Warner, WASH Project, for the World Federation of Public Health Association Conference, Mexico City, Mexico, 1987.

This document presents a set of standardized costing formats for both development (startup) and recurrent (operating) costs for primary health care projects. The formats are intended to be used as a starting point for costing a wide variety of health activities, but the authors realize that each project will vary in focus and that standardization will therefore be difficult. The costing framework in this document attempts to organize cost information in such a way to answer a variety of cost questions.

Intended audience for this framework is project managers and field personnel who are implementing AID child survival and water and sanitation projects. The framework was designed to help these individuals monitor the overall costs of programs during the implementation of projects.

The costing framework presented in this document was developed following a search of the literature on costing of health projects in an effort to identify the weaknesses and strengths of previous costing exercises. The framework is presented as two tables: the first examines the program development costs by type of cost and source of funds for a specific health activity; and the second divides the type of cost into development phase and operating phase, separated by total cost and foreign currency requirements. The framework separates costs into categories that are useful for monitoring the costs of programs, though the types of costs included are limited.

In addition to the tables, this document presents examples of cost calculations and applies the framework to two health projects: immunization and water and sanitation. With further refinement, this framework could serve as a potential model for The Guidance.

7. **Health Financing Planning Model**, by Howard Barnum and Jaehyang So, World Bank, November 1986.

This model is one of several developed by the World Bank to assist that organization in costing health care in developing countries, and to assist in policy making, planning, and budgeting in the health sector. This model provides a procedure for projecting the recurrent costs of planned health projects with special emphasis on training and personnel costs over the long run. This model also focuses on the availability and use of resources over time.

The specific questions addressed by the model include the following:

1. What are the recurrent costs of planned and existing programs in the health sector?
2. What are the implications for government budgets of additional donor capital expenditures in the health sector?
3. What are the unit cost implications of low utilization rates of health services?
4. Are the projected numbers of skilled personnel adequate to staff existing and planned projects?

The model uses between 40 and 80 equations on a Lotus 1-2-3 spreadsheet to calculate the answers to the above questions, so the user must be comfortable with using a computer and have some knowledge of health financing. The model can be adapted to predict the recurrent costs of a variety of health programs.

8. Micro-Computer Health Finance Model, by Marty Makinen, Steven Block, and Ricardo Bitran, Abt Associates, Inc., September 1985.

This micro-computer model uses a Lotus 1-2-3 spreadsheet to determine what pricing and subsidy levels will be needed to serve a desirable population at any level of health care. It analyzes: 1) the fixed and variable costs of planned and/or existing program; 2) the nature of the demand for health services; and 3) the demographic characteristics of the population. This model can be used in the absence of empirical data as a simulation exercise.

The model also permits an analysis of the financial implications of a range of policy options that the government of a developing country may choose to incorporate in its cost recovery system. These choices range from providing free care to a proportion of the population, to using a head tax for subsidizing health centers, setting a price for curative care, or subsidizing fixed costs.

The model interacts with the user and is therefore easy to use. It has been used in several consultancies for AID but has not been officially distributed for general use outside of Abt Associates Inc.

9. CostTab, Gordon Temple, World Bank.

This computer program was developed by the World Bank to assist in the costing of that organization's projects. The program presents aggregated and disaggregated costs by expenditure categories, functional project components, and financial sources. In addition, the program requires information on the projected quantities of services or materials within a determined time frame, and the base cost in dollars and local currency, in order to project total program costs over the same project period. The model adjusts costs annually with projected inflation and exchange rates for local and foreign currencies.

10. Cost-Benefit and Cost-Effectiveness Analysis in Health Care, K. Warner and Bryan Luce, Health Administration Press, Michigan, 1982.

This book is intended for those who have little background in cost-benefit and/or cost-effectiveness analysis and focuses on evaluating health care organizations and delivery of health services in the United States. The stated purpose of the text is to "demystify" this type of economic analysis for the health professional, particularly those who are involved in decision or policy-making. The book presents information of how to calculate ratios and how to interpret results. In addition, a significant proportion of the text discusses the past and potential uses for such analyses by insurance companies and government agencies which finance health care. The book concludes with a chapter which identifies a research agenda for the future.

Appendices to this book provide an extensive bibliography on cost-benefit analysis and cost-effectiveness analysis. Appendix D lists approximately 650 articles on the subject. This text seems

useful for the student of health program evaluation, though no examples of programs in developing countries are mentioned.

11. Benefit-Cost Analysis for Program Evaluation, by Mark S. Thompson, Sage Publications, London, 1980.

This textbook on benefit-cost analysis provides an overview to the purpose of the program evaluation through this method, as well as describes in detail the information needed and the steps to calculating benefit-cost ratios. The book also contains a section on how to interpret benefit-cost ratios; how to identify the relevant decision maker for the analysis; how to value the effects of programs, especially when they are nonmonetary; how to place a value on lives; and alternative types of analyses, such as cost-effectiveness analysis. The potential audience for this publication are students of program evaluation, though the book is practical enough to use in the field. Several examples of types of calculations are included in the text, which makes it a very good learning tool.

Nevertheless, this book does not address programs specifically for the health sector, nor for developing country situations. Therefore, the principles and concepts would need to be applied to the evaluation of health programs in developing countries.

12. Cost-Benefit Analysis: Issues and Methodologies, A. Ray, World Bank Publication, Johns Hopkins University Press, 1984.

This textbook provides a review of different methodologies for calculating the cost-benefit ratio. Specifically, the author discusses controversial aspects of the traditional methodology, including the introduction of differential distribution weights, social evaluation issues, the relative valuation of traded and non-traded goods, capital market issues (discount rates), and role of a sensitivity analysis.

The textbook was written for someone familiar with the various schools of thought with respect to cost-benefit analysis, and will be particularly useful for students of economics or statistics. Although several examples of calculations are included in the text, they require prior knowledge of mathematics and economics. The book does not focus on the evaluation of health care projects, and is therefore of limited use to individuals working in this field.

**Table B-1
Comparison of Guidelines, Computer Models, and Books for Costing Health Projects**

GUIDELINES, MODELS, OR BOOKS						
CHARACTERISTIC	1. EPI Costing Guidelines (Creese, WHO)	2. Cost of an ORT Program: Manual for Managers (Shepard, et al.)	3. Short Guidelines for Costing Selected Primary Health Care Projects in Developing Countries (Bitran, et. al.)	4. EPI Planning Framework (Parker, UNICEF/PAHO)	5. General Guidelines on Assessment of Costs & Coverage for AID Primary Health Care Projects (R. Grosse)	6. A Simplified Costing Format for Primary Health Care Activities (Turner & Warner, WASH Project)
Audience	EPI managers in the field	Control of Diarrheal Disease Program (CDD) Managers	Primary Health Care Program Evaluators	Donor representatives & gov't officials managing the EPI	AID project managers & consultants for program evaluation	Project managers and field personnel
Questions to Answer	What is the cost-effectiveness of the existing or alternative EPI?	What is the cost-effectiveness of an existing, future, or alternative ORT program and how do these costs/effectiveness compared to other health interventions?	What cost elements should be included in an evaluation of a variety of primary health care programs?	What are the projected costs of the EPI and who will pay for them?	What are the costs of all resources used in the development and implementation of AID primary health care projects?	What are the total costs of a health and/or water and sanitation projects
Level of Sophistication	Straightforward	Straightforward	List of cost components with simple formulas	Framework is simplified & standardized for use in Latin American countries	Comprehensive framework which identifies types of costs to be included	Simple to use, but requires knowledge of costing
Key Characteristics	<ul style="list-style-type: none"> -Costing of EPI is done with data from a sample of health centers -Cost-effectiveness measured as cost per fully vaccinated child less than one year of age 	Cost-effectiveness measured in terms of cost/deaths averted. Manual includes examples of calculations & application	General framework for calculating investment, operating and replacement costs of health projects, prior to their completion & at their completion	<ul style="list-style-type: none"> -Framework includes financial/non-financial costs; external and national inputs; capita vs. recurrent costs -Framework examines recurrent cost implications of programs 	<ul style="list-style-type: none"> -Separates costs into one-time and recurrent costs; direct and indirect. -Identifies and categorizes types of costs 	<ul style="list-style-type: none"> -Divides costs into development and recurrent -Provides tables and sample calculations -Reviews previous costing literature
Range of Costs	Immunization programs	Diarrheal Disease programs	Primary health care programs	Immunization programs	Primary health care programs	Health and water and sanitation
Purpose	Program evaluation at end of project	Program planning and evaluation at end of project	Program evaluation at end of project	Program planning monitoring, and evaluation	Program design and evaluation	Program monitoring and evaluation during or at end of project

**Table B-1 (cont'd)
Comparison of Guidelines, Computer Models, and Books for Costing Health Projects**

GUIDELINES, MODELS, OR BOOKS						
CHARACTERISTIC	7. Health Financing Planning Model (Barnum & So)	8. Micro-Computer Health Finance Model (Makinen, et al., Abt Associates)	9. CosTab (Temple, World Bank)	10 Cost-Benefit and Cost-Effectiveness Analysis in Health Care (Warner & Luce)	11. Benefit-Cost Analysis for Program Evaluation (Thompson)	12. Benefit-Cost Analysis: Issues and Methodologies (Ray)
Audience	World Bank Project	Ministry of Health program planners and managers	World Bank program planners	Students and planners of health programs	Students of cost-effectiveness analysis	Scholars of cost-benefit analysis
Questions to Answer	What are the recurrent cost implications of a proposed project? Are projected numbers of skilled project staff adequate?	What are the recurrent cost implications of providing certain primary health care services to a desired population level? What price would have to be charged to patients to recover recurrent costs?	What are the costs by year, by expenditure category? What are program financial, investment, and recurrent costs?	How do you perform cost-effectiveness analysis and how can you apply the method to health care settings?	What is the cost-effectiveness of a program?	How can the method be refined or improved?
Level of Sophistication	Interactive computer model	Interactive ("user-friendly") computer model	Interactive computer model	Easy to understand text with examples	Easy to understand text with examples	Complex discussion of methodology
Key Characteristics	Lotus 1-2-3 adapted. One component links training of personnel to total project recurrent costs. Expandable model.	Lotus 1-2-3 adapted. Calculates breakeven levels for costs and price. Calculates cost for different assumptions of demand and coverage.	Printout shows cost category based on input levels and unit prices	In-depth discussion of uses of analysis Focuses on health	Gives concrete examples of methods and logical problems to solve	Discuss various methodological issues and tries to improve methodology
Range of Costs	Health and relevant sectors	Health sector only	Health and other sectors	Health organizations	All programs	All programs
Purpose	Program planning Prospective analysis	Program planning especially for user-fee system Prospective analysis	Program monitoring and evaluation at end of project	Program evaluation at end of project	Program evaluation at end of project	Program evaluation at end of project

APPENDIX C

Table C-1: Summary of Interviews With Health Economists Involved in AID Health Projects

Table C-2: Summary of Economic and Financial Analyses in AID Project Identification Documents (PIDs) and Project Papers (PPs)

NB: A total of eight interviews were performed for eight AID Project Papers; however, seven Project Paper documents were reviewed.

Table C-1
Summary of Interviews with Economists Involved in AID Health Projects

CHARACTERISTICS	INTERVIEW A	INTERVIEW B	INTERVIEW C	INTERVIEW D
1. QUALIFICATIONS	PhD, Economics	PhD, Economics	PhD, Economics	MPA, Economic Development
2. LEVEL OF EFFORT	3 weeks	36 days	6 weeks (another consultant did financial)	4 weeks
3. PREPARATION OF CONSULTANT	Good	Excellent: all team members were briefed	Excellent: briefing by someone who was in country	Good: some reading
4. PREPARATION OF USAID	Good: interested in expanding program	Provided data; follow on to existing project	Good: USAID hired local graduate student to help	USAID economist worked with consultant
5. PREPARATION OF MINISTRY OF HEALTH	Not involved until end	N/A	Ministry of Health available for interview	Some
6. INTEGRATION INTO DESIGN	Project did not continue	Excellent: alternative designs costed and selected most cost-effective one	USAID put emphasis on using data in design	Analysis came after design determined
7. USE OF ANALYSIS	Project did not continue	Design chosen based on analysis, project now running	Figures not used in Project Paper (PP)	Used for project
8. DATA SOURCES	Primary and secondary sources	Secondary sources	Secondary sources: used data that had not previously been analyzed	Secondary sources
9. SPECIAL DATA COLLECTION	Household survey of 100 workers	None	None	None
10. SPECIAL ANALYSES	None	All technical people on team knew costs of programs	Emphasis on integration of services; cost-benefit analysis	Recurrent cost of expanding medical school training capacity
11. QUALITY OF DATA	Excellent because of household survey	Wide type and excellent volume	Great disorganization on financial information	Good, but difficult to find, national expenditure data
12. RECOMMENDED DATA COLLECTION	Survey for longitudinal analysis	None	None	None
13. RECOMMENDED FURTHER ANALYSIS	Survey results	None	None	Recurrent cost implications of design of project but USAID not interested

Table C-1(cont'd)
Summary of Interviews with Economists Involved in AID Health Projects

CHARACTERISTICS	INTERVIEW E	INTERVIEW F	INTERVIEW G	INTERVIEW H
1. QUALIFICATIONS	MS, Economics	PhD, Economics	MS, Economics	PhD, Public Policy
2. LEVEL OF EFFORT	7 weeks	28 days (7 day weeks)	2 weeks	10 days
3. PREPARATION OF CONSULTANT	Excellent: sent documents to read beforehand	Some. Not enough time for analysis because of volume of calculations	Some. Consultants did not speak language	Some. Consultants did not have enough time to finish analysis in-country
4. PREPARATION OF USAID	Excellent: collected lots of information for consultant	Supplied information	Team members not present at same time; but lots of data made available	AID health officer absent during process
5. PREPARATION OF MINISTRY OF HEALTH	Counterpart assigned to work with consultant	Available, but no counterpart	Available for interview	Some involvement
6. INTEGRATION INTO DESIGN	Team leader not interested in economics, but analysis eventually integrated into design	None	Economic analysis used to justify design, but design team members not present at same time	None. Consultant came at end of design process
7. USE OF ANALYSIS	Project started years after analysis was performed, analysis outdated	Analysis turned into Appendix - used scrupulously	Economic analysis used in Project Paper (PP)	Proposed scope of project determined before economic analysis
8. DATA SOURCES	Secondary sources	Secondary sources	Secondary sources	Secondary sources
9. SPECIAL DATA COLLECTION	None	Calculated morbidity rates for diseases	None	None
10. SPECIAL ANALYSES	USAID interested in cost implications of different project designs	Cost-effectiveness of EPI developed methodology and marginal cost-effectiveness of adding shots	Costs of regional vs. individual project	Worked at financing of project on ongoing basis; analyzed cost of services developed cost/visit equiv.
11. QUALITY OF DATA	Special survey done beforehand which was very useful	Major data collection effort	High quality because of previous project	Aggregated budget and expenditure data
12. RECOMMENDED DATA COLLECTION	None	None	None	None
13. RECOMMENDED FURTHER ANALYSIS	None	None	None	None

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Table C-2
Summary of Economic and Financial Analysis of
AID Project Identification Documents and Project Papers

CHARACTERISTIC	Project A	Project B	Project C
1. Question to be answered	What is the most cost-effective method of training?	What design of the project will minimize the recurrent costs to the government in future?	Is integration of primary health care services more cost-effective than vertical program?
2. Costing elements	Focused on training parameters	Costing of program performed on a functional basis - specific to project scope	Study used existing budgets for each primary health care vertical component
3. Joint cost	Not a problem because of narrow focus of project	Continuation of previous project inputs from other health sector projects - not applicable	Assumptions about time involved in particular activities made to allocate joint costs of integrated programs
4. Demand analysis	Descriptive	Analysis of the effect of decreased infant mortality on fertility rate and impact on demand for services	Linked to detailed demographic analysis to predict effect on demand services
5. Least-cost analysis	Measured cost-effectiveness of 3 scenarios a) expansion of program as planned b) expansion delayed 1 year c) expansion delayed 2 years	Three types of cost-effectiveness analyses performed a) project compared to alternatives b) integrated compared to vertical project c) individual project components	Keep types of cost-effectiveness analyses performed a) integrations of primary health care components b) simultaneous FP/MCH programs c) benefit-cost analysis
6. Equity implications	Study examines distributional effects of training village health workers	Not applicable	No applicable
7. Preparation/presentation	Analysis used tables; medium level of detail	High level of detail; series of tables for each project component	Initial cost-effectiveness analysis summarizes results from previous studies: High level of detail

Table C-2 (cont'd)
Summary of Economic and Financial Analysis of
AID Project Identification Documents and Project Papers

CHARACTERISTIC	Project D	Project E	Project F	Project G
1. Question to be answered	How does the cost-effectiveness of the proposed program compare to the existing one?	Is it more cost-effective to treat a preventable disease?	Is a regional program more cost-effective than a series of individual country programs?	Are the interventions selected for this project cost-effective? (unclear question)
2. Costing elements	Budgets were calculated using functionally relevant costing elements	Used traditional costing elements for type of program	Functional categories used for program, including mass communications	Based on budget figures for Ministry of Health
3. Joint cost	Not applicable because program was vertical	Based on type of vaccine and relevant costs	Not applicable	Not applicable
4. Demand analysis	-Studies of beneficiaries of programs made in detail -Comparison was made between projected and actual beneficiaries	Based on mortality data	Not applicable	Some analysis of beneficiaries
5. Least-cost analysis	Study compared current method of intervention with proposed	Performed 6 analyses including total program, individual components, and marginal cost-effectiveness	-Calculated hospitalization and treatment costs -Examined regional vs. national projects - Integrated vs. vertical services	Discussion of cost-effectiveness of ORT, immunization based on other studies in other countries
6. Equity implications	Author focuses on delivery of services to the target population	Discussed distributional effects	Discussed weighting of target population to account for income differences	Not applicable
7. Preparation/presentation	Highly detailed analysis, lots of tables	High level of detail, developed method	Descriptive, medium level of detail	Mostly descriptive, some tables of Ministry of Health

Table C-2 (cont'd)
Summary of Economic and Financial Analysis of
AID Project Identification Documents and Project Papers

CHARACTERISTIC	Project A	Project B	Project C
8. Recurrent cost analysis	Study examined cost recovery through user fees	Significant attention paid to recurrent cost implications a) recurrent cost disaggregated by donor support b) recurrent cost burden of personnel on government calculated User fee analysis performed	Cost-benefit analysis examined recurrent costs of programs
9. Capital replacement	Not addressed	Study of financing of capital replacement costs performed showing inability of government to cover these costs in the long run	Study analysis included
10. Affordability of program	Donor sponsored, but implications to government discussed	Discussion and analysis of minimization of recurrent costs through minimizing retraining of workers	Project found capable of providing sufficient returns to cover recurrent costs based on the internal rate of return
11. Data sources and use	- Household survey - Government data - Data from existing program	Previous program data on costs and demand used to project future levels	- Used old government and program data - Several sources on cost-effectiveness of integrated vs. vertical program in the country
12. Distinguishing features	- Analysis based on household survey - Analysis examined phasing of inputs and effect on output - Analysis examined distributional effects	- Study calculated present-cost of death averted - Unit outputs for each project component determined - Table developed which shows quantitation of outputs for cost-effectiveness - Training budgets highly detailed - User fee analysis	- Analyzed cost and impact of integrated vs. vertical programs - Analyzed incremental costs and benefits of extending services - Detailed demographic analysis and impact on demand for services - Calculated net income saved from deaths prevented

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Table C-2 (cont'd)
Summary of Economic and Financial Analysis of
AID Project Identification Documents and Project Papers

CHARACTERISTIC	Project D	Project E	Project F	Project G
8. Recurrent cost analysis	Performed three types of recurrent cost analyses a) costs of program relative to spending b) spending to donor relative to government c) turnover rate of recurrent costs	Study of income as way of recovering recurrent costs	Discussion of use fees as a way of recovering recurrent costs	Not included
9. Capital replacement	Not applicable	Not applicable	Not included	Not included
10. Affordability of program	- Study examined rate of donor vs. government expenditure in future - Phasing or rate of extension on project affect affordability	- Study including analysis of timing of inputs and linked this to affordability	Not included	Not included
11. Data sources and use	- Baseline survey of ongoing data program - Government sources	Lack of data so 1)extrapolated from one region 2)used interview info. 3)used hospitals records for incidence/mortality	-Other cost-effectiveness studies - Studies from neighboring countries	Few: World Bank documents, government reports, hospital records
12. Distinguishing features	- Author recommends data collection of benefits during - Analysis of phasing of inputs - Analysis of expected benefits based on future productivity, savings to health sector, and earning advancement	-Recommends data collection as part of program	- Chose not to calculate benefit-cost ratios because of nonquantifiable outputs -Table developed which analyzed quantification of outputs	- Estimated total lives saved for project - Analyzed budget allocation trends - Developed cost per visit equivalents to expenditures

APPENDIX D

BIBLIOGRAPHY AND SUMMARY OF COST-EFFECTIVENESS AND OTHER COST STUDIES REVIEWED

**Table D-1: Summary of Cost-Effectiveness and Other Costing
Studies of Health Projects**

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**Table D-1
Summary of Cost-effectiveness and Other Costing Studies
of Health Projects**

CHARACTERISTIC	1. Mauritania cost-effectiveness study	2. Gambia cost-effectiveness study	3. Indonesia cost-effectiveness study
1. Focus of analysis	Cost-effectiveness of immunization strategies	Cost-effectiveness of immunization	Cost effectiveness of immunization
2. Major cost categories used	Capital investment and recurrent costs	Variable and Fixed costs	Total cost per vaccine
3. Organization of cost components	Ten budget categories by type of cost (e.g. salaries, transport) presented for each strategy	Seven separate categories; Personnel, buildings, equipment and transportation costs reported for both local and national levels	Not applicable
4. How joint costs separated	Allocated on basis of percent of health workers time devoted to vaccination	Allocation based on number of contacts for each antigen; multiple vaccines were allocated equally	Allocated vaccine and vaccine supply cost to each antigen
5. Comparative analysis	Compared fixed centers, mobile teams and mass campaign strategies	Compared cost per death and cost per case averted for disease	Compared immunization with treatment cost for 4 diseases, and incremental costs of adding vaccines
6. Sources of funds	Separated costs by government and two major donors	Not specified	Not specified
7. Data collection efforts	Cost data collected from financial report of donors, government receipts of expenditures and previous reports	Costs based on figures collected in 1982 study	Used financial projections for the Expanded Program on Immunization from the Ministry of Health based on hospital cost analysis

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Table D-1 (cont'd)
Summary of Cost-effectiveness and Other Costing Studies
of Health Projects

CHARACTERISTIC	4. Cote d'Ivoire cost effectiveness study	5. Immunization cost-effectiveness studies	6. Ecuador cost-effectiveness studies
1. Focus of analysis	Cost-effectiveness study of measles component of the World Health Organization's (WHO) Expanded Program on Immunization	Field testing of WHO Guidelines; cost-effectiveness studies of immunization programs in Indonesia, Thailand, Philippines	Cost-effectiveness study of immunization strategies in Ecuador
2. Major cost categories used	Total annual costs reported only	Separated into operating and capital costs	Separated into capital and operating costs
3. Organization of cost components	Total annual costs include equipment, fuels, supplies, travel and misc.	Operating costs were divided into 5 categories and capital costs into 4. Costs were also separated by type of health center	Capital costs were divided into 4 categories. Operating costs were divided into 6 categories
4. How joint costs separated	Estimated that 75% of all EPI costs attributable to measles vaccine	Staff time, transportation and other shared costs are allocated based on proportion of time attributable to the EPI	Based on the total number of doses and the number of days of the campaign. Salaries allocated on percent of time
5. Comparative analysis	Calculated cost per death averted and years of life added due to vaccine	Compared cost per fully vaccinated child in 3 countries	Compared cost per dose and cost per fully immunized child for campaign and routine services
6. Sources of funds	Separated costs by government and 2 major donors	Not specified	Not specified
7. Data collection efforts	Cost calculations based on program budgets	Cost information based on sample of different types of health facilities	Cost data based on last round of campaign and several provinces extrapolated to national level. Costs also based on sample of centers

**Table D-1 (cont'd)
Summary of Cost-effectiveness and Other Costing Studies
of Health Projects**

CHARACTERISTIC	7. Egypt cost-effectiveness study	8. Bangladesh cost-effectiveness study	9. Indonesia cost-effectiveness study
1. Focus of analysis	Cost-effectiveness of National Control of Diarrheal Disease Program	Cost-effectiveness of clinic based services for diarrheal disease	Cost-effectiveness of diarrheal disease treatment through oral rehydration therapy
2. Major cost categories used	Costs divided into project and nonproject costs	Costs divided into short- and long- run average costs	Costs divided into general health center cost, costs of Control of Diarrheal Diseases (CDD) training, costs of CDD drugs, and cost of CDD management. Private sector and community costs included
3. Organization of cost components	Project costs were divided into administrative overhead, operational categories and commodities; non-project costs were divided into Ministry of Health and private expenditures for a total of 19 categories	Short-run costs were divided into 10 separate operational categories (e.g., maintenance and salaries)	General health center costs were divided into 4 recurrent costs and 3 annualized capital costs
4. How joint costs separated	Allocation based on percent time attributed to prevention of treatment activities	Allocation based on proportion of time spent on activity	Allocation based on the proportion of health center visits for diarrheal disease
5. Comparative analysis	Compared cost of prevention with cost of treatment	Compared long-run average cost per patient, per severe patient, and per death	Compared costs among health centers, and explored private and community financing of project
6. Sources of funds	Not specified	Not specified	Examined public and private expenditures
7. Data collection effort	Costs based on existing project records; invoices of commodities; and Ministry of Health records	Cost data obtained from existing financial, supply and worker time use records and equipment use logs	Based on existing data from four sub-districts, data on unit costs of drugs

**Table D-1 (cont'd)
Summary of Cost-effectiveness and Other Costing Studies
of Health Projects**

CHARACTERISTIC	10. ORT (mass media) cost-effectiveness study	11. Egypt cost-effectiveness study of ORT	12. Mali Cost analysis of rural health project
1. Focus of analysis	Cost-effectiveness of ORT projects in Honduras and Gambia	Cost-effectiveness of ORT project in Egypt	Cost analysis of a rural health project
2. Major cost categories used	Broken down by host country and donor costs	Study examined incremental costs of ORT programs different than the control area, including recurrent and capital costs	Costs separated into non-recurrent and recurrent costs. Analysis calculates incremental recurrent cost of government of expansion of program
3. Organization of cost components	Costs divided into 8 distinct categories based on functional categories of the program	Analysis used salary, supply, transportation, media, and equipment	Costs divided into personnel, transportation, equipment and supplies, medicine, and existing services
4. How joint costs separated	Allocated on proportion of time of health workers spent on activity	Allocated on proportion of time of health workers spent on activity	Not specified
5. Comparative analysis	Cost per presumed death averted for both programs calculated	Compared incremental cost-effectiveness of different study areas	Compares incremental costs of expanding the program
6. Sources of funds	Costs divided between government, pharmaceutical company and 3 donor agencies	Not specified	Not specified
7. Data collection efforts	Data collected from accounting ledgers, estimates of media time	Data based on sample of 29 villages in 6 study cells	Based on USAID records on program cash expenditures (explicit costs)

Table D-1 (cont'd)
Summary of Cost-effectiveness and Other Costing Studies
of Health Projects

CHARACTERISTIC	13. Tanzania Cost analysis of low-cost health care	14. India Cost-benefit analysis of anti-malaria program	15. Peru Cost analysis of medical care under Social Security
1. Focus of analysis	Cost analysis of low-cost health care delivery project based on village health workers	Cost and benefit analysis of an anti-malaria program	Cost analysis of medical care
2. Major cost categories used	Costs divided into investment and recurrent costs for rural dispensaries and health centers	Costs divided into material costs and operational costs	Costs reported as public sector investment to type of facility, and by expenditure category, private sector and community costs included
3. Organization of cost components	Investment costs included construction vehicles, initial training & durables; Recurrent costs included supplies transportation costs, seminars, and salaries	Material costs include drugs, DDT, and contingencies; operational costs include staff	Expenditures are divided into 5 categories: salaries and fees, medical supplies, contracted services, monetary benefits, and capital goods
4. How joint costs separated	Allocated on a percentage basis of total health workers assigned to rural centers	Not specified	Not specified
5. Comparative analysis	Not specified	Total cost figures include central and state government contributions plus external assistance	Governmental expenditure by level reported
6. Sources of funds	Not specified	Not specified	Examined public and private expenditures
7. Data collection efforts	Based on data from training programs by donors	Based on government reported outlays for the program	Data from hospital records and social security by system

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Table D-1 (cont'd)
Summary of Cost-effectiveness and Other Costing Studies
of Health Projects

CHARACTERISTIC	16. Indonesia Vitamin A costing study	17. Cost of UNICEF's Growth- monitoring, Oral rehydration, Breastfeeding, & Immuniza- tion (GOBI) Activities	18. Bolivia cost study
1. Focus of analysis	Costing of alternative strategies for vitamin A delivery	Costing of GOBI activities for 90 countries	Costing of low-cost integrative health services
2. Major cost categories used	Cost components were classified into direct and indirect, fixed and variable; recurrent and capital	Cost divided into capital and recurrent	Costs divided into investment and recurrent costs
3. Organization of cost components	18 separate categories were identified relating to vitamin A distribution	Analysis uses 6 categories; transportation and supplies are categorized under both capital and recurrent cost	Recurrent costs are divided into 7 categories; investment costs into 8 categories. Investment costs included some startup costs
4. How joint costs separated	Allocation made on proportion of health workers time devoted to vitamin A distribution	Most of costs imputed from unit cost estimates based on reported figures	Allocation between investment and recurrent on percentage of total cost
5. Comparative analysis	Comparison made between strategies; capsule or liquid form of vitamin A	Comparison made between regions for a 3- and 7-yr. program and full coverage program	Examined cost of current program and expanded program
6. Sources of funds	Financing sources for program were identified for government and donor input	Model developed for estimation of donor support required for GOBI program	Costs divided into 4 major and 3 minor sources of funds
7. Data collection	Selected sample of health facilities upon which to base cost estimate	Costs based on unit prices of supplies, demand for services, pay scales, and estimates of training	Cost information came from project documents

**Table D-1 (cont'd)
Summary of Cost-effectiveness and Other Costing Studies
of Health Projects**

CHARACTERISTIC	19. DANFA Project	20. Dominican Republic Low-Cost Health Project
1. Focus of analysis	Cost of community-level health services	Costing of low-cost community services
2. Major cost categories used	Operational costs only	Cost information divided into specific functional categories (family planning for example) or budget categories
3. Organization of cost components	Operational costs divided into 6 subcategories and 15 subcomponents of costs	Cost information further divided into specific programs (family planning for example) or budget categories
4. How joint costs separated	Not applicable	Based on percent allocation of total costs
5. Comparative analysis	Costs compared on a yearly basis	Not applicable
6. Sources of funds	Not available	Costs divided into government and donor costs
7. Data collection	Used project documents	Based on project documents

**THE ANE BUREAU GUIDANCE FOR COSTING OF
HEALTH SERVICE DELIVERY PROJECTS**

(THE GUIDANCE)

Revised September 1988

**Prepared by the Resources for Child Health Project (REACH)
AID contract no. DPE-5927-C-00-5068-00.**

ACKNOWLEDGMENTS

The ANE Bureau Guidance for Costing of Health Service Delivery Projects was commissioned by the ANE Bureau, Office of Technical Resources, Division of Health, Population and Nutrition (ANE/TR/HPN) to the Resources for Child Health (REACH) Project. Technical contributions were made by AID staff in ANE/TR/HPN and S&T/Health, and staff from the World Health Organization, World Bank, The Urban Institute, University of Michigan, Reed College, Mount Holyoke College and the Harvard Institute for International Development. In addition, significant contributions were made by those individuals who conducted field tests of **The Guidance** in the Philippines and Pakistan. Acknowledgement should be given as well to those who were involved in the production of **The Guidance**.

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I. INTRODUCTION

The ANE Bureau Guidance for Costing of Health Service Delivery Projects was developed to assist professionals working in the field in costing Agency for International Development (AID) health and population projects. This document, henceforth referred to as **The Guidance**, provides information on the collection and analysis of cost data. In addition, **The Guidance** can serve as a reference for AID health and program officers on how cost data can be used to perform economic and financial analyses of projects.

As outlined in a companion document entitled **Background for the ANE Bureau Guidance For Costing of Health Service Delivery Projects**, currently there is no uniform method for costing of health service delivery projects, and available approaches show a wide range in purpose and applicability to project and program design. In addition, the quality and scope of cost information used for the economic and financial analyses performed for AID project design in the past have varied widely. Consequently there is a need for AID to develop a standard method of costing health projects. **The Guidance** addresses some of these needs by providing a standard framework for defining, collecting and presenting information on the costs of health service projects.

Assessing the costs of AID health service delivery projects can facilitate the following types of activities:

- o cost-effectiveness analysis, which can help determine the least costly approach to project design, a task that is frequently hampered by a lack of adequate or appropriate data;
- o project economic analysis, which is frequently neglected in AID project design, in part because of a dearth of guidance on what data are needed and how to collect them; and
- o project financial analysis, which determines how much a health project costs and how a financing strategy can be developed in order to sustain the project.

Furthermore, AID Missions can use the standardized forms in **The Guidance** to help monitor project expenditures against a projected budget over the life of the project. Using a single method of defining

and analyzing costs can facilitate comparisons across projects. Indirectly, **The Guidance** can be used as a basis for project monitoring and for opening a dialogue about the costs and financing of health projects with decision makers. This dialogue may eventually lead to discussions about the host country's financial commitment to the long-term sustainability of health service investments.

The detail presented in this document reflects the precision required under a standardized costing approach. Although the level of explanation may be excessive for professional economists and financial analysts, in the interests of completeness, both in content and as a reference document and guide, **The Guidance** provides considerable depth and detail.

The Guidance will not provide direct assistance to individuals completing economic and financial analysis requirements for AID project design. Such assistance is provided by the *AID Handbook 3*. It is hoped however that **The Guidance** will promote an understanding of cost data, identify sources of cost information, and provide a framework for the raw material of project economic and financial analyses. Although cost information relates directly to health project benefits and outcomes, **The Guidance** does not provide a detailed discussion of alternative types of analyses that can be performed using cost data. Methods for cost-benefit and cost-effectiveness analysis have been described in several other manuals which are described in **The Background**.

The Guidance is organized in six sections. Section II below describes the general costing framework and principles adopted for **The Guidance**. Section III presents cost tables that can be used to collect and monitor project cost data, and Section IV describes rules for calculating certain types of costs. Section V describes how the standardized framework can be applied to project budgeting, monitoring, and evaluation. Section VI highlights some of the potential uses for cost data. Additional information is presented in the appendixes.

II. COSTING APPROACH AND GENERAL PRINCIPLES AND FRAMEWORK

A. Full Costing Approach

The costing approach used in **The Guidance** measures the full costs of a project and places a monetary value on all inputs, whether paid for in local or foreign currency or donated. The advantage of using this approach is that the total costs can be assessed, the allocation of funds is clear, and the long-term recurrent cost burden is estimated. Typically, donors support capital and start-up costs of projects and the host country government is required to finance the project's replacement costs in local currency. Some capital investments have short and long-term financial consequences for governments that are overlooked during the planning stage of a project. Measuring the full costs and projecting the annual burden over time permits identification of the full resource requirements of the effort and the information needed to plan for long-range financing.

B. General Principles for Estimating Health Project Costs

Some general principles for estimating costs are presented below. Also described is a framework within which to collect, categorize, and quantify costs, along with some practical guidelines for collecting, estimating and verifying cost data within the context of the health sector. The framework is most appropriate for planning and evaluating projects but is broadly applicable to monitoring project activities as well.

Cost estimates are made up of two components: base costs and contingencies, which should be calculated, presented separately, and then aggregated to provide an estimate of the total cost of project components.

1. Base Costs

Base costs are estimated project component costs, given physical quantities and prices for a given period of time. The more detailed the activity or project, the more accurate the base cost estimates are likely to be. During the course of project design and implementation base cost estimates should be continually refined. Base cost estimates can be based on previous AID health project efforts or those of other donors.

2. Contingencies

Project contingencies are possible increases in base costs due to possible changes in the content or design of the project, as well as changes in prices of project components over a given period of time. They should be realistic in scope and not attempt to cover all possible risks. Contingencies plus base costs should reflect the most realistic estimate of the total cost of the project. Contingencies should be estimated and calculated separately from base cost estimates.

a. Physical Contingencies

Physical contingencies represent the possible increase in base costs due to a change in quantity or design of a project. They are most appropriately expressed as a percentage of base costs. For example, the operating costs of a health project may vary considerably depending upon the level of utilization, and operating cost estimates should reflect anticipated increases in utilization over time. Another example includes the estimation of construction costs for health facilities. Factors pertaining to geography, climate, and labor availability will have a distinct impact on construction costs.

Physical contingency estimates for medical and technical supplies should consider: (a) degree of precision of quantity estimates (including spare parts); (b) degree of precision of specifications; and (c) extent to which equipment and supplies are purchased from commercial sources locally or as a special order procured internationally. If, for example, the scale of the project changed during implementation, then cost estimates would need to be adjusted accordingly. The extent to which

services can be accurately and fully defined in advance (e.g., quantity and type of services to be delivered) will determine the magnitude of physical contingencies for this category of expenditure. Acceptable ranges of physical contingencies will vary among and within projects. In general, physical contingencies for construction will tend to be higher (10 to 15 percent) than those for equipment and material (5 to 7 percent).

b. Price Contingencies

Price contingencies accommodate future cost increases due to inflation rates and foreign currency fluctuations in costing projects. They are expressed as a percentage of the sum of base costs plus physical contingencies. Price contingencies should also take into consideration the local and foreign components of project costs of particular importance. Inflation rates in the country where the project is located will be different than rates in the countries where some project commodities will be purchased. Consequently, the appropriate inflation rate(s) will vary. Since costs are expressed in U.S. dollars under AID contract procedures, it is important to consider all currency fluctuations.

Sources for estimates of local inflation rate include the World Bank, the AID Mission economist, the International Monetary Fund's *International Financial Statistics Yearbook*, or the local planning ministry. AID Mission economists typically have *International Financial Statistics*. Although systematic projections beyond one year are often not available, estimates can be made, and are important when price trends or other factors indicate that inflation is rising (e.g., when government spending increases sharply). A conservative estimate would take the average inflation rate over the last ten years. Alternatively, one could take the projected one-year rate, depending on the historical fluctuation in rates. When even projections are made, their derivation should be well-documented and discussed with host-country counterparts and officials at the AID Mission.

Government and international statistics about historical price inflation rates are published in *International Financial Statistics Yearbook* (published annually by the International Monetary Fund) and the data annex to the *World Development Report* (published annually by the World Bank). Inflation rates specific to certain types of products (e.g., medical care, fuel, or construction) are sometimes available and should be incorporated into project planning.

Estimates of inflation and currency exchange rates should be combined in the price contingency estimate. If, for example, the domestic consumer price index is expected to rise 8% each year and the value of the local currency is expected to drop 5% each year relative to the U.S. dollar, the current price of items purchased in-country (expressed in U.S. dollars) should be multiplied by a price contingency factor of 1.03 per year (the sum of 1.00 and 0.03). In general, it is unnecessary to try to refine price contingency factors on a year-by-year basis unless there appears to be significant fluctuation in inflation rates in recent years. One in-country and one overseas estimate for the life of the project should suffice. With a constant price contingency factor, projections of future costs can be made using the formula:

Future cost = Current cost (1.00 + price contingency factor)ⁿ.

where n is the number of years between the year of the base estimate and the future year for which cost are being estimated.

3. Local and Foreign Currency Requirements of Project Costs and the Currency Exchange Rate

The foreign exchange requirements for a project should be evaluated for primarily two reasons. First, these calculations will provide an estimate of need for foreign currency in future years. Second, one can estimate the capacity of governments to cover the costs of foreign exchange using aspects of projects, or anticipate future reliance on donors for financing these costs. The Guidance provides a framework for estimating foreign exchange requirements.

Both the foreign and local currency requirements should be estimated for each resource category. For example, medical and technical equipment may be procured both within and outside of a country. Total project costs should reflect the source of origin of equipment and supplies. The foreign currency (or foreign exchange required) should be expressed as a percentage of each category.

The exchange rate should be determined and agreed upon by all persons involved in costing and used consistently during a given costing exercise. If available, the market exchange rate is preferred to the official exchange rate. At the outset, the selected exchange rate, the date, and source of that rate should be specified. When estimating costs over the life of a project or analyzing expenditures incurred for a previous time period, one should consider the actual or anticipated change in exchange rates in order to keep local and foreign exchange components and the values of cost estimates or expenditures, realistic. The currency should be in U.S. dollars and the pertinent exchange rate specified.

III. TABLES FOR COLLECTING, CATEGORIZING AND QUALIFYING PROJECT COST DATA

A. Basic Information About the Project

At the beginning of each costing exercise, basic information about the health project should be documented in order to establish clearly some of the bases for cost estimates. Particularly pertinent information is the estimated length of the project, the exchange rate and the inflation rate. A proposed framework for recording this information is presented in Table 1 below. Data on the exchange rate should be presented in dollars and remain consistent throughout the exercise.

Table 1

**Form for Recording Basic Background Information About a
Health Service Delivery Project**

1. Country:

2. Project title:

3. Length of Project:

4. Begin month/year

5. Exchange rate(s): (rate; source; month/year: rates should be used
consistent within costing exercise)

6. Inflation rate(s): (rate(s) should be consistent with source of
origin of materials, equipment, and supplies)

7. Interest rate: (rate should reflect real discount rate)

8. Taxes and customs duties:

9. Proposed financing of the project:

USAID	Government	Other	Total
____%	____%	__ __%	____%

10. Assumptions used to calculate base costs, including population size, birth rates, coverage rates, utilization patterns, treatment protocols, drug preferences, as well as other factors, should be explicitly stated here.

B. Breakdown of Project Costs by Resource and Functional Categories

Project costs can be conceptualized in two ways: by resource category and functional category. *Functional categories* define the project in terms of its functions or objectives (e.g., training, mass media, immunization service delivery) and will be discussed in the next section below. *Resource categories* refer to the types of resources that will be used by the project to complete its objectives (e.g., volunteer labor, technical assistance, supplies, and travel). A prerequisite to the systematic collection of cost data is the establishment of proper functional and resource categories for each project. Mixing functional and resource categories within the same costing framework is a common error in project costing. Such merging leads to a lack of clarity of project content and fails to provide adequate detail for the whole or various parts of the project. Although functional and resource categories should be well-established at the outset of the costing exercise, the categories are refined over time to accommodate unforeseen information.

1. Resource Categories

Resource categories are relatively standard across health projects, although depending on the project's scope and objectives, some categories may not have to be used. After the categories for a specific project have been established, the foreign exchange component and contingencies should be estimated and recorded for each. Once base costs are estimated and aggregated by resource category, contingencies can be added separately.

Detailed resource categories and a format for presenting project base costs and contingency factors are presented in Table 2. Table 2 provides a format for calculating total costs from base costs and contingency factors and detailed project cost data should be recorded by category as shown. Because it is recommended that costs be presented in as much detail as possible, subcategories are discussed in Section IV of this report; others may be added or deleted according to the nature of a project's costs.

Table 3 permits the recording of cost data over time in three ways. The first way is to record the unit, unit prices, and quantities to arrive at the total cost over a five-year period. Price, multiplied by quantity, is equal to total cost in this table. Second, the total cost is allocated over the life of the project by means of a completion rate. Third, the percent of the total is recorded for each year. This table shows how fast different types of resources will be used over the life of a project and will highlight major project efforts.

Table 4A allows estimates of the financing of a health service delivery projects by resource category and by source of funding: government, USAID, other donor, or individual contributions to the effort. In cases where other donors, such as UNICEF, WHO, or non-governmental organizations play a major role in financing aspects of the health service delivery project, the category "other donor" should be subdivided further. This table illustrates changes in financing patterns over time. Results from this table can be used in planning the financing of a project by identifying the sources of

financing for different aspects of the project.

Table 4B records cost information found in Table 4A in percentages which allows for a better illustration of the burden of project financing and changing patterns over time. Of particular importance is the percent of investment versus recurrent cost by source. The last column contains the *cost profile* of this project and can be compared to those of other projects. A cost profile is the "thumbprint" of a project and shows relative proportions among cost categories for a project.

Table 4C summarizes key information for the project, such as total costs, percent of total, and foreign exchange requirements. This table can be used during discussions about project costs to inform decision-makers.

**Table 2
Form for Recording Base Costs and
Contingencies by Resource Category**

Resource Category	Base Cost \$	Physical Contingency Factor^a	Price Contingency Factor^b	% Customs Transport & Import Duties^c	Total Unit Cost \$	Percent Foreign Exchange
Investment Costs						
1. Construction						
a. Buildings						
b. Site Development						
c. Architectural fees						
2. Furniture						
3. Equipment						
a. Medical and technical						
b. Cold Chain						
c. Audiovisual						
d. Office						
4. Vehicles						
5. Initial Stocks						
a. Drugs						
b. Oral rehydration salts (ORS)						
c. Vaccines						
d. Contraceptives						
6. Technical Assistance						
a. Short-term						
b. Long-term						
7. Research and evaluation						
8. Training						
a. Short-term						
b. Long-term						
c. Host Country						
9. Media production						
10. General						

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TABLE 2 (CONT'D)
Form for Recording Base Costs and Contingencies by Resource Category

Resource Category	Base Cost \$	Physical Contingency Factor ^a	Price Contingency Factor ^b	% Customs Transport & Import Duties ^c	Total Unit Cost \$	Percent Foreign Exchange
Recurrent Costs						
1. Salaries and benefits						
a. National						
b. Regional						
c. Other						
2. Per diem and travel expenses						
a. Training						
b. Supervision						
c. Service Delivery						
3. Building OMA ^d						
4. Equipment OMA ^d						
5. Vehicle OMA ^d						
6. Replenishment of stocks						
a. Drugs						
b. ORS						
c. Vaccines						
d. Contraceptives						
7. Supplies						
a. General (office/administrative)						
b. Medical/technical						
c. Cold chain						
d. Audiovisual						
8. Training						
9. Media						
10. General						

^a Physical contingencies are possible increases in base costs due to a change in quantities, anticipated loss, wastage or spoilage or a change in methods of project execution and are expressed as a percent of base cost estimates.

^b Price contingencies are possible increases in base costs due to inflation and foreign currency fluctuations. They are most appropriately expressed as a percentage of the sum of base costs plus physical contingencies.

^c If the project is not one exempted from taxes or customs duties, tax rates may be obtained from the Government tax office directly or through the procurement/financial/economic specialists within the Ministry of Health or Ministry of Finance. If the project is not exempt, taxes should be included in the base costs. Donors are often not willing to assume a tax burden, so customs duties should be discreetly identified and extracted from base costs where possible.

^d OMA = Operation, Maintenance, and Annual Value

Table 3
Hypothetical Child Survival Project
Costs by Resource Category over a 5-Year Period

Resource Category	Unit	Unit Cost \$	Quantities					Total Cost \$					Percent of Total Cost								
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL	
Investment costs:																					
Construction	m ²																				
Furniture																					
Equipment																					
Vehicles																					
Initial stocks of drugs																					
Technical assistance	month																				
Research & evaluation																					
Training																					
Media production																					
General																					
SUBTOTAL																					
Recurrent Costs:																					
Salaries																					
Per diems & travel expenses																					
Building OMA																					
Equipment OMA																					
Vehicle OMA																					
Replenishment of stocks																					
Supplies																					
Training																					
Media																					
General																					
SUBTOTAL																					
TOTAL																					
PERCENT OF TOTAL																					

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Table 4A
Form for Recording the Financing for a Project
by Resource Category and Source of Funding

Resource Category	Government						USAID						Other Donor						Individual					
	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total
Investment costs:																								
Construction																								
Furniture																								
Equipment																								
Vehicles																								
Initial stocks of drugs																								
Technical assistance																								
Research and evaluation																								
Training																								
Media production																								
General																								
Subtotal																								
Recurrent Costs:																								
Salaries and benefits																								
Per diem & travel expenses																								
Building OMA																								
Equipment OMA																								
Vehicle OMA																								
Replenishment of stocks																								
Supplies																								
Training																								
Media																								
General																								
Subtotal																								
TOTAL																								

Table 4B
Form for Recording the Financing for a Project
by Resource Category and Source of Funding
(in percent)

Resource Category	Government						USAID						Other Donor						Individual					
	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total
Investment costs:																								
Construction																								
Furniture																								
Equipment																								
Vehicles																								
Initial stocks of drugs																								
Technical assistance																								
Research and evaluation																								
Training																								
Media production																								
General																								
Subtotal																								
Recurrent Costs:																								
Salaries and benefits																								
Per diem & travel expenses																								
Building OMA																								
Equipment OMA																								
Vehicle OMA																								
Replenishment of stocks																								
Supplies																								
Training																								
Media																								
General																								
Subtotal																								
TOTAL																								

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**Table 4C
Summary Table of Project Costs
and Financing by Source**

Resource Category	Total Cost Years 1-5 \$					Percent of Cost					Percent Foreign Exchange				
	Govt.	USAID	Other Donor	Population	TOTAL	Govt.	USAID	Other Donor	Population	TOTAL	Govt.	USAID	Other Donor	Population	TOTAL
Investment costs:															
Construction															
Furniture															
Equipment															
Vehicles															
Initial stocks of drugs															
Technical assistance															
Research and evaluation															
Training															
Media production															
General															
Subtotal															
Recurrent Costs:															
Salaries and benefits															
Per diem & travel															
Building OMA															
Equipment OMA															
Vehicle OMA															
Replenishment of stocks															
Supplies															
Training															
Media															
General															
Subtotal															
TOTAL															

2. Functional Categories

Table 5 identifies possible functional categories for a hypothetical child survival project financed by AID. A project's functional categories will vary greatly depending on its focus and objectives. The purpose of classifying costs is to focus on the cost of major technical efforts rather than individual types of costs. In this way, potential shortages of resources for key project activities can be identified and reallocation from one aspect to another made.

TABLE 5 Examples of Functional Categories for Costing a Hypothetical Child Survival Project
<p><u>National level functional categories</u></p> <ul style="list-style-type: none">o Supervision and management of child survival activities in the Ministry of Healtho Training of national-level program managerso Development of a mass media strategy <p><u>Regional level (Region X) functional categories</u></p> <ul style="list-style-type: none">o Strengthening and integrating of existing health services in regional-to peripheral-level health facilities<ul style="list-style-type: none">1. Expanded Program on Immunization (EPI)2. Oral rehydration therapy/Control of diarrheal disease (ORT/CDD) program3. Malaria control program4. Nutrition activities5. Family planning and maternal and child health programso Upgrading and strengthening village health worker programo Developing of a mass media strategy for child survivalo Strengthening regional management capabilities<ul style="list-style-type: none">1. Supervision systems2. Health information system3. Planning, budgeting, and management4. Research and evaluation

Table 6 illustrates the relationship between resource and functional categories for the hypothetical child survival project shown in Table 5. Appendix A, a sample child survival project costing exercise, provides examples of how some of these tables can be applied to an AID health project.

Table 6
Form for Showing the Relationship Between Resource
and Functional Categories for a Child Survival Project

Resource Category	NATIONAL LEVEL				REGIONAL LEVEL			
	Supervision and Management	Training	Mass media Strategy	SUBTOTAL	Immunization Program (EPI)	ORT/CDD Program	Malaria Control Program	Nutrition Activities
Investment costs:								
Construction								
Furniture								
Equipment								
Vehicles								
Initial stocks of drugs								
Technical assistance								
Research & evaluation								
Training								
Media production								
General								
SUBTOTAL								
Recurrent Costs:								
Salaries								
Per diems & travel expenses								
Building OMA								
Equipment OMA								
Vehicle OMA								
Replenishment of stocks								
Supplies								
Training								
Media								
General								
SUBTOTAL								
TOTAL								
PERCENT OF TOTAL								

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Table 6 (cont'd)
Form for Showing the Relationship Between Resource and
Functional Categories for a Hypothetical Child Survival Project

Resource Category	REGIONAL LEVEL								SUBTOTAL	TOTAL
	Family Planning MCH programs	VHW program	Mass media	Supervision systems	Health info systems	Planning budgeting management	Research and evaluation			
Investment costs:										
Construction										
Furniture										
Equipment										
Vehicles										
Initial stocks of drugs										
Technical assistance										
Research & evaluation										
Training										
Media production										
General										
SUBTOTAL										
Recurrent Costs:										
Salaries										
Per diems & travel expenses										
Building OMA										
Equipment OMA										
Vehicle OMA										
Replenishment of stocks										
Supplies										
Training										
Media										
General										
SUBTOTAL										
TOTAL										
PERCENT OF TOTAL										

IV. PRACTICAL GUIDELINES FOR ESTIMATING PROJECT COSTS BY RESOURCE CATEGORY

This section provides some practical guidelines intended to facilitate the collection, estimation and verification of project costs by resource category. Data sources and assumptions used to calculate these costs should be documented. The guidelines presented here were developed from a review of donor approaches to costing projects and project components, those of AID, the World Bank, the World Health Organization (WHO), the United Nations International Children's Fund (UNICEF) and others. The guidelines were also based on a review of approximately 20 guidelines, computer models, and books for costing health projects, costing approaches used in AID Project Paper analyses, and cost-effectiveness and other costing studies undertaken as part of health projects. A description of the methods and results of that review is provided in a companion AID document entitled *Background for the ANE Guidance on Costing of Health Service Delivery Projects*.

A. Estimating Investment Costs

1. Construction

a. Buildings

Estimates for number of square meters and for the unit cost per square meter should be made in consultation with architects in the Ministry of Health or the Ministry of Public Works. Unit cost per square meter may also be verified with local construction firms and with bilateral and multilateral organizations which have recently completed or are in the process of financing projects with similar civil works components.

The number of square meters for new construction should be verified with Ministry of Health or Ministry of Public Works officials to ensure compliance with size norms which might be established for different levels of health facilities. Cost estimates for building construction depend upon the type of intervention in the building: new construction, rehabilitation (repainting, restoration fixtures, and general refurbishing), reconstruction (tearing down of a section of the building to rebuild it), and extension (new construction which is attached to the previous structure).

To estimate the cost of various interventions, the number of square meters should be multiplied by the unit cost per square meter for that intervention. For example, if the original building size was 100m², and plans are made to rehabilitate 50%, reconstruct 35%, and extend 25%, then a total 15m² ((100m² - (50m² + 35m²)) of the original building would remain untouched. The cost would be (50m² x unit cost for rehabilitation) + (35m² x unit cost of reconstruction, which is usually the same as new construction) + (25m² x unit cost for extension).

Whereas reconstruction and extension would normally have the same unit cost per square meter as new construction, the unit cost per square meter for rehabilitation would in all likelihood carry a lower unit cost.

b. Site Development

Fixed costs for site development are about 10% of building costs for peripheral health facilities. The cost of land should also be included here.

c. Architectural Fees

Cost for architectural services includes design work and site surveys. These should be calculated as a percentage of building costs. In West Africa, for example, fees range from 5 to 10% according to World Bank estimates for health projects there. Higher percentages are attributable to hospital construction and lower percentages to lower level health facilities.

2. Furniture

Furniture costs may be broadly estimated at 8% of the cost of construction costs, however furniture costs should be itemized. In the interests of proper planning and accuracy, a list of furniture requirements should be drawn up, wherever possible. In estimating furniture costs, the costs of transport should be included. It must be determined whether furniture will be purchased locally or imported, whether items will be bought off the shelf or ordered (in bulk) for building, and how furniture will be transported (air, sea and/or truck, train).

The AID Mission may provide office furniture to the health project free of cost. The value of donated equipment should be inputted by multiplying the quantity of furniture by the current fair market price. If office furniture must be purchased locally, the AID Mission controller and general services officer should be able to provide price estimates.

In addition, prices may be obtained from local suppliers; if imported, prices may be obtained from selected American suppliers but may include transport cost estimates. Prices may also be verified with the Ministry of Health's procurement officer or the local UNICEF office which usually has vast procurement experience and thus can provide reliable indicators including transport costs for some items. For example, the UNICEF office in Mali estimated in 1982 that 30% should be added to the cost of furniture and equipment if shipped by air and 15% to 20% if shipped by sea. Import duties should also be added where relevant.

3. Equipment

Equipment which satisfies the needs of the project and which conforms (to the greatest extent possible) to the norms established by the Ministry of Health should be enumerated. The list should include as many specifications as possible for these will have a bearing on costs. Equipment may include medical, technical, cold chain, audiovisual, and office items.

a. Medical and Technical Equipment

Medical and technical equipment includes equipment for medical examinations and for furnishing health facilities and supplying outreach workers (e.g., X-ray, laboratory equipment, weighing scales, and medical examination tables).

Frequently, medical and technical equipment will be imported. Estimates, including transport costs, may be obtained from a variety of American firms able to provide such equipment. Costs may be verified by the Ministry of Health procurement officer, the AID Mission controller or UNICEF procurement officer. UNICEF's UNIPAC catalogue may also be consulted as a reference, but these prices should be inflated to include transportation costs (25% to 30%). If consulting an older catalogue, costs should be inflated to accommodate price increases in order to arrive at the current price.

For estimating transportation and/or shipping costs for medical and technical equipment, the following rules of thumb are recommended in the absence of specific values: for shipment by air, 30% of the value should be added; for shipment by sea, 15 to 20% of the value should be added. It is also important to factor in costs of spare parts. The Ministry of Health and the Ministry of Public Works may be consulted for estimates and local suppliers of such services. Depending on project design, estimates for spare parts may encompass one year or the life of the project. Long-term needs in spare parts are more appropriately budgeted as recurrent costs (see notes on equipment maintenance).

b. Cold Chain Equipment

Cold chain equipment includes refrigerators, freezers, vaccine carriers, cold boxes, ice packs, alarm systems, and cold room supplies. The unit price for most cold chain equipment can be found in the UNICEF UNIPAC document entitled *EPI Technical Series: The Cold Chain Product Information Sheets*. Almost all cold chain equipment is purchased through the UNIPAC system. Again, costs of transportation, import duties, and spare parts costs should be factored into cost calculations.

c. Audiovisual Equipment

As mass media components are increasingly being added to most AID child survival projects, it is important to calculate the cost of equipment purchased for communication and education activities. Typical audiovisual equipment includes overhead projectors, video equipment, televisions, cassette recorders, microphones, projectors, and project screens. The AID Mission controller or general services officer may have invoices from which to estimate costs of such equipment. UNICEF has a vast experience in procurement of audio visual aids and would be a good source of information. Transport costs and import duties should be included in estimates of full cost.

d. Office Equipment

Office equipment for the project should also be itemized. Once it is determined whether such equipment will be purchased locally or imported, quotes including transport costs and spare parts may be obtained from potential suppliers. As in the case for furniture and equipment, estimates may be verified by the AID Mission controller, general services officer, the local UNICEF office, the Ministry of Health procurement office and other bilateral and multilateral aid donors supporting health (or similar human service) projects.

4. Vehicles

Like the cost of equipment, the cost of vehicles should be estimated on the basis of whether or not the items will be purchased locally or imported. Quotes (including transport and spare parts) solicited from potential suppliers should be verified by the local AID Mission controller, general services officer, the Ministry of Health procurement officer, and other bilateral and multilateral aid donors supporting health and similar human services projects in the country.

5. Initial Stocks

a. Drugs and Oral Rehydration Salts (ORS)

The cost of the *initial* stock of drugs should be considered an investment cost. Subsequent stock replenishments should be viewed as recurrent and calculated as part of ongoing project costs. The investment period is generally defined as the first year of the project, though this may vary depending on the nature of the project. One method of estimating either the investment or recurrent costs of drugs or ORS is to base the estimate on need, or the incidence of the relevant diseases in the target population. This approach however, will lead to an overestimation of demand, and the estimate obtained by this approach should probably be reduced by about 20%. The estimated need is then multiplied by the unit price per volume dosage of the appropriate drug(s) for treatment and by the average required dosage for full treatment. For example, the projected cost of the initial ORS stock would be based on the incidence of diarrheal disease of children less than five years of age. Guidelines for calculating stocks of drugs over time for a population are presented in Appendix B.

The medical and public health members of the project design team should be able to provide estimates of treatment protocols for key diseases of concern to the project. Incidence rates for these same diseases can be determined from USAID records and Ministry of Health documents and statistics. Ministry of Health officials working at central and peripheral levels can provide information on treatment protocols based on their experience and on available health data. The price of drugs will vary according to the method of purchase and the supplier. If the method of procurement and sources of supplies have not been determined, start-up costs using various

alternatives should be estimated. Possible sources of unit price information include local private and public wholesalers, distributors and producers and, at the international level, invoices from USAID and UNICEF procurement services. The method of procurement and supply should be determined for each drug as these can greatly affect the cost of drugs. Transport costs and import duties should be added to procurement costs where relevant.

b. Vaccines

Vaccine costs for vaccines are calculated based on estimated target population group (children aged 0-5 years and pregnant women), projected population coverage rate, unit price per dose of each vaccine type included in the WHO's Expanded Program on Immunization (EPI) and the number of doses required for each child to become fully vaccinated. Vaccine wastage should be included in overall vaccine costs. Cost estimates should be adjusted on a yearly basis according to fluctuations in target population growth rate and size and in coverage levels.

Table 7 illustrates the recommended WHO vaccine schedule for a standard EPI, the average price per dose, and estimated wastage factors. The average price per dose of vaccine should be multiplied by the estimated wastage factor and the number of required doses per child.

Unit Cost and Dosage for Vaccines			
Vaccine	Number of Doses Required ^a	Average Price Per Dose ^b	Estimated Wastage Factor ^c
BCG (Tuberculosis)	1	\$0.06	2.00
DPT (diphtheria, pertussis, tetanus)	3	\$0.02	1.33
Polio (oral)	3	\$0.02	1.33
Measles	1	\$0.07	1.33
Tetanus toxoid	2-5	\$0.03	1.33

^a Doses required does not include booster. Tetanus toxoid is administered to pregnant women aged 15 to 40 years.

^b Average price per dose will vary by country

^c Wastage factors are estimated from WHO training documents "How To Estimate Vaccine Requirements for the First Time." These estimates can be modified based on country experience.

The USAID health project may include other vaccines: yellow fever, injectable polio and DPT combination or hepatitis B and their dose requirements and costs may be determined in collaboration with project design team experts. The WHO training manuals for the EPI can be used for reference.

The need for a physical contingency with drugs and vaccines cannot be overemphasized. The total quantity of drugs and supplies which must be purchased is generally larger than the quantity actually administered, often by a sizable amount. From the point of purchase by the project at the international, national, or regional levels, to the point of actual use, drugs and supplies may be lost as a result of misplaced shipments, damage from water, rodents, thawing (especially important for some heat-labile vaccines), freezing (important for toxoid vaccines), pilferage, and by expiration of products. Whether the analyst is working from dispensing records of an existing project or from a project designer's estimate for drug and supply needs, quantities consumed will need to be expanded to account for the quantities lost at the health facility and at the levels of shipment and storage between the health facility and the point of purchase.

c. Contraceptives

A health and family planning project may require the purchase of an initial stock of contraceptives. The projections for contraceptive requirements have traditionally been performed by AID Population Officers following a standard set of guidelines outlined in the *Contraceptive Prevalence Tables*. A copy of these guidelines should be available in the USAID health office.

Briefly, projections on contraceptive requirements are based on: 1) historical trends and patterns in contraceptive use (see World Fertility Survey or other national surveys of health and family planning use, especially the AID Demographic and Health Surveys for estimates); 2) future orientation and

Table 8		
Prices of Contraceptives		
Commodity	Quantity	Price
Pills	1,200 monthly cycles	\$0.03 - 0.12/cycle
IUD	200 units	\$0.95/units
Vaginal tablets	4,800 units	\$0.095/units
Condoms	6,000 pieces	\$4.24/100 pieces
Contraceptive foam	3 dozen	\$1.04/dozen
Contraceptive jelly	3 dozen	\$7.40/dozen (including applicator)

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implementation of the program; and 3) projected demand for new contraceptive methods.

The unit price for contraceptives varies according to type and quantity. Estimates of unit price may be verified and collected at the USAID health office or at the local manufacturer. Table 8 above summarizes some unit price estimates published by the AID Bureau of Science and Technology/Population Office (December 30, 1986).

6. Technical Assistance

Technical assistance required to initially start the project should be calculated. Technical assistance costs (unit cost/month x length of assignment) for USAID projects should be estimated for both short-term consultants and long-term advisors. For short-term consultants, costs must be estimated for salary, per diem, travel, and other direct costs (e.g., visas, shots, secretarial assistance).

Salary costs = Daily consultant rate x number of working days. (The maximum daily rate is \$274.00 for AID projects.)

Per diem = Per diem rate for country x number of days of assignment including weekends and holidays where applicable. (Per diem rates can be found at the local AID Mission.)

Travel costs overseas depend on the origin of flights, length of stay and routing patterns. Other direct costs vary depending on length and requirements of the assignment. One week of short-term technical assistance can be estimated between \$3,000 and \$3,500. Similarly, the World Bank currently (1987) estimates the cost of one month of technical assistance at U.S. \$12,000/month equivalent.

Long-term technical assistance costs must include assessments of AID allowances. These allowances include housing, cost of living, education, home leaves, vacation and compensatory allowance for hardship posts. One year of technical assistance costs can be estimated at between \$150,000 to \$200,000 depending on the salary level of the advisor and the degree of hardship for a particular country.

Where it is unclear whether technical assistance will be provided by a national or an expatriate, it is advisable to assume the higher cost (i.e., an expatriate at US \$12,000/month equivalent).

7. Research and Evaluation

Costs for this category will be estimated and categorized according to the nature of work envisaged. Investment costs of research and evaluation consist mainly of personnel costs but also includes materials and supplies necessary to carry out these activities. If the research and evaluation activity takes place prior to the start of the health project, then it can be considered an aspect of investment costs (i.e., a fertility or coverage survey).

8. Training

Training directly required for project initiation, such as language training or technical training should be included as part of investment costs. Training costs within AID projects are incurred for short- and long-term institutional training (i.e., for pre-existing courses of study awarding degrees or certificates), either in the United States or a third country, and for specially designed training programs conducted in the host country itself, (often) involving the training of local trainers.

For institutional training, the investment costs include tuition, books, airfare, housing, and living expenses. Each AID Mission has a copy of AID's regulation for participant training (Handbook 10). These regulations pertain to U.S. and third-country training. Appendix E of the handbook, updated quarterly, contains all the relevant maintenance allowances on a country-specific basis. All allowances are payable in local currency. For specially designed training programs conducted in the host country, the initial training of teachers and development of training materials are investment costs.

9. Media Production

Costs in this category include those related to initial costs for producing radio and television transmissions, such as design fees, as well as other mass media activities (e.g., painting of billboards). Values for these costs can be estimated by local television and radio stations, or the local UNICEF office.

10. General

General costs refer to other investment costs not included in the previous categories.

B. Estimating Recurrent Costs

1. Salaries and Benefits

This resource category reflects salaries (earnings) and benefits (such as housing, insurance, uniforms, and incentive payments) of health workers, administrative and technical personnel, and volunteers who will contribute to a project. Recurrent personnel costs are particularly difficult estimations because of the wide variety of personnel involved. These include physicians, nurses, health assistants, supervisors, laboratory technologists, statisticians, supply officers, guards, drivers, project managers, community volunteers, and perhaps individuals working for non-governmental organizations (NGOs) and private firms. For most health projects, personnel costs represent the greatest single component of total cost.

The cost of salaries and benefits represent the opportunity cost of using personnel for the health service delivery project rather than for another activity in the public sector [NB: Only if wages represent the true marginal product of labor. Otherwise, earnings from other sources, such as private practice, should be factored into the calculations]. To estimate personnel costs, the number and type of personnel required by the project should be determined in collaboration with other project design team members. These figures can be based on levels used in similar USAID or other donor projects.

The annual salary (earnings) and benefits should be estimated for each type of personnel including volunteers. Salary rates for government health and administrative personnel can be obtained from the administration and finance office of the Ministry of Health. They may also be obtained or verified at ministries responsible for setting or paying government salaries (e.g., the Ministry of Civil Service and Social Security).

Salary scales may not include benefit payments received by government employees and these must be factored into personnel costs. Annual benefits may be calculated as a percent of annual base pay. Ministry records may provide data on benefits received by certain types of health workers. These data may be applied to other types of personnel as an average ratio of benefits to salary, if specific information is lacking. For housing, the true market value should be used.

The opportunity cost of volunteer labor involved in the health project should be included in the analysis. First, the numbers and types of volunteers (e.g., Peace Corps, local village chiefs, school teachers, local businessmen) should be enumerated. Second, an estimation of their annual earnings should be made either through interviews with representative volunteers or through data collection at other ministries and businesses. Data collected should determine what these individuals could be earning if they were engaged in their most likely alternative livelihood other than the health project.

Total annual earnings and benefits of project personnel should be allocated to the health service delivery project when those activities occupy 100% of their time. However, most health workers, program managers and volunteers are involved in a variety of activities and project-specific tasks are not likely to occupy their time fully. In this case, only a proportion of their total annual earnings (salary and benefits) should be allocated to project costs. There are several methods for determining the proportion of personnel costs; the most appropriate method will depend on the availability of data and time to undertake sample surveys and analysis.

The first method allocates costs on the basis of the proportion of time spent providing project-specific services. This proportion can be estimated in three ways: a) through interviews with a sample of health workers, administrative and technical personnel and volunteers; b) through analysis of the total number of person-hours devoted to project-specific activities as compared to total person-hours worked; and c) through time-motion studies and other observational techniques.

Interviews with personnel provide general estimates, though their recall of time spent working on a health activity may be imprecise. These responses should be verified either by asking project managers and supervisors their opinions of percent of health workers' time devoted to project-specific activities and vice versa, or by double-checking the proportions using another approach. Interviews should be conducted in an unbiased manner without using leading questions, such as "do you spend less than 25% of your time on family planning activities?". Interviews should be conducted in a sample of health facilities which is representative of the facilities implementing the health service delivery project. Previous costing studies have conducted interviews on the proportion of time using a questionnaire.

In cases where specific hours are set aside for provision of services in health facilities (i.e., immunizations given on certain days of the week at specific hours), analysis of activity-specific hours to total work hours can provide an estimate of the proportion of time spent on that activity. For example, if immunizations are given one morning (four hours) and one afternoon (three hours) per week by two out of four nurses per health facility, then the activity-specific hours per week equal 14 (2 nurses X 7 hours) and total work hours per week equal 140 (7 X 4 nurses X 5 days). The percent of time in that facility spent on immunization activities is 14/140 or 10%. This percent can be applied to the annual earnings of all health personnel. Again, this analysis should be conducted in a representative sample of health facilities, using interviews to determine the schedule of activities and numbers and types of personnel involved.

Time-motion studies and other observational methods result in more accurate measures of proportion of time spent per health activity; however, these studies require a significant investment of time and resources which are not always available.

The second type of approach for calculating the proportion of annual earnings to be allocated to the costs of a health project uses project-specific contacts as a source of data. The number of project-specific contacts (e.g., number of immunizations, number of family planning consultations and number of diarrhea cases treated) per month or per year is divided by the total monthly or annual

number of contacts. This proportion is applied to the salary estimates of health and administrative personnel. Because of the availability of these data, this method may be the least time-consuming. However, one drawback is it assumes that each unit of service requires the same level of resources.

As stated previously, the method selected to estimate percent of time spent on project-specific activities will depend upon the availability and quality of data and the time allowed to complete the cost analysis. The particular method used should be documented clearly in footnotes in the tables. For **The Guidance**, the preferred method is to conduct interviews and to verify responses using one of the other methods.

Table 9 can be used to estimate personnel costs for the health service delivery project. Separating national, regional and other level personnel provides valuable information on specific functional activities and can be used for a functional analysis of the project in areas of management, supervision, and cold chain equipment and maintenance.

Table 9
Matrix for Estimating Personnel Costs

Type of personnel	Number	Average annual salary or earnings (including benefits)	%time spent on activity	Annual cost of personnel \$
<u>National level</u>				
a.				
b.				
c.				
d.				
Subtotal				
<u>Regional level personnel</u>				
a.				
b.				
c.				
d.				
Subtotal				
<u>Other level(s)</u>				
a.				
b.				
Subtotal				
<u>Volunteers</u>				
a.				
b.				
Subtotal				
TOTAL				

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This section discusses the elements outlined in Table 2, under recurrent costs for project evaluation.

2. Per Diem and Travel Expenses

The per diem rate varies from country to country and within countries according to the destination and rank of person traveling. The official U.S. government rate can be obtained from the AID Mission controller. Other governments and donor organizations have different rates. Per diem rates are multiplied by the number of days in a location to estimate per diem costs. Additional travel expenses, such as fares for boats, planes, and buses and honorariums for health workers should be included here as well.

3. Building Operation, Maintenance and Annualized Value

The ongoing cost of running and maintaining a facility may include charges for electricity, water, telephone, postage, photocopying and printing, office equipment repair and supplies, building maintenance and repair, and housekeeping supplies. At a health facility, there are also costs for general patient supplies such as towels, linens, food, patient records, alcohol, cotton balls, tongue depressors, thermometers, and disinfectant.

These costs can be estimated by examining the monthly expenditures or budget of a representative sample of health facilities. Discussion with an accountant or administrator may be required to clarify facility's categorization of costs. These figures may be used to estimate annual operation and maintenance figures for one health facility, and this figure can then be multiplied by the total number of facilities to be used during the life of the project.

Building maintenance costs can be calculated as a percent of their investment cost. This percentage will vary, however, depending on the quality of construction materials, the age of the building, and the nature of the services that are delivered within the facility. If the facility is highly utilized, then maintenance and operation costs will be higher. In general, operation and maintenance costs range from 2.5 to 4 percent worldwide, although figures of 8 to 9 percent may be applicable when facilities are in poor condition, highly utilized or both.

In order to compare investment cost of buildings with recurrent costs on an annual basis, the use of the building must be expressed in an equivalent annual figure (annualization). Annualization reflects real resource use in the delivery of health services. Four types of information are required to estimate the annual use of buildings (and other capital) investments: 1) the number and type of buildings and health facilities to be used in the health project; 2) initial cost or replacement value; 3) the official rate of interest; and 4) the expected useful life.

The number and type of facilities to be used for the health service delivery project can be determined in collaboration with other members of the project design team. The initial construction cost of a representative facility can be found in Ministry of Health or Ministry of Public Works records. The rate of interest should be consistent in estimating the annual use of all capital investments of the health service delivery project (e.g., equipment and vehicles) and should reflect the current official rate at

which money can be invested or borrowed. This rate can be found at the Ministry of Plan and Finance and is used to calculate the "present worth of annuity factor":

Estimated Annual Use of the Capital Asset	<u>Total Value</u> ¹ Present Worth of Annuity Factor
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The present worth of annuity factor is also based on the useful life of the capital asset. For buildings the useful life can be assessed through interviews with Ministry of Health officials, though 25 years may be used as a standard.

Because facilities may be used for a variety of health activities, only a part of the total annualized facility cost should be allocated to the health service delivery project. The proportion of the annualized value allocated to the project will depend upon the intensity of use of the building for project activities. Several allocation methods exist which are described below in descending order of precision. The method used should be documented clearly in the tables and should be selected based on the availability of data and time for analysis.

One allocation rule is based on the area (number of m² or ft²) used for the project-specific health activity as a proportion of total area (m² or ft²). The numbers of meters or feet can be determined by pacing the perimeter of the building and the activity area. A second method allocates annualized facility costs on the proportion of rooms used for the project to total facility rooms. This method may be more appropriate than pacing for larger health facilities, such as hospitals. A final method allocates annualized facility costs on the proportion of staff time spent on the project-specific health activity, as estimated for personnel costs. The first allocation rule is preferred.

Table 10 may be used to calculate the annual equivalent cost of project facilities. Cost = (number x value x proportion) divided by the appropriate present worth of annuity factor. Refer to Appendix D.

¹ Different conventions exist for estimating the annual use of capital assets, and the application of these methods depends upon the purpose of the analysis. The Guidance was developed to improve consistency of cost evaluation across projects and the method selected provides a good estimate of resource use while being relatively straightforward.

Table 10					
Estimate of Annualized Value of Buildings					
Type of building	Number	Cost of construction	Proportion of building used for project	Present worth of annuity factor	Cost \$

Annualized furniture costs are calculated in the same manner and can be factored into the line item for building operation, maintenance and annualization. The expected life of furniture must be estimated for each country situation, but one could use five to ten years as a standard. Table 11 can be used for these calculations.

Table 11					
Estimate of Annualized Value of Furniture					
Type	Number	Market value	Proportion used for project	Present worth of annuity factor	Cost \$

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4. Equipment Operation, Maintenance, and Annualized Value

Like building maintenance costs, standard cost estimates for equipment maintenance vary. Information on general annual equipment maintenance costs may be estimated from previous AID or other donor experience in other health projects, or from information provided by suppliers at the time of purchase. However, an attempt should be made to address country-specific conditions.

The estimated percentage of total investment for required operation and maintenance of equipment varies linearly with the equipment's complexity. In general, office furniture and general office maintenance has been estimated to be approximately 5% of investment cost per year; office equipment and audiovisual aids are approximately 10%; and medical and technical equipment vary between 10% and 20% of investment costs. These estimates are based largely on WHO and World Bank projects and will vary depending on circumstances and intensity of use.

Cold chain maintenance and repair (at both central and regional levels) can be estimated to be between 10% and 20% of investment cost. In health facilities, the cost of cold chain operation can be based on the following calculations:

Gas refrigerator	– Average liters per year per facility	× average cost per liter	× number of facilities	× number of refrig. per facility
Petrol cold box	– average liters per year per	× average cost per liter	× number of facility	× number of refrig. per facility

Estimates on fuel requirements are best made at the facility-level by asking health staff.

Similar rules for annualizing equipment costs apply here as well. The useful life for each type of equipment will vary and is therefore important to itemize. Previous studies have chosen five to ten years for cold chain equipment, 10 years for audiovisual equipment and five to ten years for medical and technical equipment. Interviews with repairmen usually provide the best estimates of useful life. Table 12 will facilitate annualization calculations.

As with other capital goods, the annualized cost of equipment should be allocated to the health service delivery project on a proportional basis reflecting expected use by the project. Allocation can be made in several ways: 1) on a proportion of volume used for the project to total volume (for cold chain equipment, for example); 2) on a proportion of project-specific contacts to total contacts (for hospital beds, for instance); and 3) on a proportion of personnel time spent on the project specific activity. The method selected and assumptions used should be stated clearly.

Table 12 can be used to estimate the annualized cost of equipment for the health service delivery project.

Table 12

Estimate of Annualized Value of Equipment

Type of Equipment	Number	Unit price	Proportion for project activities	Present worth of annuity factor	Cost \$
Medical/ Technical					
a.					
b.					
c.					
d.					
Subtotal					
Cold Chain					
a.					
b.					
c.					
d.					
Subtotal					
Audiovisual					
a.					
b.					
c.					
d.					
Subtotal					
Other					
a.					
b.					
c.					
d.					
Subtotal					
TOTAL					

NB: Cost = (number x unit price x proportion)/ present worth factor

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5. Vehicle Operation, Maintenance, and Annualized Value

A detailed method for calculating the cost of operating and maintaining a car, based on a WHO project in Kenya, is presented in Appendix C (Table C-1). Table C-2 provides a more aggregated method of estimating vehicle operation and maintenance costs that has been used for project development in West Africa. Both methods provide some benchmarks and guidance on how to categorize and price the recurrent costs of vehicles.

The life of vehicles varies from country to country and even within a country, depending on factors such as the environment, maintenance capabilities, availability of spare parts, care of the users, and extent of use. Experience from previous AID health projects on the useful life of vehicles should be considered first. Previous studies have used between 3 and 15 years. The life of the vehicle may also be estimated by Ministry of Health officials (who use similar vehicles for similar purposes) the Ministry of Health procurement officer or vehicle fleet manager, and UNICEF officials. If project vehicles are not expected to last through the full project period, the cost of replacing them with new vehicles should be factored into the investment costs.

Allocation of vehicle use to the project can be made on the proportion of kilometers or miles driven for the project out of the total distance traveled, or the proportion of personnel time spent driving for the project. Data can be found by interviewing mechanics or personnel at the USAID, UNICEF, and WHO offices. The preferred method is to allocate use on the basis of distance driven. The annualized

Table 13					
Estimate of Annualized Value of Vehicles					
Type of vehicle	Number	Unit price	Proportion used for project activities	Present worth of annuity factor	Cost \$
TOTAL					

NB: Cost = (number x unit price x proportion) / Present worth factor

8/1

value of vehicles can be calculated using Table 13.

6. Replenishment of Stocks

Stock replacement costs are calculated using the same methodology as described for initial stock costs (see pages 21-24). This method is based on the potential demand and need for treatment.

7. Supplies

Supply costs are sometimes difficult to calculate, because utilization cannot be predicted with a great deal of accuracy. Supplies can be separated into the following categories: general, medical/technical, audiovisual, and cold chain. General supplies include office stationary and pens. Medical/technical supplies include vaccination cards, alcohol, syringes and needles, and growth monitoring supplies. Audiovisual supplies include cassettes, batteries, and art supplies; and cold chain supplies include thermometers and monitoring cards. The best source of supplies costs are AID (project implementation orders) for health projects, UNICEF/UNIPAC invoices or the UNICEF catalogue, and local suppliers. UNICEF typically has a good deal of experience in procurement of vaccination and audiovisual supplies and their staff should be consulted to obtain these costs.

A reliable estimate of supply requirements should be drawn up in collaboration with the project paper design team. Health facility staff can provide estimates of actual demand for supplies. Estimates of *demand* as opposed to simply accounting for historical levels of supplies should be elicited, as the latter definition of supplies frequently fall short of the former. Health center staff might find it easier to estimate needs for a week or a month rather than for a year; multiply such information by 52 or 12 for annual estimates. If extrapolating, seasonal fluctuations in the demand for health services must be considered and estimates adjusted accordingly. Once coverage (number of consultations, for example) of the health facility is established, data collected (cost per consultation, for example) may be extrapolated to estimate supply requirements for vertical or horizontal programs. In addition, a provision for breakage or wastage should be included in quantity estimates.

For example, the cost for prenatal consultation forms can be calculated in the following fashion: multiply the birthrate by the population covered = number of births (pregnancies)/year x percentage of pregnant women estimated to use health services = number of forms needed x unit cost of forms, plus an additional 2% wastage factor. (The wastage factor can usually be obtained from procurement officer in the Ministry of Health. The cost depends on whether forms are printed locally, imported, "homemade", xeroxed, purchased in bulk.) The cost for other consultation forms (adult consultations, postnatal, growth charts) may also be calculated by adapting the same formula. Table B-2 in Appendix B provides a framework for calculating these costs.

8. Training

Recurrent training costs generally pertain to specially designed in-country training, the salaries of teachers, the ongoing publishing of materials, per diems, and other maintenance allowances for

trainees. Long-term, institutional or participant training costs are usually treated as investments. The anticipated turnover rates of the various types of personnel trained in these in-country courses, at different locations, should be estimated since these have been very high in many health care programs. These estimates, and their corresponding requirements for annual replacement training, should be made and added to base costs accordingly. Training components of other similar human service projects in country could serve as sources for estimates of turnover rates.

9. Media

Mass media costs include those for final transmission through radio, television and the print media and those for printing, reproduction, and production of media and promotional materials. Costs for radio and television emissions can be estimated based on the duration of the spot and the average cost per minute of media time and are obtainable from local stations. The cost of journal articles can be calculated based on average length per article and costs per page. Printing, reproduction, and production costs can be obtained directly from public ministries and private sector firms involved in these activities. The local UNICEF office should have cost figures as a result of their social mobilization activities.

Type of media	Number of broadcasts (annual)	Length of broadcast (in units)	Cost/unit time for broadcasting	Cost \$
Television				
Radio				
Other				
Total				

NB: Cost = (number broadcasts x length/ unit) x cost/ unit

The following table may assist in calculating media transmission costs.

10. General

General costs include those not previously described in the above cost categories and are project-specific.

V. USE OF THE RECOMMENDED FORMAT

The Guidance provides a standardized framework for collecting, classifying, and calculating the full cost of a health service delivery project. A common set of tables was developed to accommodate a wide range of project activities and to be useful for project planning, monitoring and evaluation. As a result, the user of The Guidance must *apply* the framework to a country and project-specific situation. Not all costs will be relevant to a project and the analyst must first start by identifying relevant costs: those which will flow as a consequence of the implementation of the health service delivery project. Many of the line items in the tables will remain blank, depending upon the type of project being costed.

In addition, the purpose of the costing exercise (whether for planning, monitoring or evaluation) will determine which cost categories are relevant. Total project costs may be overvalued as a result of double-counting resources used for project implementation, and this problem is particularly important when evaluating investment and recurrent costs. The following paragraphs will illustrate this point.

If The Guidance is to be used to plan a budget for a health service delivery project, then the focus of the analysis is on financial resources and requirements. In this case, capital costs should not be annualized as recurrent costs, but reported under the appropriate investment cost category during the years they are actually expected to take place (i.e. according to an investment calendar).

If the purpose of the cost evaluation is to compare the past costs of a project with its potential future costs (e.g., a mid-term evaluation), then the relevant costs to be evaluated are only those which will continue in the future. For example, if there will be a change in the type of equipment used in the project, then the cost of the previous equipment should be excluded from the calculations as they are "sunk" costs for the project. In this case, the cost analysis should include the annualized value of new equipment.

If the purpose of the assessment is to evaluate a previously terminated project to determine the cost of a similar future project, then all relevant, previous project costs should be included in the analysis. Again, the value of capital goods should be annualized and recorded as a recurrent expense rather than a project investment. Studies which use a one-year evaluation period should include annualized values of capital goods as recurrent expenses, as well.

VI. USES OF COST INFORMATION

The Guidance recommends standard methods and conventions for collecting and categorizing cost information for health services delivery projects. The importance to host country managers and policymakers and AID field officers of engaging in these tasks is briefly highlighted in this chapter. The following remarks are neither exhaustive nor intended to substitute for professional advice and assistance on the uses of cost information. Rather, they are offered to serve as concluding endorsements of the value of undertaking the exercise for designing and implementing sustainable health services projects.

- A. The data collected and categorized provide the raw material for economists and financial analysts to use when performing economic and financial analyses for project design.
- B. The cost tables can be used as the basis for developing a system for routinely collecting and monitoring project cost data over time, thereby improving the reliability and validity of initial financial and economic analyses.
- C. Cost data, arrayed by expenditure categories (and converted to percentages), can be used by the project managers to identify those areas of the operation that account for the largest proportions of cost. Once those areas are identified, efforts can be made to analyze opportunities for cost containment, which if accomplished, can improve project efficiency.
- D. Project costs can be compared to information on existing or potential revenue sources (e.g., user fees, general revenues, third-party payers, donor contributions, employer contributions) and levels in order to identify the options for financially sustaining project outputs after AID funding ceases.
- E. Total project costs can often be converted into a cost per beneficiary and then used to project the (usually incremental) costs of expanding operations from one area to another. When this is done, consideration must be given to the effects of economies of scale on unit costs.
- F. Units of cost data can be combined with similar units of project output or outcome data and analyzed to determine the cost-effectiveness of alternative designs for a particular project. The project design that is the most cost-effective provides more benefit for the same cost, or the same amount of benefit for a lower cost. Costs can be compared with the standard child survival indicators (Tier 2 and Tier 3) to assess the relationship between investments in health and outcomes.

APPENDIXES

- Appendix A: Examples of a Costing Exercise for a Hypothetical Child Survival Project**
- Appendix B: Proposed Matrix for Calculating Stocks of Drugs Over Time and Population**
- Appendix C: Guidance on Calculating Vehicle Operations, Maintenance, and Annualization**
- Appendix D: Present Worth of Annuity Factors and Useful Life Table**

APPENDIX A

EXAMPLES OF A COSTING EXERCISE FOR A HYPOTHETICAL CHILD SURVIVAL PROJECT

- Table A-1:** Hypothetical Child Survival Project: Base Costs and Contingencies by Resource Category
- Table A-2** Hypothetical Child Survival Project: Costs by Resource Category Over a 5-Year Period
- Table A-3** Financing of the Hypothetical Child Survival Project by Resource Category and

Table A-1
Hypothetical Child Survival Project
Base Costs and Coningencies by Resource Category

Resource Category	Base Cost \$	Physical Contingency Factor ^a	Price Contingency Factor ^b	% Customs Transport & Import Duties ^c	Total Unit Cost \$	Percent Foreign Exchange
Investment Costs						
1. Construction						
a. Buildings						
b. Site Development						
c. Architectural fees						
2. Furniture						
3. Equipment						
a. Medical and technical						
b. Cold Chain	250.00	5%	5%	5%	277	100
c. Audiovisual						
d. Office						
4. Vehicles	10,000.00	10%	5%	5%	12,128	100
5. Initial Stocks						
a. Drugs						
b. Oral rehydration salts (ORS)						
c. Vaccines	0.02	10%	5%	10%	0.03	100
d. Contraceptives						
6. Technical Assistance						
a. Short-term	12,000.00				12,000	100
b. Long-term						
7. Research and evaluation						
8. Training						
a. Short-term	1,000.00				1,000	0
b. Long-term						
c. Host Country						
9. Media production						
10. General						

Table A-1 (cont'd)
Hypothetical Child Survival Project
Base Cost and Contingencies by Resource Category

Resource Category	Base Cost \$	Physical Contingency Factor^a	Price Contingency Factor^b	% Customs Transport & Import Duties^c	Total Unit Cost \$	Percent Foreign Exchange
Recurrent Costs						
1. Salaries and benefits						
a. National	3,000.00				3,000.00	0
b. Regional	2,000.00				3,000.00	0
c. Other						
2. Per diem and travel expenses						
a. Training	50.00				50.00	0
b. Supervision	50.00				50.00	0
c. Service Delivery						
3. Building OMA ^d						
4. Equipment OMA ^d	500.00	10%	5%	5%	606.00	50%
5. Vehicle OMA ^d	2,109.00	10%	5%	5%	2,558.00	50%
6. Replenishment of stocks						
a. Drugs						
b. ORS						
c. Vaccines	0.02	10%	5%	10%	0.03	100
d. Contraceptives						
7. Supplies						
a. General (office/ administrative)						
b. Medical/ technical	0.24	10%	5%	10%	0.31	100
c. Cold chain						
d. Audiovisual						
8. Training	250.00				250.00	0
9. Media						
10. General						

^a Physical contingencies are possible increases in base costs due to a change in quantities, anticipated loss, wastage or spoilage or a change in methods of project execution and are expressed as a percent of base cost estimates.

^b Price contingencies are possible increases in base costs due to inflation and foreign currency fluctuations. They are most appropriately expressed as a percentage of the sum of base costs plus physical contingencies.

^c If the project is not one exempted from taxes or customs duties, tax rates may be obtained from the Government tax office directly or through the procurement/financial/economic specialists within the Ministry of Health or Ministry of Finance. If the project is not exempt, taxes should be included in the base costs. Donors are often not willing to assume a tax burden, so customs duties should be discreetly identified and extracted from base costs where possible.

^d OMA = Operation, Maintenance, and Annualization

Table A-2
Hypothetical Child Survival Project
Costs by Resource Category over a 5-Year Period

Resource Category	Unit	Unit Cost \$	Quantities					Total Cost \$						Percent of Total Cost						
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL
Investment costs:	m ²																			
Construction																				
Furniture																				
Equipment	each	277.00	200	0	0	0	0	200	55,400	0	0	0	0	55,400	100	0	0	0	0	100
Vehicles	each	10,000.00	20	0	0	0	0	20	200,000	0	0	0	0	200,000	100	0	0	0	0	100
Initial stocks of drugs	dose	0.03						1,200,000	36,000	0	0	0	0	36,000	100	0	0	0	0	100
Technical assistance	month	12,128.00	4	4	4	4	4	20	48,512	48,512	48,512	48,512	48,512	242,560	20	20	20	20	20	100
Research & evaluation																				
Training	person	1,000.00	40	0	0	0	0	40	40,000	0	0	0	0	40,000	100	0	0	0	0	100
Media production																				
General																				
SUBTOTAL																				
								343,912	48,512	48,512	48,512	48,512	537,960							
Recurrent Costs:		5,000.00	120	120	120	120	120	600	600,000	600,000	600,000	600,000	600,000	3,000,000	20	20	20	20	20	100
Salaries	month	50.00	24	24	24	24	24	120	6,000	6,000	6,000	6,000	6,000	30,000	20	20	20	20	20	100
Per diems & travel expenses	trip																			
Building OMA																				
Equipment OMA	year	500.00	20	20	20	20	20	100	10,000	10,000	10,000	10,000	10,000	50,000	20	20	20	20	20	100
Vehicle OMA	year	2,558.00	20	20	20	20	20	100	51,154	51,154	51,154	51,154	51,154	255,769	20	20	20	20	20	100
Replenishment of stocks	dose	0.03	0					4,800,000	0	36,000	36,000	36,000	36,000	144,000	0	25	25	25	25	1000
Supplies	each	0.31						5,000,000	372,000	372,000	372,000	372,000	372,000	1,860,000	0	38	25	18	19	1000
Training	month	250.00	0	12	8	6	6	32	0	3,000	2,000	1,500	1,500	8,000	0	38	25	18	19	100
Media																				
General																				
SUBTOTAL																				
								1,039,154	1,078,154	1,077,154	1,076,654	1,076,654	5,347,769							
TOTAL																				
								1,383,066	1,126,306	1,125,666	1,124,806	1,124,806	5,885,729							
PERCENT OF TOTAL																				
								24	19	19	19	19	100							

Table A-3
Financing of the Hypothetical Child Survival Project
by Category and Source of Funding
(in percent)

Resource Category	Government						USAID						Other Donor						Individual					
	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total
Investment costs:																								
Construction																								
Furniture																								
Equipment							100	0	0	0	0	100												
Vehicles							100	0	0	0	0	100												
Initial stocks of drugs							50	0	0	0	0	50	50	0	0	0	0	50						
Technical assistance							100	100	100	100	100	100												
Research and evaluation																								
Training													100	0	0	0	0	100						
Media production																								
General																								
Subtotal																								
Recurrent Costs:																								
Salaries and benefits	80	80	90	90	100		20	20	10	10	0													
Per diem & travel expenses	50	50	50	50	50	50	25	25	25	25	25	25	25	25	25	25	25	25						
Building OMA																								
Equipm... OMA	0	0	25	25	50	30	100	100	75	75	50	70												
Vehicle OMA	0	0	25	25	50	30	100	100	75	75	50	70												
Replenishment of stocks	0	10	20	20	40	20		45	40	35	25	40	0	45	40	40	25	40						
Supplies	0	10	20	20	40	20		45	40	35	25	40	0	45	40	40	25	40						
Training		25	25	50	50	50		50	50	50	50	40	0	25	25	0	0	10						
Media																								
General																								
Subtotal																								
TOTAL																								

APPENDIX B

**PROPOSED MATRIX FOR
CALCULATING STOCKS OF DRUGS
OVER TIME FOR A POPULATION**

Table B-1 **Sample Treatment Protocols for
Selected Diseases**

Table B-2 **Costing of Drugs Required for Treating
Malaria and Malnutrition**

Table B-1

Sample Treatment Protocols for Selected Diseases

Diseases/ Afflictions	Drugs	Dosage
Malaria Simple case Serious case (with vomiting)	Chloroquine pill (100mg) Quinine salt	1 dose @ 10 mg/kg 10 mg/kg every 8 hrs not to exceed 1.8 g/day for 3 days
<u>Prenatal prophylaxis</u>	Chloroquine pill	5 mg/kg/week
Anemia Pregnant women Children	Folic acid +0.25 mg iron Iron sulfate (60 mg)	For 30 days For 60 days
<u>Malnutrition</u> Moderate (0-5 years) Serious	Multivitamin pills Multivitamin pills	For 10 days For 30 days
<u>Diarrheal disease</u> Moderate dehydration Severe dehydration	Oral rehydration therapy Ringer solution (125 ml.packet)	2 packets/child 2 packets/day
<u>Skin infections</u>	Benzyl benzcate (1 1/3)	1 applic. per 24 hrs. for 72 hrs.

SOURCE: Orivel, Perrot, Government Preparation for World Bank Guinea Health Project.

Table B-2
Costing of Drugs Required for Treating Malaria and Malnutrition

Disease / Affliction	(1) Estimated number of cases for population of 15,000 for 1 year	(2) Unit cost of drug	(3) Number of drug units per treat- ment	(4) Cost of drugs for treatment (2) X (3)	(5) Cost of drug for population of 15,000 1 year (1) X (4)
<u>Malaria</u>					
Simple Case	30,000		4		
Serious Case (with vomiting)	300		3		
Pre-natal prophylaxis	750		90		
<u>Malnutrition</u>					
Moderate (0-5 years)	600		10		
Serious	30		30		
				Total cost of drugs for population of 15,000 for 1 year	

NB: The calculation of drug costs in this table is based on the assumption that the entire target population will use the health service. The total cost of drugs for population of 15,000 for 1 year is the unit cost per population covered. This unit cost can be multiplied by the estimated percentage of the total target population. Once a project or program becomes successfully operational, the percentage of target population actually using the facility is likely to rise and should be taken into consideration when conducting economic and financial analyses over a time period. In most cases, the target population itself will grow as a result of population growth rates in the country.

SOURCE: Government preparation Document for World Bank Financial Guinea Health Project.

APPENDIX C

GUIDANCE ON CALCULATING VEHICLE OPERATING, MAINTENANCE, AND DEPRECIATION COSTS

Table C-1 What It Costs To Run a Car Properly

Table C-2 Vehicle Operation and Maintenance

**Table C-1
What It Costs To Run a Car Properly**

Operating Expense	Explanation	Cost per year			
		1st	2nd	3rd	4th
Gasoline	Assume 15 miles per gallon during the first two years, 13.5 the third year, & 12 miles the fourth year. Gasoline will cost \$2.15 per gallon during the first two years & \$2.50 per gallon the second two years.	\$1,720	\$1,720	\$2,222	\$2,500
Oil	Eight quarts of oil are required every 2000 miles. The price will be \$2.40 per quart during the first two years and \$2.65 per quart during the second two years.	115	115	127	127
Oil filters	Oil filters are changed every 4,000 miles. They cost \$8.00 each the first year	24	27	30	34
Tires	A new set of tires is required every 13,000 miles. They cost \$360 the second year.		360	403	452
Coolant	Each year the coolant must be changed at a cost of \$12.00 the first year.	12	13	15	17
General lubrication	General lubrication should be performed every 2,000 miles at an estimated cost of \$60.00 the first year	60	67	75	84
Brake fluid	Brake fluid should be checked when lubrication is performed. In the course of a year two pints would be used at a cost of \$3.00 per pint the first year.	7	8	9	
Battery	Assume 1 new battery every 23,000 miles. Estimated cost in the second year is \$125.		125		157
Spark plugs	Spark plugs must be changed each 11,000 miles. They cost \$3.00 each or \$12.00 for 4 in the first year.	12	13	15	17
Fan belt	The fan belt must be replaced after 23,000 miles at a cost of \$8.00 in the second year.		8		10
Minor tune up	In the second year valves must be reset, air filter changed, & carburetor cleaned & adjusted.		60		
Repairs (figures are for parts & labor respectively)	Repair of fender damaged in a minor accident.	70			
	Replacement of fuel pump.	30			
	Replacement of clutch.		45		
			15		
	Overhaul of brakes: Front brakes			200	
					50
	Rear brakes	45	50	56	63
		15	17	19	21
Replace wheel bearings.			35		
			10		
Engine overhaul including replacement of piston rings, bearing sets, gaskets, rebuild carburetor, replace valves.			50		
			10		
				600	
Total for All Operating Costs		\$2,109	\$2,642	\$3,325	\$4,091

Note: Except for oil and gasoline, all other expenses include a 12% inflation increase per year

Conversion 1 gallon = .263 liters, 1 mile = .63 km).

SOURCE: WHO Working Group on Essential Drugs (Kenya)

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Table C-2

**Vehicle Operation and Maintenance Estimates
for West Africa**

Equipment	Estimate	Source
Gas	# km traveled/mo. x 12 mo. x mileage (liters/100km) x unit cost/liter	Mali, World Bank
Oil	15% x cost of gas	Mali, World Bank
Insurance	Fixed price varies from country to country; check with Ministry of Health official in charge of vehicle fleet.	
Spare parts/labor	24% (2%/month) x cost of vehicle or 30% of invest- ment cost to cover 5 yrs.	Mali, World Bank
Motorcycle (0.6 l/km)	40% cost of vehicle	Deutsche Gesellschaft fur Technische Zusammenarbeit (GTZ)
Moped (0.4 l/km)	(65% incl. depreciation)	
	30% x cost of moped (63% inc. depreciation)	WHO (Kenya) Working Group on Essential Drugs
	20% x cost of vehicle	

NOTE: Data are based on best estimates from local experts using expected use as a basis for kind of abuse vehicles will receive. Some mileage indicators: Mali/Farst/Land Rover, 20 l/100 km; World Bank light vehicle (Renault 3cv) 12 l/100 km; Project Peugeot 504, 15 l/100 km.

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APPENDIX D
PRESENT WORTH OF ANNUITY FACTORS
AND USEFUL LIFE TABLE

APPENDIX D

PRESENT WORTH OF ANNUITY FACTORS

YEAR	RATE OF 5 %	RATE OF 7 %	RATE OF 10 %	RATE OF 12 %	RATE OF 15 %
1	0.95	0.93	0.91	0.89	0.87
2	1.86	1.81	1.74	1.69	1.63
3	2.72	2.62	2.49	2.40	2.28
4	3.55	3.39	3.17	3.04	2.85
5	4.33	4.10	3.79	3.60	3.35
6	5.08	4.77	4.36	4.11	3.78
7	5.79	5.39	4.87	4.56	4.16
8	6.46	5.97	5.33	4.97	4.49
9	7.11	6.52	5.76	5.33	4.77
10	7.72	7.02	6.14	5.65	5.02
11	8.31	7.50	6.50	5.94	5.23
12	8.86	7.94	6.81	6.19	5.42
13	9.39	8.36	7.10	6.42	5.58
14	9.90	8.75	7.37	6.3	5.72
15	10.38	9.11	7.61	6.81	5.85
16	10.84	9.45	7.82	6.97	5.95
17	11.27	9.76	8.02	7.12	6.05
18	11.69	10.06	8.20	7.25	6.13
19	12.09	10.34	8.36	7.37	6.20
20	12.46	10.59	8.51	7.47	6.26
21	12.82	10.84	8.65	7.56	6.31
22	13.16	11.06	8.77	7.64	6.36
23	13.49	11.27	8.88	7.72	6.40
24	13.80	11.47	8.98	7.78	6.43
25	14.09	11.65	9.08	7.84	6.46

Source: EPI / Gen / 79 / 5, Annex 1, Capital Annuity Factors, p. 49

**APPENDIX D
USEFUL LIFE TABLE**

Capital Asset	Useful Life
Building	25 years
Vehicle	3-5 years
Refrigerator	5-10 years
Other cold chain equipment	5-10 years
Furniture	5-10 years
Medical equipment (e.g., exam table)	5-10 years
Medical equipment (e.g., speculum)	3-4 years
Sterilizer	5 years
Audiovisual equipment	5 years

NB: Estimates of useful life vary according to the country. These figures represent standard values.

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Table 1

Form for Recording Basic Background Information About a Health Service Delivery Project

1. Country:

2. Project title:

3. Length of Project:

4. Begin month/year

5. Exchange rate(s): (rate; source; month/year: rates should be used consistent within costing exercise)

6. Inflation rate(s): (rate(s) should be consistent with source of origin of materials, equipment, and supplies)

7. Interest rate: (rate should reflect real discount rate)

8. Taxes and customs duties:

9. Proposed financing of the project:

USAID	Government	Other	Total
____%	____%	____%	____%

10. Assumptions used to calculate base costs, including population size, birth rates, coverage rates, utilization patterns, treatment protocols, drug preferences, as well as other factors, should be explicitly stated here.

**Table 2
Form for Recording Base Costs and
Contingencies by Resource Category**

Resource Category	Base Cost \$	Physical Contingency Factor^a	Price Contingency Factor^b	% Customs Transport & Import Duties^c	Total Unit Cost \$	Percent Foreign Exchange
Investment Costs						
1. Construction						
a. Buildings						
b. Site Development						
c. Architectural fees						
2. Furniture						
3. Equipment						
a. Medical and technical						
b. Cold Chain						
c. Audiovisual						
d. Office						
4. Vehicles						
5. Initial Stocks						
a. Drugs						
b. Oral rehydration salts (ORS)						
c. Vaccines						
d. Contraceptives						
6. Technical Assistance						
a. Short-term						
b. Long-term						
7. Research and evaluation						
8. Training						
a. Short-term						
b. Long-term						
c. Host Country						
9. Media production						
10. General						

Table 2 (cont'd)
Form for Recording Base Costs and
Contingencies by Resource Category

Resource Category	Base Cost \$	Physical Contingency Factor^a	Price Contingency Factor^b	% Customs Transport & Import Duties^c	Total Unit Cost \$	Percent Foreign Exchange
Recurrent Costs						
1. Salaries and benefits						
a. National						
b. Regional						
c. Other						
2. Per diem and travel expenses						
a. Training						
b. Supervision						
c. Service Delivery						
3. Building OMA ^d						
4. Equipment OMA ^d						
5. Vehicle OMA ^d						
6. Replenishment of stocks						
a. Drugs						
b. ORS						
c. Vaccines						
d. Contraceptives						
7. Supplies						
a. General (office/administrative)						
b. Medical/technical						
c. Cold chain						
d. Audiovisual						
8. Training						
9. Media						
10. General						

- ^a Physical contingencies are possible increases in base costs due to a change in quantities, anticipated loss, wastage or spoilage or a change in methods of project execution and are expressed as a percent of base cost estimates.
- ^b Price contingencies are possible increases in base costs due to inflation and foreign currency fluctuations. They are most appropriately expressed as a percentage of the sum of base costs plus physical contingencies.
- ^c If the project is not one exempted from taxes or customs duties, tax rates may be obtained from the Government tax office directly or through the procurement/financial/economic specialists within the Ministry of Health or Ministry of Finance. If the project is not exempt, taxes should be included in the base costs. Donors are often not willing to assume a tax burden, so customs duties should be discreetly identified and extracted from base costs where possible.
- ^d OMA = Operation, Maintenance, and Annual Value

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Table 3
Hypothetical Child Survival Project
Costs by Resource Category over a 5-Year Period

Resource Category	Unit	Unit Cost \$	Quantities					Total Cost \$					Percent of Total Cost								
			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	TOTAL	
Investment costs:																					
Construction	m ²																				
Furniture																					
Equipment																					
Vehicles																					
Initial stocks of drugs																					
Technical assistance	month																				
Research & evaluation																					
Training																					
Media production																					
General																					
SUBTOTAL																					
Recurrent Costs:																					
Salaries																					
Per diems & travel expenses																					
Building OMA																					
Equipment OMA																					
Vehicle OMA																					
Replenishment of stocks																					
Supplies																					
Training																					
Media																					
General																					
SUBTOTAL																					
TOTAL																					
PERCENT OF TOTAL																					

Table 4A
Form for Recording the Financing for a Project
by Resource Category and Source of Funding

Resource Category	Government						USAID						Other Donor						Individual					
	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total
Investment costs:																								
Construction																								
Furniture																								
Equipment																								
Vehicles																								
Initial stocks of drugs																								
Technical assistance																								
Research and evaluation																								
Training																								
Media production																								
General																								
Subtotal																								
Recurrent Costs:																								
Salaries and benefits																								
Per diem & travel expenses																								
Building OMA																								
Equipment OMA																								
Vehicle OMA																								
Replenishment of stocks																								
Supplies																								
Training																								
Media																								
General																								
Subtotal																								
TOTAL																								

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Table 4B
Form for Recording the Financing for a Project
by Resource Category and Source of Funding
(in percent)

Resource Category	Government						USAID						Other Donor						Individual					
	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total	Yr 1	2	3	4	5	Total
Investment costs:																								
Construction																								
Furniture																								
Equipment																								
Vehicles																								
Initial stocks of drugs																								
Technical assistance																								
Research and evaluation																								
Training																								
Media production																								
General																								
Subtotal																								
Recurrent Costs:																								
Salaries and benefits																								
Per diem & travel expenses																								
Building OMA																								
Equipment OMA																								
Vehicle OMA																								
Replenishment of stocks																								
Supplies																								
Training																								
Media																								
General																								
Subtotal																								
TOTAL																								

TABLE 5
Examples of Functional Categories for Costing a Hypothetical Child Survival Project

National level functional categories

- o Supervision and management of child survival activities in the Ministry of Health
- o Training of national-level program managers
- o Development of a mass media strategy

Regional level (Region X) functional categories

- o Strengthening and integrating of existing health services in regional-to peripheral-level health facilities
 - 1. Expanded Program on Immunization (EPI)
 - 2. Oral rehydration therapy/Control of diarrheal disease (ORT/CLD) program
 - 3. Malaria control program
 - 4. Nutrition activities
 - 5. Family planning and maternal and child health programs
- o Upgrading and strengthening village health worker program
- o Developing of a mass media strategy for child survival
- o Strengthening regional management capabilities
 - 1. Supervision systems
 - 2. Health information system
 - 3. Planning, budgeting, and management
 - 4. Research and evaluation

Table 9
Matrix for Estimating Personnel Costs

Type of personnel	Number	Average annual salary or earnings (including benefits)	%time spent on activity	Annual cost of personnel \$
<u>National level</u>				
a.				
b.				
c.				
d.				
Subtotal				
<u>Regional level personnel</u>				
a.				
b.				
c.				
d.				
Subtotal				
<u>Other level(s)</u>				
a.				
b.				
Subtotal				
<u>Volunteers</u>				
a.				
b.				
Subtotal				
TOTAL				

Table 12

Estimate of Annualized Value of Equipment

Type of Equipment	Number	Unit price	Proportion for project activities	Present worth of annuity factor	Cost \$
Medical/ Technical					
a.					
b.					
c.					
d.					
Subtotal					
Cold Chain					
a.					
b.					
c.					
d.					
Subtotal					
Audiovisual					
a.					
b.					
c.					
d.					
Subtotal					
Other					
a.					
b.					
c.					
d.					
Subtotal					
TOTAL					

NB: Cost = (number x unit price x proportion)/ present worth factor

Table 13

Estimate of Annualized Value of Vehicles

Type of vehicle	Number	Unit price	Proportion used for project activities	Present worth of annuity factor	Cost \$
TOTAL					

NB: Cost = (number x unit price x proportion) / Present worth factor

Table 14

Media Transmission Costs

Type of media	Number of broadcasts (annual)	Length of broadcast (in units)	Cost/unit time for broadcasting	Cost \$
Television				
Radio				
Other				
Total				

NB: Cost = (number broadcasts x length/ unit) x cost/ unit

ANE Bureau Guidance for Costing of Health Service Delivery Projects

(The GUIDANCE)

Lotus 1-2-3 Costing Tool

Instruction Booklet

September 1988

**Prepared by Software Innovations, Inc.
for Resources for Child Health Project (REACH)**

AID Contract No. DPE-5927-C-00-5068-00

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Introduction

The ANE Bureau Guidance for Costing of Health Service Delivery Projects was developed to assist professionals working in the field in costing Agency for International Development (AID) health and population projects. **The Guidance**, provides information on the collection and analysis of cost data. In addition, **The Guidance** can serve as a reference for AID health and program officers on how cost data can be used to perform economic and financial analyses of projects.

The Lotus 1-2-3 spreadsheets on the enclosed diskette are designed to complement and facilitate the use of the information and methods outlined in **The Guidance**. Lotus 1-2-3 was selected because of its widespread use in the field. These spreadsheets will operate on Lotus 1-2-3 Version 2, and it is recommended that the computer have a hard disk and at least 640K of memory.

The spreadsheet was designed to be easy to use for beginners who have never worked in Lotus before. A main menu allows the user to access all the tables on the spreadsheet and enter information without the need for knowing all functions of Lotus. Help information on Lotus is also available for the novice user. In addition to giving the novice user an introduction to **The Guidance** spreadsheet this instruction booklet also outlines some advanced functions and uses of the spreadsheet for the more experienced user.

Hard Disk Installation

These instructions are for users who are using a computer with a "Hard Disk" installed. The {} symbols in these instructions mean that information between the two brackets may be replaced with a different label. When entering a command from these instructions do not type in the two symbols {}.

If you are using a computer with two "Floppy Disks", read the next section for installation instructions.

Starting the Computer

Turn on the computer and wait for the "C" prompt:
[C:\]

Creating a Directory for the Spreadsheet

Type MD {GUIDANCE} and press the [RETURN] key to create the director for the spreadsheet. MD stands for "Make Directory".

Type CD {GUIDANCE} and press the [RETURN] key to enter the newly created director. CD stands for "Change Directory".

Loading the Spreadsheet

Place The Guidance diskette in the Floppy drive and close the door to the drive.

Type COPY A:*. * and press the [RETURN] key to copy the spreadsheet from the distribution diskette.

The first drive on a machine is usually called the "A" drive. On some machines this drive may be called the "B" drive. If you get an error message while entering the following command you should press the "A" key to Abort the process and enter the command again substituting "B" for "A". For example, if the COPY A:*. * command produces an error message most likely COPY B:*. * will function correctly.

The spreadsheets are now on your computer and are available for use. The next section describes how to start Lotus 1-2-3 and access the demo and spreadsheets.

Place The Guidance diskette in a safe place.

You may use a different directory for the spreadsheets if you wish by replacing GUIDANCE in these instructions with a name (7 Characters or less) of your choosing.

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Floppy Disk Installation

These instructions are for users who are using a computer with two "Floppy Disks" installed, and no "Hard Disk".

Starting the Computer

Place the "DOS" disk in the first floppy disk drive and close the door.

Turn on the computer and wait for the "A" prompt:
[A:\]

Loading the Spreadsheet

Remove the "DOS" diskette from the first drive and place **The Guidance** distribution diskette in the Floppy drive and close the door to the drive.

Place a blank formatted diskette in the second Floppy drive and close the door.

At the "Prompt" type **Copy A:*. * B:** and press the [RETURN] key.

The spreadsheets are now on your computer and are available for use. The next section describes how to start Lotus 1-2-3 and access the demo and spreadsheets.

Place **The Guidance** diskette in a safe place.

Using the Spreadsheet

Using Lotus 1-2-3 spreadsheets is fairly simple. The following instructions will show you how to start Lotus and how to load **The Guidance** spreadsheet.

Within the Lotus 1-2-3 program if you get confused, or have made an error you may press the "ESCAPE" key repeatedly until you return to the spreadsheet (the label at the top right corner will read "READY").

All descriptions of Lotus 1-2-3 commands in this manual include the key sequence necessary to access the related activity being described. The / key activates the Lotus 1-2-3 menu from within the spreadsheet. In the descriptions of commands the / key will be translated as Menu. For example, the key sequence /FS will allow you to enter the name of a file to be saved. After the key sequence the names of the command sequence will be presented in parenthesis. For Example: /FSR (Menu File Save Replace).

Starting Lotus 1-2-3

From a Hard Disk

In order to run Lotus on a hard disk you must set a "PATH" to where the program resides. On most machines Lotus will be installed in a "Directory" called LOTUS or 123. Ask someone familiar with the machine to tell you how it is configured.

To set the PATH type `PATH = \{LOTUS}` and press [RETURN] (or replace LOTUS with the name of the Directory where it was installed). Remember not to type the {} symbols in the command.

Make sure you are in the directory where **The Guidance** spreadsheets were installed. You may confirm that the spreadsheet is in the present directory by typing `DIR *.WK1` and pressing [RETURN]. The name of the project spreadsheet with which you wish to work on should appear in the directory. Once you have confirmed that **The Guidance** spreadsheet has been copied you are ready to start the Lotus program. At the prompt type 123 and press [RETURN]. The Lotus 1-2-3 program should start. If you have any problems con-

sult someone who is familiar with the machine and Lotus 1-2-3.

From a Floppy Disk

Place the Lotus 1-2-3 disk in the first Floppy drive and close the door. Place **The Guidance** disk or another diskette with copies of **The Guidance** spreadsheet for your project in the second Floppy drive and close the door. At the prompt type **B:** and press **[RETURN]**.

At the prompt type **A:123** and press **[RETURN]**.

The Lotus 1-2-3 program should start. If you have any problems consult someone who is familiar with the machine and Lotus 1-2-3.

Loading the Guidance Spreadsheet

You are now ready to load the Guidance spreadsheet. Press in sequence the keys /FR (Menu File Retrieve).

The name of the available files will appear. It may be that on your machine there will be additional names for different projects. Use the arrow keys to select the name of the file you wish to load and then press [RETURN]. The following screen should appear:

```
AI:                               FILES
Name of file to retrieve: C:\GUIDANCE\*.wk?
GUIDANCE.WK1
A   B   C   D   E   F   G   H
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
```

Guidance Spreadsheet Main Menu

Main Menu Screen

When the spreadsheet has been loaded (approximately 2 Minutes) you will see the initial Main Menu screen. From this screen all tables may be accessed.

A3: [W4] 1

READY

A	B	C	D	E
The ANE Bureau Guidance for Costing of Health Service Delivery Projects				
1	Table 01	Basic Information		
2	Table 02	Base Costs and Contingencies		
3	Table 03	Costs by Expenditure		
4	Table 04	Financing by Expenditure and Source		
5	Table 05	Examples of Functional Categories		
6	Table 06	Expenditure vs. Functional Categories		
7	Table 07	Unit Cost and Dosage for Vaccines		
8	Table 08	Pricing of Contraceptives		
9	Table 09	Matrix for Estimating Personnel Costs		
10	Table 10	Value of Annual Use of Buildings		
11	Table 11	Value of Annual Use of Furniture		
12	Table 12	Value of Annual Use of Equipment		
13	Table 13	Value of Annual Use of Vehicles		
14	Table 14	Media Transmission Costs		
15	Table B-2	Costing of Drugs Required for Treatment		
16	Appendix D	Present Worth of Annuity Factors		
H	Help	Help Information		

Position Cursor and Press ALT + C to make a selection; ALT + M to return.

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Lotus 1-2-3 Commands

Moving Around the Spreadsheet

It is very easy to move around The Guidance spreadsheet. From the Main Menu you may highlight the leftmost number for the table you wish to access and press ALT+C (hold down the ALT key and press the "C" key). To return to the main menu hold the "ALT" key and then press "M". On Wang keyboards, press the SHIFT and 2nd keys at the same time and then press M or C to emulate ALT+M and ALT+C.

Within a table you may use the following keys to move around:

ALT+M	Return to the Main Menu
HOME	Goto top left corner of table
PGUP	Move up one screen
PGDN	Move down one screen
TAB	Move to the right one screen
SHIFT+TAB	Move to the left one screen
Down-Arrow	Move down one "cell"
Up-Arrow	Move up one "cell"
Left-Arrow	Move left one "cell"
Right-Arrow	Move right one "cell"
F9	Recalculate Formulas

The top titles and the left titles are fixed for each table. This allows you to see where you are on the table while entering information. When you return to the main menu (ALT+M) the titles will be cleared.

To move to a new table without returning to the main menu you may select to go directly to the table via the "GOTO RANGE" set of commands:

Press F5 then press F3 to get a list of the tables then move the cursor to select the table name and press [RETURN].

Caution: The table may not look correct when accessed in this manner since the "Titles" will be fixed for the table you originally accessed.

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Entering Information

Information for The Guidance spreadsheet may only be entered into the spreadsheet in "unprotected" areas. This is to ensure that the standard calculations within the spreadsheet are not accidentally erased. If you try to enter information into a "Protected" area the program will beep and display ERROR in the top right corner of the screen. To continue entering information into an "unprotected" area press the ESC key and move to a new cell and enter the information.

To enter information move the cursor to the correct cell and type the numbers or text you wish to enter and press [RETURN]. The information will be displayed on the spreadsheet. You will see at the bottom right the label "CALC". This specifies that information has been entered, but the spreadsheet has not been recalculated to correctly reflect the new information. To recalculate the formulas press the Function Key F9; all related information will be recalculated.

If you want to change a value on the spreadsheet you must place the cursor over the number and then type in the new information and press [RETURN]. Remember that after you have made changes the formulas will not automatically be recalculated. It is necessary to press the F9 key to recalculate all new values. Also, changes to the spreadsheet are not automatically retained until you save the spreadsheet /FSR (Menu File Save [RETURN] Replace).

Tables 9 through 14 are worksheets which will provide figures for Tables 2 through 6. It is necessary to enter the information into tables 9 through 14 first.

After you have changed information on the spreadsheet you must save the changes (see next section). When saving the changes you may save the file by a new name. The name of the file should be no longer than 7 characters.

Sample Table Screen

The following is a sample of a screen that will appear when you make a menu selection.

C29: U [WB]

READY

A	B	C	D	E
22	Table 2: Costs by Resource Category _____			
23				Physical
24			Base	Contingency
25	Resource Category		Unit Cost \$	factor
26	-----			
27	INVESTMENT COSTS			
28				
29	1. Construction			
30	a. Buildings			
31	b. Site development			
32	c. Architectural fees			
33	2. Furniture			0
34	3. Equipment			
35	a. Medical and technical			0
36	b. Cold chain			0
37	c. Audiovisual			0
38	d. Office			0
39	4. Vehicles			
40	5. Initial stocks			
41	a. Drugs			

Saving the Lotus Spreadsheet

In order to save the changes you have made to the spreadsheet press the key sequence /FS then press [RETURN] then the key R (Menu File Save [RETURN] Replace).

Save File Screen

A3: [W4] 1 EDIT
Enter save file name: C:\GUIDANCE\GUIDANCE.WK1

A	B	C	D	E
The ANE Bureau Guidance for Costing of Health Service Delivery Projects				

1	Table 01	Basic Information		
2	Table 02	Base Costs and Contingencies		
3	Table 03	Costs by Expenditure		
4	Table 04	Financing by Expenditure and Source		
Etc...				

Leaving the Program

When you are finished and have saved the changes, you will need to exit the Lotus 1-2-3 program. Press the key sequence /QY (Menu Quit Yes). You will now be back at the "Prompt".

Printing Guidance Tables

To print the tables you will need to make sure that your printer is turned on. Press the key sequence /PPR F3 (Menu Print Printer Range FunctionKey3). A list of valid ranges to print will appear at the top of the screen. Move the cursor over the table you wish to print and press [RETURN]. Once you have selected the range to print you only need to press the G (Go) key and the table will be printed.

A3: [W4] 1					MENU		
Range	Line	Page	Options	Clear	Align	Go	Quit
Specify a range to print							
A	B	C	D	E			
1	The ANE Bureau Guidance for Costing of Health Service Delivery Projects						
2							
3	1	Table 01	Basic Information				
4	2	Table 02	Base Costs and Contingencies				
5	3	Table 03	Costs by Expenditure				
6	4	Table 04	Financing by Expenditure and Source				
Etc...							

Guidance Help Information

If you select position the cursor to the Help menu selection and press ALT+C you will be shown a screen with brief descriptions of the tables and of the necessary key strokes to operate the spreadsheet. In addition to this help screen there is also help available for the Lotus 1-2-3 program by pressing the function key F1.

Help Information from Spreadsheet

Help Information

To make a selection highlight your choice and hold the ALT key and then the C key. You will be placed on the selected spreadsheet.

To return to Main Menu Hold the ALT key and press the M key.

The top and side titles for the table will be fixed so that you have a reference point within the table.

If you want to return to the top left corner of a table press the HOME key.

Key Actions:

HOME	Move to top left of table
PGDN	Move one screen down
PGUP	Move one screen up
TAB	Move right one screen
SHIFT-TAB	Move left one screen
Up-Arrow	Move one cell up
Down-Arrow	Move one cell down
Left Arrow	Move one cell left
Right-Arrow	Move one cell right
F9	Recalculate Spreadsheet
F1	Lotus 1-2-3 Help Information
ESC	Abort Present Commands

To enter a value from the Present Worth of Annuity Factors Table hold the ALT key and press the P key. This will send you to the table with the PWAF values.

Position the cursor on the appropriate number and hold the ALT key and press the R to insert the value into the table.

Using Lotus to Monitor/Evaluate Project Activities

(Advanced Functions)

In addition to assisting in the development of project cost information The Guidance spreadsheets may be effectively used as a tool to monitor and evaluate changes in project costs.

It is recommended that when you start a new project you make a copy of the blank spreadsheet. This spreadsheet will be the initial worksheet for the development of the project. After the initial development has been completed make a new copy of the spreadsheet on which modifications to the project will be made. At any point in the project you can make a new copy of the spreadsheet, making sure that all new modifications are made to the latest version of the Guidance spreadsheet. This process will give you a historical set of spreadsheets that reflect the status of the project at the time the new versions were created.

It is not recommended that you perform analysis activities with the latest version of the spreadsheet. Make a copy of the latest version which will be the spreadsheet you use for performing analyses. This will guarantee that you will not lose any information.

To analyze the information you will import an old spreadsheet and specify that the information should be subtracted from the latest version. The values on the spreadsheet will reflect the difference between the original figures and the present figures.

To load an only spreadsheet press **F5** then type in **A1** and press **[RETURN]**. Now press the key sequence **/FCSE (Menu File Combine Subtract Entire)** and then select the spreadsheet to combine with the cursor and press **[RETURN]**. The figures on the spreadsheet will reflect the changes from the original budget.

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Modifying the Guidance Spreadsheet

(Advanced Functions)

It is fairly easy to modify the guidance spreadsheet.

Deactivate the protection of the spreadsheet: **/WGPD**
(Menu Worksheet Global Protection Disable).

Insert a new row **/WIR [RETURN]** (Menu Worksheet Insert Row). When inserting a new row it is best to insert it in the middle of a range that may be grouped together. For example, when adding a row to the personnel matrix do not insert the row after the last line in a grouping. Insert the row in the middle of the grouping. This is to ensure that the equations that calculate the total costs for that group will remain consistent.

Copy the equations from the previous line: Move the cursor to the left most cell of the line on the table you wish to copy from and press **/C**. (Menu Copy PeriodKey), move the cursor to the right most cell of the line and press **[RETURN]**, move the cursor to the left most cell of the new line and press **[RETURN]**. Do not copy a line from any of the information which is derived from an accessory table. In addition, do not copy from the first or last line of a groups.

Change the description of the Label for the new line.

Turn back on the protection of the spreadsheet **/WGPE** (Menu Worksheet Global Protection Enable).

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Graphing Lotus Information

(Advanced Functions)

This description of graphing functions is not intended to cover all aspects of Graphing The Guidance information. In this section you will learn some of the basic concepts and steps for graphing simple information. The best way to learn about Lotus graphs is to select some information you wish to display and experiment with the graphing functions to get a feel for how they operate.

Not all computers are able to display graphics. To see if your computer has graphic capabilities, press the F10 key. If the sample graph is displayed on your screen you will be able to prepare and display graphs.

The main criteria for creating graphs is to select at least two "ranges". The first Range X will be the labels for the graph, the subsequent ranges A-F will be for data. The two ranges should have the same number of elements. For example, if you select five labels to include in the X range, you should also select five related data elements for each of the subsequent ranges.

After you have selected at least the X and A ranges you may select to View the graph. If you want to change the type of the graph (for example, from a line chart to a pie chart) select Type and then select the type of graph you want to view.

Selecting Options will allow you to include titles for the graph, and enter legends for the data ranges you selected.

Lotus Graph Menu

```

A3: [W4] 1                                MENU
Type X A B C D E F Reset View Save Options Name Quit
Set graph type
A          B          C          D          E

```

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