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Organization of Health Care in a Developing Country

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Organization of Health Care in a Developing Country

By

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1. Introduction

The health status of a community must be related, on the one hand, to the community's identified health needs and, on the other, to the health services provided. The basic objective of any community health program must be to match these demand and supply components effectively.

Unfortunately, needs are not always known or identifiable, especially in the context of comprehensive care, which attaches considerable importance to preventive needs. Safe drinking water, for example, may be a vital element in the prevention of disease, but its importance may not be fully appreciated by the community.

On the services side of the equation we must look realistically upon severe shortages and maldistributions of health workers with specific skills and upon limitations of economic resources. Over a period of time, however, a reallocation of resources is possible, along with a reorientation of training emphasis. This gives the organization of health care a dynamic dimension. As restraints are removed, the range of alternatives increases, and hopefully the organization structure is updated. This, in turn, recasts the problem and calls for further scrutiny of remaining restraints.

Then, in relating rather uncertain needs to restricted resources, we face the additional obstacle of political and cultural blocks. To illustrate, certain segments of the population may insist upon utilizing certain practitioners, regardless of the existence of more effective modes of treatment. The cultural restraints impose additional costs upon the system. These must be evaluated in order that productive programs in health edu-

cation may be formulated. The removal of cultural restraints through these community programs introduces a dynamic element into the problem much as professional training programs do.

The problem formulated is quite general. Our interests, however, centre upon rural, tradition-oriented communities in developing countries. Here the health needs are intense though ill-defined, the services are especially constrained, and cultural and political factors loom large. For example, a politically motivated decision to provide free care has a pronounced impact upon the health service system. Finally, there is a clear trend toward a regionalized system of health services with village primary health centers forming the base.

We shall take these health centers as given, though their organization is subject to critical appraisal. In particular, the organization of health care services must be studied within an analytical framework that is not only well-suited to the problem of identifying and relating health needs to current practices in resolving them, but can also serve effectively in the assessment of the optimal manner of meeting the health needs. Finally, a comparison of optimal practice with current practice will suggest the prospects and programs for moving toward the optimum, thereby more effectively utilizing scarce manpower and resources in mollifying the nearly insatiable needs of the community.

The analytical framework that we have devised will be described first in schematic and then in mathematical terms. A concrete illustration will help to explain the thinking behind the models.

2. Schematic representation of analytical framework

Some of the community's health needs inevitably go unsatisfied for one of three reasons. In the first place, some are unrecognized; we referred earlier to the failure to appreciate the value of safe drinking water. Secondly, the cost of satisfaction (economic and otherwise) may exceed the benefits. To illustrate, a screening program for a given disease may not be undertaken because the cost will exceed the benefit derived from the treatment of a very small number of cases uncovered. Finally, resources are inevitably inadequate to fulfil all of the opportunities to achieve positive net benefits. This forces the satisfaction of needs according to some system of priorities, expressed or implied.

A schematic view of the circumstances just described is afforded by Figures 1 and 2. Fig. 1 presupposes a rational system in which priorities are assigned on the basis of net benefit, i.e., the utility derived from

the fulfilling of the need, less the cost of such fulfilment. The first unit of resources is then allocated to the problem that will produce the great-

FIGURE 1

Real Benefits Available

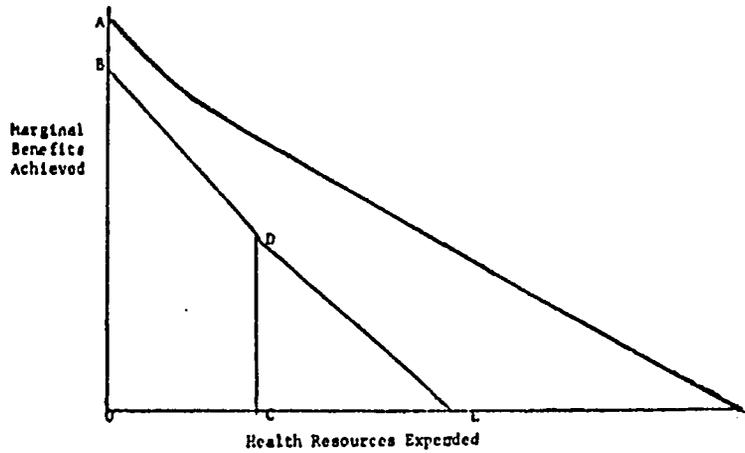
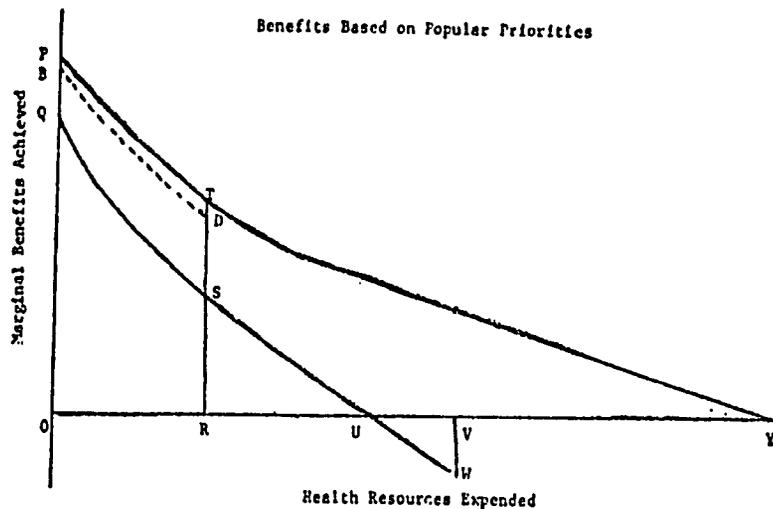


FIGURE 2

Benefits Based on Popular Priorities



est net benefit, and each subsequent assignment of resources is designed to produce the maximum increment in net benefit. As a result one faces the downward sloping curves of gross marginal benefit, *AF*, and of net marginal benefit, *BE*.

Admittedly, a single measure of utility is difficult to be achieved in practice. Likewise, resources are specific in ways which prohibit perfect substitution in the allocation to needs. Nevertheless the essence of the problem can be depicted in the two dimensional form of the figures.

Total potential benefits are identified as the area AOF ; correspondingly the area BOE defines potential net benefits, given existing technical and administrative practice, which would drain off an amount $ABEF$.

With limited resources, say an amount OC , some of the potential net benefits cannot materialize. The unrealized benefit amounts to CDE . Depending upon circumstances of development in a given country, the limiting factor in determining the size of the shortfall may either be the inadequate supply of health resources, such as trained manpower, or the inadequate effective demand which citizens are able to exercise.

In reality, as we have noted, health needs are imperfectly understood. This results in a popular demand for health services that is not entirely in accord with the principle of maximization of net benefits. The supply side is likewise distorted to the extent that health planners are ignorant of need, unable to measure benefit accurately, or are irrational in their assessment of priorities. The results of these less than optimal allocations of resources are depicted in Figure 2. The net benefits curve, QW , tends to be flatter than BE and may include a negative component, UW , that reflects a certain amount of satisfaction which, contrary to expectation, would be exceeded by the cost of fulfilment. A popular, but costly, elixir for example may be less effective in restoring vigor, than the public has been led to believe. The line BD has been reproduced from Figure 1 in order to show area $BQSD$ as the amount of net improvement that could be achieved through increased knowledge and better planning with existing resources and methods of providing services. The cost of dispensing current services is denoted by the area $PQST$; therefore, this depicts the potential benefit of providing these services more efficiently. Finally, the ramifications of the scarcity of resources is depicted by the area RSU , less UVW . Further comparisons would reveal the nature of interactions and the effect of moving forward on two or more fronts simultaneously.

It is clearly impossible to construct a precise set of such curves for any country. Nevertheless, enough may be known to establish their general appearance and to compare conditions between countries. In any event it is necessary in some way to establish a basis for directing efforts toward improvement in the provision of medical care.

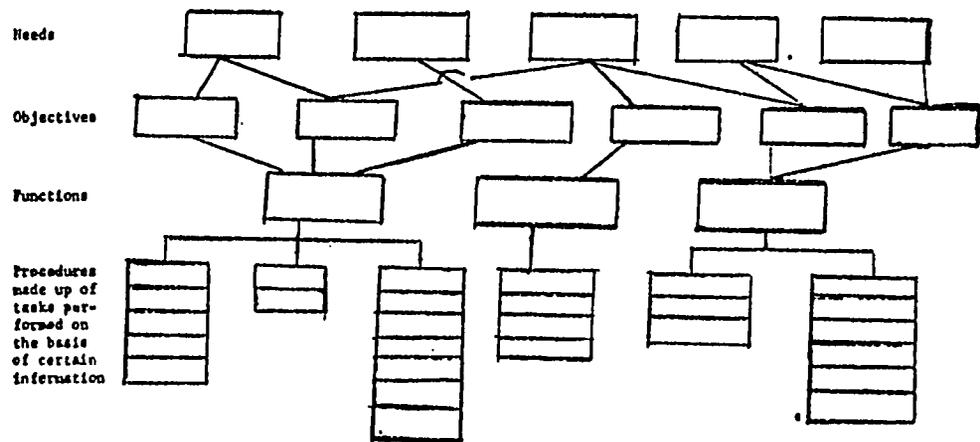
Our own experience in India suggests that the primary orientation must be toward the mechanism for providing services (reflected by $PQST$

of Figure 2), but not without regard for the other two aspects of the problem. In particular, the analysis of the manner in which the primary health center functions cannot proceed until the current bundle of felt needs has been described in quantitative terms ; these needs, however, are sufficiently clear and demanding of resources that any sophisticated appraisal of other than popular needs and priorities is unwarranted at this time.

Then we are led to an operational analysis of the most effective means of satisfying existing health needs through the retraining and reassignment of existing manpower. Only after the appropriate manpower mix is established can one speak of training programs to extend the supply of manpower.

Since our focus is upon the operational analysis, we must consider the functional structure of the health services system from which the picture of Figure 3 emerges. Based upon a wide range of existing health needs, general statements of purpose are developed. These, in turn, are reflected in specific objectives of the health services system.

FIGURE 3
Schematic Representation of Analytical Framework



The objectives ideally serve as a base from which the organization structure is developed, programs are formulated and implemented, and evaluation is made in terms of the extent to which the objectives are satisfied.

Some problems generate multiple objectives. For example, mortality due to tetanus among infants may lead to the objectives that all midwives

be trained in the use of sterile instruments, that the mortality rate be reduced by 40 per cent in three years, and that the entire community be educated concerning the nature of tetanus. It is also possible for several needs to funnel to a single objective. To illustrate, a variety of ailments may suggest the objective that a supply of aspirin always be on hand in the health center. Finally, needs may simply dead-end because of the lack of administrative or technical capability to satisfy them.

At the next level we specify certain functions, i.e., areas of activity which hopefully contribute to the accomplishment of the many program objectives. Each functional area is likely to be concerned with several objectives. While it is also conceivable that a given goal would involve two or more functions, such a division of responsibility would be viewed very critically.

The activities within functions are conveniently divided into sequences of individual tasks, each series being denoted as a procedure. Individual tasks are distinguished, not only by their content, but also by the skills of the individuals performing them; thus, delivery by a midwife is differentiated from delivery by a physician.

The schematic model has the form of an hourglass with the functions located at the narrow middle. For this reason the analysis focuses upon functions, for at this level the total problem can be broken into a manageable number of components. In order to make maximum use of this disaggregation feature, the functions should be defined so as to be as independent of one another as possible. Likewise, each should be reasonably homogeneous in terms of the objectives covered and the activities entailed.

In spite of the above principles, the choice of functions is somewhat arbitrary and subject to modification with experience. The list in Table 1, therefore, is not immutable, but it does illustrate the nature of functions.

TABLE 1
ILLUSTRATIVE LIST OF HEALTH FUNCTIONS

<i>Personal</i>	<i>Community</i>
Maternal Care	Environmental Sanitation
Normal Adult Care	Investigation and Control of Mass
Well-Child Care	Disease
Care of Illness and Trauma	Data Collection, Evaluation,
Care of Disabled and Handicapped	Administration
Care of Mentally Ill	

We must observe, unfortunately, that many analysts have dealt only with the lower half of the hourglass. They have started with traditional classifications based upon disease category or clientele and then have enumerated a host of service requirements. As the list has grown, so has the cry about a manpower crisis; yet the requirements and resulting shortages have not been systematically related back to the values and goals of the health services system.

3. Information system

Before clarifying the analytical base with an illustration, we should note that parallel to the health services system itself is an essential information system. While information systems are increasingly receiving the attention they deserve, their role is especially noteworthy in health because of the vagueness with which needs are initially expressed. The correct diagnosis of needs in terms of treatment required is an important aspect of health service effectiveness. An equally important factor in the information system is the evaluation of the appropriateness of the tasks performed and the levels of skill required.

4. Illustration

In order to remove some of the abstraction from our analytical base, we shall follow one health need through the hierarchy of objectives, functions, and procedures. Pregnant women have need for the delivery of healthy babies. As a result, certain realistic objectives are formulated, such as: the protein intake during the pre-natal period will reach minimum prescribed levels in 80 per cent of all cases; and the mortality rate during the first month after birth will not exceed five per cent of the number of live births. These objectives clearly fit within the preventive (maternal) care function. It, in turn, entails one procedure for the routine care of uncomplicated deliveries, another for the care of mothers with a history of previous pregnancy problems, and still others. One of these procedures might include such individual tasks as history-taking, urinalysis, and the provision of certain food supplements.

5. Mathematical modeling of analytical framework

The schematic model is useful conceptually, but analysis ultimately

requires measurements which must be related in some way in the evaluation. Thus we are led to the construction of mathematical models.

Initially, focusing upon functions, we can think of them as being related to procedures as :

$$f_j = f(P_j) \quad (j = 1, 2, \dots, q) \quad (1)$$

and to objectives as :

$$f_i = h(O_i) \quad (i = 1, 2, \dots, s) \quad (2)$$

Similarly, procedures are related to tasks as :

$$P_j = g(T_{jk}) \quad (k = 1, 2, \dots, r). \quad (3)$$

Concerning (1) and (2), we note that the function is merely a channel through which certain procedures serve in part to satisfy given objectives. The functional classifications thus turn out to be mathematical functions in the sense that :

$$O_i = F_i(P_j) \quad (4)$$

where j takes on some of the subscripts from 1 to q .

Equation (4) is ambiguous, however, with respect to the units of measure employed. Objectives are stated, either in quantitative terms (such as mortality levels, days lost from normal activity, etc.) or in terms of the values attributed to these quantities. Procedures are measured in units of health worker effort of specific types or in terms of the cost of that effort.

Ideally we would like to assess the cost of the effort relative to the value of the benefit within the restraints of time available. At the present stage of development, though, we are not prepared to compare, for example, the values of the prevention of a case of tuberculosis with that of a prevented case of diarrhoea. In other words, we are at the level of sophistication of a cost effectiveness analysis, rather than a cost-benefit analysis. Among other things, this hampers us in the assignment of priorities to objectives, a matter to which we shall return in a moment.

6. Nature of the evaluation

Current health service activities, measured according to costs incurred (C) and time devoted by specific categories of health workers (H), satisfy

to some extent the community's health needs as they are reflected through the health services quantitative objectives. Hence :

$$O_{ij} = F_i(C_{ijk}, H_{ijk}^w), \quad (5)$$

where the superscript w refers to the category of health worker. Though financial and manpower resources are limited, their reorganization might permit the attainment of higher goals. Information obtained within the functional-analytic framework can suggest appropriate modifications of procedures within economic, personnel, and cultural limitations.

For one thing, personnel may be made more productive in their present role. Certain laboratory tests, for example, may be added or modified in order that they be made more informative. Secondly, the roles of personnel may be altered. Perhaps tradition within the professions or the community fails to recognize that certain activities could be capably performed by persons of lesser skill.

After practicable modifications have been introduced, the impact of remaining restraints can be assessed in order to guide the development of professional training and community education programs.

At this point one has an overview of the functional loading and manpower mix generated by a set of stated health needs and objectives. The application of professional judgment to this overview may suggest that certain goals clearly deserve higher priorities or that some functions command greater emphasis at the expense of others. It may be suggested, for example, that community and preventive functions should be given more attention, whereas personal, curative activities should receive less. Moreover, reliable estimates can be made concerning the expected impact on available resources brought about by the proposed shift. Ultimately, we hope that value judgments can replace fallible professional opinion, but as we have noted, value criteria in health are at a rather early stage of development.

7. Practical problems

Thus far we have dwelt upon the structure of the health services system. Analysis depends, of course, upon the information system embodied within the structure. We shall turn our attention briefly, therefore, to a few of the practical informational problems that we have encountered in our studies in India.

The first concerns the expression of health needs. Individuals are likely to recall personal illness and accident episodes for short periods of time, but the recall is usually in vague symptomatic terms often unrelated to specific illnesses and therefore difficult to categorize functionally. Only careful probing of the village residents will produce information that is useful in this respect. Probably no amount of probing will produce data on health needs that have not resulted in overt illness. Household surveys must be supplemented, therefore, by expert knowledge and surveys of community health problems.

Evaluation of the health services system requires more than a simple enumeration of episodes. It must be founded upon an understanding of village attitudes toward illness, their classification of disease, and patterns of health services utilization which they employ. At the one extreme this requires fairly subjective, open-ended socio-anthropological studies while at the other extreme it requires detailed quantitative portrayal of illness experiences as sequences of inter-related events. It is important to know the order in which various persons were consulted, the response given to their recommendations, and the point at which contact with the health system was terminated. An individual who visited a doctor but failed to purchase the medicine prescribed is quite different from one who visited the same physician and followed his recommendation along the entire path to recovery.

Likewise, activities at the health center require detailed scrutiny. Quantitative aspects of patient flow can be recorded in a straightforward manner, but qualitative appraisals offer many challenges. As a sample: how is professional competence to be judged? How are minimum required skills to be determined?

8. Summary

In spite of the data collection problems it appears feasible to supply the information required for the lower half of the hourglass that depicts our functional-analytic framework. Furthermore, we are able to go farther in relating these activities to health needs and objectives than most studies in the past have attempted. We are currently carrying forward this type of analysis with respect to the primary health center system in India. One day we hope to increase the level of sophistication in the upper portion of the hourglass to the point where a complete cost-utility evaluation can be performed.