

The importance of this specification lies in the fact that the total cost of activity includes the costs of the persons who are not treated successfully and that the model can change between time periods. Here, the general equilibrium effects of intervention can be incorporated into the model by respecifying the technology matrix (30), the set of input and factor prices, and the set of inputs for the new time period.

Since factor prices and input constraints can be obtained without much difficulty, attention focuses on the technology matrix. How is this crucial piece of information obtained? As evidenced by Dunlop's estimation of the technology matrix for Uganda, this can be accomplished with a minimal amount of data (31); the true cost of these estimations lies in the expertise to develop such a model.

Division of Costs

The accounting application of cost principles is a handy and practical tool, as well as a logical thought process for the health administrator. Costs are primarily divided into three categories: (1) full costs; (2) differential costs; and (3) responsibility costs, and relate to three types of cost accounting. Full cost accounting measures the direct and indirect cost of not only producing goods and services, but also for any other activity that is of interest to management. Differential accounting estimates how costs, revenues, and/or assets would be different if one course of action were adopted as compared with an alternative course of action. Lastly, responsibility accounting traces costs to individual organization units, each of which is headed by a manager. For example, responsibility accounting would allocate the costs of a health care project to each of the sub-centers involved in the project. Since each type of costing can be applied to the health care field each is examined in detail. Table 1 is provided as a reference aid to the reader.

Full Cost Accounting

Full cost accounting addresses all the resources used for a given objective and includes, therefore, both direct costs that are specifically traceable to or caused by that objective, and indirect costs, or costs that are associated with or caused by two or more objectives jointly, but that are not directly traceable to each of them individually. (32)

At this point, a distinction should be made between direct and variable costs. If the cost objective is a product, many costs that are direct to that product vary with the volume of output. Anthony and Reese (1979) alert us to the distinction:

the direct/indirect dichotomy relates to the traceability of costs to cost objectives, whereas the variable/fixed dichotomy relates to the behavior of cost as volume fluctuates. (33)

The calculation of indirect costs involves an allocation of costs incurred for several objectives. Just what the fair share of costs allocated to any one objective may be is related to a causal occurrence, e.g., a health

Table 1: Accounting Methods

Cost Concept	Full Cost	Differential Cost (DC)	Responsibility Cost
<u>Cost Concept</u>	<p>Direct</p> <p>relates to output</p> <p>Indirect</p> <p>not traceable to output</p> <p>Includes</p> <p>joint cost overhead</p>	<p>Fixed(F) - invariant w.r.t. volume</p> <p>Semivariable(S) - vary less than proportionately with volume</p> <p>Variable(V) - vary with volume</p> <p>Includes</p> $(F+S+V)_2 - (F+S+V)_1 = DC$ <p>where: Period 1 vs. 2 is based on:</p> <p>input/output volume changes</p> <p>money/real price changes</p>	<p>Controllable, Discretionary, Engineered, Committed</p> <p>mgt. discretion by objective varying inputs/outputs</p> <p>given physical production run</p>
<u>Measurement of Costs</u>	Actual	Actual or Estimated with respect to volume changes	Actual and Estimated Costs Designated by Responsibility Center Rather than Volume or Output
<u>Uses:</u>	Financial Reporting Profitability Analysis	Facilitate Comparisons Narrow Realm in which decisions will be made	Designated for Management Control Process

care project that requires close supervision and heavy time inputs on the part of the Ministry of Health should bear a larger burden of the administrative costs than a less supervisory-intensive program. In practice, payroll, personnel, material, space, and activity are often bases used to determine this fair share allocation. (34)

A further distinction should be drawn between the actual costs to produce a given product and costs that should have been incurred. In accounting terminology, this latter procedure is called standard cost accounting. It merely assigns to each product a fixed amount of input that should be required to produce a unit of output, where the factor price of the input is priced at what it should be with respect to prices. (55) Obviously, such standard costs convert budgeting and forecasting into simple multiplication processes.

In allocating indirect costs, some fair share of the costs must be assigned to each product. While neither of these methods is applicable in the health care field, allocation on the basis of time spent on a given activity or some valuation of the end product, e.g., the benefits from averting various illnesses, could be used.

Full cost accounting is most useful: (1) in financial reporting; (2) in an analysis of profitability; and (3) in answering the question "what did it cost". (36) It should be noted, however, if some of the costs of production are indirect, the full cost of an objective cannot be measured with complete precision. In other words, there can be as many cost estimates as there are accountants. Discretion arises with respect to the following: (1) capital versus product costs; (2) the measurement of direct costs, i.e., are records kept in the same fashion in various projects; (3) the distinction between direct and indirect costs; (4) alternative allocation methods; and (5) assorted overhead measurement allocations.

Differential Accounting

Differential accounting brings in the concept of function that was developed earlier. Differential costs are costs that are different under one set of conditions than they would be under another set of conditions. These conditions are indicated in Table 1 by the subscripts 1 and 2. Full cost is the sum of direct and indirect costs; differential cost includes only those elements of cost that are different under a certain set of conditions. While full costs are calculated directly from accounting records, there is no comparable or systematic way of collecting differential costs. Also, full cost takes on the historical perspective of what the costs were. Differential costs always relate to the future, i.e., what would costs be under different scenarios.

To estimate differential costs, one must calculate total costs under varying assumptions, usually varying the volume of activity. Should: (1) the measure be based on inputs or outputs; and (2) the measure be expressed in money amounts or physical quantities? The choice of input versus output criteria rests on how one expects costs to vary. For example, input costs should be considered when comparing programs that produce the same amounts of health care, but do so by using different sets of inputs. Output measures would be more appropriate when considering the expansion of services. The choice of physical