

PART I

PURPOSES AND CONCEPTS

STRATEGIES FOR DEVELOPMENT OF HEALTH INDICES

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INTRODUCTION

The title of this chapter contains words that can be variously defined. In practice, the term "health level indices" is usually understood to mean summarized measurements that can be used to classify population groups on the basis of their health situation. Such measurements would provide information on relevant aspects of the health situation.

"Strategy" could be changed to "principles" or "outlines", but "indices" requires some comment. An index (plural indexes, or in a scientific context indices) is something that points out, indicates, shows, directs, or manifests, such as a number, sign, or guide, but index can also mean an alphabetic or other systematic list.

Measurement of levels of health is a fundamental problem for every health administrator. In 1955 a WHO expert committee stated (1) that for the health administrator "... nothing could be more valuable than to have at his command one or more measuring rods to help him in his task and also in assessing his specific problems relating to the health of the people, in designing his plans to deal with these, in guiding his administration and in evaluating his schemes." Considerable efforts have been made to realize these expectations. In 1970 another WHO expert committee concluded (2) that there is no agreement on units of measurement and weighting factors to be applied when combining various states of health for which specification is a problem in itself. The same can be said today in spite of the numerous activities aiming to produce serviceable indicators. The activities of the United Nations, the International Labour Organisation (ILO), and the Organisation for Economic Cooperation and Development (OECD) are examples (3- 6).

WHY MEASUREMENTS ARE NEEDED

Nowadays, with authorities having greater responsibilities for health and welfare, decision makers require indicators that could show in which direction

a particular situation is tending. An example in the field of economic indicators is gross national product (GNP). Ideally, a valid indicator system for health and social welfare should consist of a relevant series of measurements that are easily understood and obtainable. This goal is obvious and easily defined but practical progress towards it has been very limited, particularly at the international level, and the whole idea of such a system is jeopardized if the number of indicators grows.

To be realistic there is at the moment no reason to believe that international, or even national, activities in developing some selected indicators would provide decision makers with answers to all the problems. These may be specific and they may vary with time, in which case global or general indicators may be of little use. In this connexion the objective is not to find general indicators but something more pragmatic intended to resolve existing problems of decision makers at all levels. The focus of interest is similar to the objectives for planning of information services, that is, *the production of information that an organization or system requires for decision making and action.*

Any determination or measurement is intended to serve a definable purpose. At a more conceptual level information is primarily used for evaluation. Here, the term is used in its broadest sense to mean "conclusions made by comparing observations with something that can serve as a standard". Measurements can in principle be either exact or crude, and some important aspects are not quantifiable at all. In such cases impressions are relevant as measurements and, in fact, a number of crucial decisions rely heavily on "impressionistic evaluation".

All information is evaluated either from the scientific point of view or pragmatically for everyday use. Sometimes, the former is said to represent the "curiosity value" of information, the latter its "decision value". Ideally, information should have a high content of at least one of these qualities, but in reality it is usually low in both. It is rarely possible to maximize both qualities at the same time. In general, the two values should be considered separately and the difference between them remembered in discussion of information needs.

SYSTEMS CONCEPTS IN MANAGEMENT AND INFORMATION SERVICES

Deciding "what should be known" is not a useful activity unless information is available on practical procedures. Here, some thought should be devoted to general strategy. Planning, decision making, and the whole area of modern management cannot really be discussed without considering the concept of systems, and specifically one particular type of system — that of *human organizations*. Typically, these function for a specific purpose and are composed of elements that are relevant to this purpose. Formal organizations are, of course, "systems", but the same framework can be applied to informal ones. The basic requirement of such a system is that the components are influential and relevant, and that they interact functionally. Together, they

form a "whole" in which all components function differently from one another. This "whole" can be constructed in different ways according to needs or purposes. *Systems analysis* is a technique for analysing systems and their activities. Often, it aims to provide a quantifiable picture of the functioning of a system, but the same principles are applicable to systems that do not have measurable elements. A recent WHO technical report (7) deals with applications of systems analysis to health management.

Modern "scientific" management is the most relevant application of the systems approach in this connexion. In principle, the focus of interest is the "whole", that is, all achievements in relation to overall goals. If applied to health it means, for example, that instead of requiring that all components, such as hospitals, are maximally effective, success or failure is measured in terms of overall effectiveness, that is, in increased length of life or perhaps in prevention of illness. Systems management tries to avoid situations where something is done effectively that should not be done at all.

In every human organization, when analysed as a system, a formal, and sometimes an informal, element exists that has a duty to coordinate, control, or activate; in other words, to manage. Management is primarily based on information in the broadest sense. Management systems can be divided into subsystems, and in theory, but often in practice also, there is a component that specializes in collection, processing, analysis, and presentation of data and information. The generic name for all these activities is *information system*. The epithet "system" is correct in this context because it is not important that all activities take place in the same organizational unit or office. The main thing is that they form something that functions as a "system" with the primary purpose of serving the management system and ultimately helping the whole organization to achieve its goals. An information system may consist not only of statistics, data archives, and other routine elements, but also of *ad hoc* research activities and expertise.

THE DECISION PROCESS AND PLANNING

Information services have been described here as directly serving management and decision makers; this, however, does not describe the process in detail. In practice, decisions are always preceded by some form of planning, which may be formal and elaborate or hardly recognizable as such. By definition, any planning process incorporates evaluation, which in most cases is in the form of weighing actual situations against expectations. It is obvious that emphasis of any elements of this continuous evaluation/planning/decision making cycle will reveal the shortcomings of the information system. It is not surprising that planners, as a group, now demand better information; this is, of course, because planning without information tends to be a rather academic and sterile exercise.

There are, in fact, two main types of planning. Firstly, we can plan for something that is perhaps relatively new. Traditional examples are seen in the

field of building construction, but also relevant in this connexion are health programmes aimed at solving a defined problem. Malaria and smallpox eradication programmes are examples of international planning. The second approach to planning is when the objective is to improve or control something that already exists.

These two aspects are based on different ways of thinking or, in modern usage, on different types of model. Their most important characteristic is that they *require different types of information*. In the "goal-attainment" model we are interested in effectiveness, which can, for example, be obtained by means of epidemiological measurements. For many practical management purposes, however, a "control" model, which focuses attention on efficiency and on the correct use of resources, is equally relevant. Finance, personnel, services provided, and other measurements, which are often of little interest to an epidemiologist, are valid indicators in a control model, which basically sees the activity as a continuous service to be controlled. In real situations both types of model are influential, but to varying degrees. The control model tends to refer to a static situation while goal-oriented planning is typical in a society or an organization that is introducing innovations.

Another aspect of planning is the distinction made between "strategic", "tactical", and "operational" plans. These serve different types of decision and so require different information. Analysis of the system and situations and the choice of model should be made with these specific points in mind.

MODELS AND THEIR CONSTRUCTION

It is often believed, wrongly, that it is relatively simple to determine what information is needed and how it is to be used. Without systematic effort which requires time and experienced assistance decision makers are in most cases unable to ascertain what information they really need or actually use. When the objective is to discuss strategies for measuring health-related needs, knowledge of information requirements is vital. It is natural to think about information needs in decision making since a decision can be defined as any event where a course of action is selected from available alternatives. In principle, decision making is a process that converts information into instructions for the system. On the basis of the known facts there may, of course, be no reason to take action. A *laissez-faire* attitude, however, without input of proper information, can lead to critical situations.

It is, of course, impossible to perform detailed analyses of decisions made in real-life situations but it is possible to select and symbolically present the most important aspects as a model. The word "model" can refer to anything represented on a different scale or in a simplified way in order to give a clearer picture of a real-life situation. This is similar to documenting a programme or describing the goals and objectives of a service system. The construction of a model has much to recommend it; the basic relationships within the system can be seen more clearly. Moreover, implicit values and assumptions

have to be made explicit, which means that they can be critically analysed. The most important features of a model are to indicate what information is relevant, in what detail something should be known, and what, for example, are the risks if we use estimates of levels of health instead of measurements.

Models may contain concepts and other nonquantifiable information. The expression "mental" model is intended to show that the information content of such a model is not limited to formal aspects, but covers also relevant details of the "system" and its functions in the present and in the future. Obviously, a mental model exists only, in practice, in the imagination of competent decision makers. Evaluative considerations rely partly on experience and partly on facts, but also to a great extent on intuition. A completely different vocabulary for the same elements in the model could be used – for example, personality, experience, policy, and role.

In many cases the model is only a way of thinking about what might happen if something is or is not done. However, such abstractions are realities in relation to decisions, and the more important these decisions are the more they are based on abstractions. On the other hand, formal models are constructive elements in mental models and they may influence and improve the understanding of the reality. It can also be said that health policy decisions are compromises between different interest groups that use different mental models.

METHODS FOR DATA COLLECTION

Data for measuring health and other information relevant to decision making can be collected in numerous ways. Health-related measurements can be limited to services; these are traditionally called "statistics", but under this heading there are many different subsystems. Summarized reports or forms containing aggregated data for individuals or events over a period of time are commonly used. At the next hierarchical level these data are further summarized, and from such regional summaries national measurements are obtained. The main weakness of a system of this kind is its rigidity. Answers are limited by the questions considered when the basic form was introduced.

Individual data systems (such as registers or data banks) apply the opposite principle. Each person or event is handled separately and summaries are made on an *ad hoc* basis and any relevant combination of questions can be answered. Such systems are flexible but are hampered by the large amount of information they require and the consequent heavy demand on resources.

Ad hoc surveys and epidemiological research are appropriate for data collection purposes. Some surveys are purely statistical while others are clinical, but most are combinations of the two. Control activities to monitor drug quality, the efficacy of treatment methods, the safety of technical experiments, etc., also belong to the health information system, but in practice these may more correctly be considered as the "environment" of the information system.

Coordination of research activities is vital for health information systems. The *ad hoc* approach is specially planned to answer a specified question and usually provides more exact responses than other methods. It can also be the most economic method but there are exceptions to this since *ad hoc* surveys require considerable time, and competent researchers are often unwilling to abandon their other duties to initiate a specific study or survey.

One particular advantage of specially planned sample surveys is that it is possible to cross the sectoral boundaries of societal systems and to link different types of relevant information for an individual or a family. For example, the health situation and past and present environmental conditions, both physical and social, can be linked and analysed.

A single *ad hoc* survey is, in principle, an analysis of present circumstances but for many decisions a knowledge of trends is more valuable than the actual data. An obvious solution to this is to make repeated surveys; the problems to be solved dictate whether the same sample or another comparable sample of informants or objects for measurement is to be studied. A "before and after" strategy is useful in situations where there has been new legislation or any other innovation, a marked increase in resources, or some other unique event that can serve as a marker. In some countries such surveys are functioning as routine components of a national health information system (8).

Other relevant components of information systems are knowledge obtained from experts and published information, and to these managers have turned in the past. Even now, personal contacts, reports, and memoranda form the backbone of health management. Published information about other experience is also useful; it often gives examples for comparison, provides informal norms, and enables resources to be diverted to other activities. However, use of scientific literature requires competent readers and reviewers, who may be needed urgently elsewhere.

Data processing and communication are also parts of the information system but they fall into a separate category, the other categories being oriented to collection of data. The different subsystems process and analyse data in order to produce useful information, but information services cannot fulfil their purposes without communication. The function of communication is to "get the message across". It is not intended to discuss communication problems here; it is enough to point out that if reports are incomprehensible on account of their mathematical language or use of overdetailed tabulations, or because of classifications that are meaningless in operation, there is no effective communication and thus no useful information system. This situation is not rare, but there is no reason to believe that managerial staff value an information system in these circumstances.

MODELS AND INFORMATION PLANNING

The earlier discussion of indices, systems, and models leads on to the key issue of this chapter. We can postulate that *an intentionally collected*

item of information is primarily serving one purpose, that is, to be of use for a model that enables evaluative considerations to be made. Only rarely is it possible to construct a valid formal model to which quantitative measurements can be fitted. In most cases the basic models are mental ones, as previously described.

In this situation models are not an objective but only a method to help solve the problem of how to establish the information requirements. The focus of interest is not the formulation of the decisions to be made, but selection of the information items or indicators needed to form opinions about the problem. This could be called information *content* planning. For this limited purpose relatively crude models can be used, but even these models can only be constructed by those who understand the particular problem. In most cases this requires teamwork by experts. Valid models cannot be made by one person who is expert in, say, statistical methodology but who is unable to investigate the problem thoroughly.

As mentioned above, a model indicates which information is relevant, in what detail something should be known, and what errors are likely to occur in using estimates instead of measurements. If progress can be made in this respect many difficulties can be solved, enabling experts in methods and techniques (method planners) to take part in the dialogue.

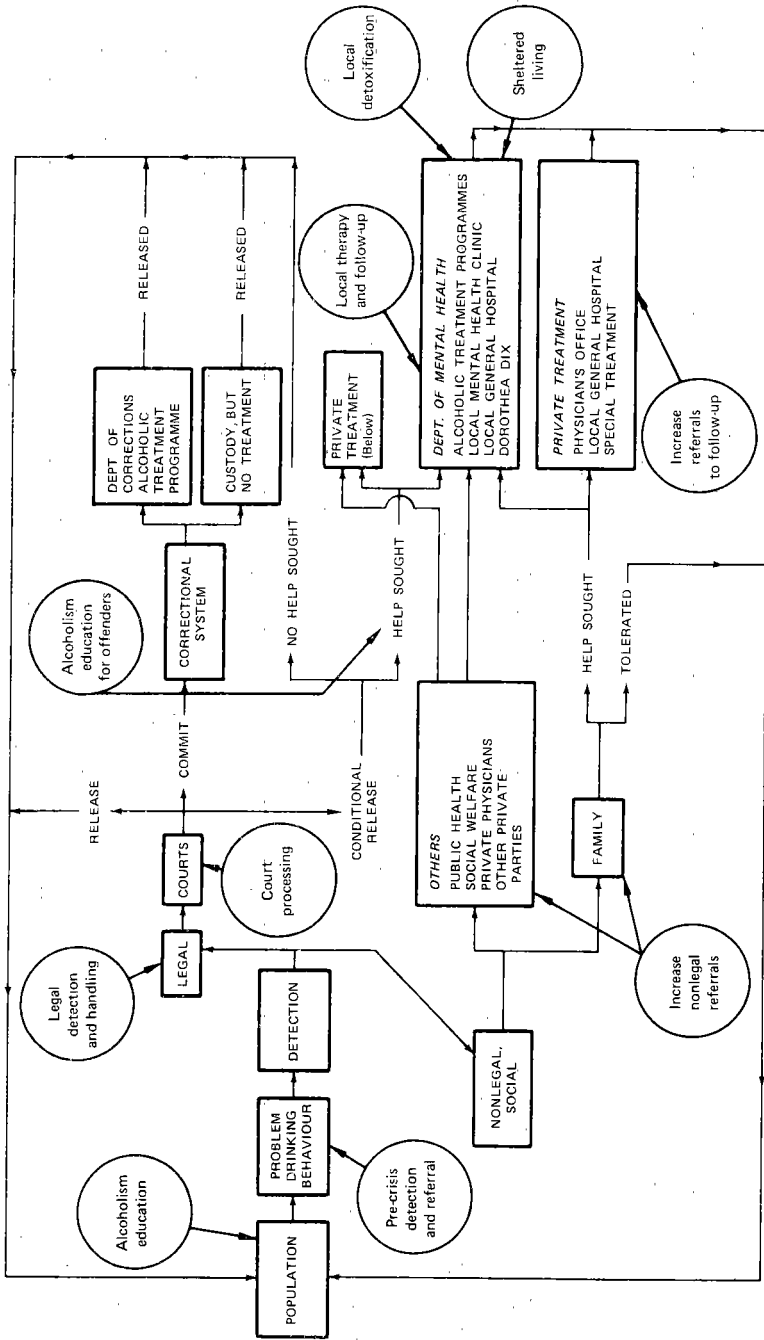
Real-life situations can be simulated by means of a crude descriptive model. For this purpose basic simulation is enough. It may be appropriate to describe this as “imaginative thinking”, but there is reason to stress that in the entire process decision makers and users are the most important groups and that without their help other participants do not know which is the critical subsystem and what information can be dispensed with; without their participation the exercise is meaningless. Outside experts can give helpful advice but planning should be carried out mainly by the organization’s personnel and not by visiting consultants. In principle, this kind of modelling – a simulation exercise or comparable activities – can be performed at any decision making level of the national hierarchical structure (9).

Fig. 1 shows a visualized model for a programme in which the points of intervention are the focus of interest. In this case information would be required at these points (10).

An annex to this chapter (p. 29) describes the development of a model for the oral health services. This is seen as a national problem with active participation by the national authorities. Modelling construction was carried out as a special exercise in which all relevant decisions were simulated. Attention was focused not on what should be decided, but on what information such decisions require. The most important problem areas are outlined but the actual indicators are not given.

Very similar thinking lies behind the description or model of tuberculosis services in Finland in Part III, Example 13. This is intended primarily to outline information needs but also to help in the planning of information services to produce the relevant data. This model is served by a planned system of functioning data banks, routine reports, and specific research intended to fill gaps in the information. The attention given to this is justified because the tuberculosis problem was exceptionally severe in Finland and the disease still

Fig. 1. Points of intervention in the public/private system for dealing with problem drinkers in North Carolina, USA (10)



consumes considerable resources. The same principle, starting with a model to show what information is needed, followed by the requirements for indicators, and then on this basis the technical arrangements for data collection, is also used in an example on abortion policy (see Part III, Example 12).

USE OF "LEVEL OF HEALTH" MEASUREMENTS

Measurement of health levels is discussed in a general way in Chapter 1 but the question of how to measure health must also be studied more pragmatically. It may be asked, "Do we really need to measure levels of health?" To this question we can add another: "For what type of decision is the information so vital that it must be specially measured?" The answers to these questions are also important from the point of view of methodology because it can be postulated that the intended use determines the content, exactness, and other characteristics of expected measurements and information. Actual methods of measurements can be selected only when these are known. Of course, there are many other considerations that have to be taken into account such as resources, available materials, and the attitudes of those involved.

It is very difficult to continue this discussion without introducing the term "need". This is the difference between the measured situation and what is seen as the "normal" or acceptable health level. Attributes like "real", "subjective", "objective", "perceived", "medically defined", or "scientific" need are generally used to show how, and by whom, this difference has been measured. In principle, there is no correct or incorrect way of measuring the difference: the expected use of the results decides which way is the best. Of course, the realities such as resources must be considered. One logical approach to level of health measurement is to start from the simplest and most elementary decisions at the individual level and proceed to more complicated ones where the entire community is intentionally managed in order to solve health problems (11).

LEVEL OF HEALTH IN THE INDIVIDUAL

The first step in the chain of events is *the decision made by the individual*. We may realize that our health differs in some unacceptable way from the norm; this norm reflects the values of the group to which we belong. This *perceived illness* is a central, but not the only, element in our decision that we *need* something in order to achieve a more acceptable health situation. We can limit our social participation, our work, for example, and assume the role of a sick person, but we can also decide that we need qualified medical help. The result — *perceived need of medical care* — is influenced by subjective elements such as the perceived severity of the problem or the expected

benefits of treatment. Use of the interview process is the logical way to discover our needs at this level. Of course, the picture can be clarified if some objective measurements such as unemployment are also made.

The next decision for the individual is whether or not to appeal to the health services. Influential in this decision are all the previously listed facts and valuations, and also specific conditions that regulate the patient's opportunity for contacting the health services — for example, service availability, cost, and the patient's social circumstances. This level of health is reflected as demand, which in principle should be relatively easy to measure. In reality, it is a complex question, as shown by the different types of demand and services, and by the existence of waiting lists, etc.

LEVEL OF HEALTH IN PATIENT/SERVICE INTERRELATIONSHIPS

To make the above-mentioned decisions there is in principle *one* decision maker or "actor" only — the individual. The environment for this decision making varies, and can even be manipulated, but as soon as the patient makes contact with representatives of the health services other decision makers enter the picture. If systems terminology is used the patient and at least one representative of the service system form a more or less standing relationship, which theoretically fulfils the minimum requirements for an organization, an organization being defined as a system that contains at least two elements having a common purpose. The usual name for this organizational nucleus is "patient/physician relationship". The purpose of the organization is to help patients recover their health and solve other health-related problems. In the decision-making process the medically qualified partner decides what is required, which means in principle that a *professionally* (or *scientifically*) *defined need* is determined. When the medically qualified partner has formulated his or her ideas about what should be done the patient can introduce reservations, interrupt the relationship, or form another patient/service relationship. In most health service systems the patient is granted the right to select a physician whose attitudes match his own.

In practice, the physician or the first service unit contacted can very rarely take entire responsibility for the diagnostic or curative activities; in most cases the patient is referred to a more specialized or competent service unit. The role of the patient in decision making becomes smaller and *professionally specified need* is characteristic of a higher service hierarchy level. It would be more correct to label this a *professionally specified demand* because the medical experts usually know what are the real limits of resources. However, systematically, the optimal situation for *one* patient is the goal of decision making and the actions that follow this.

Some conclusions about this level of health can be made on the basis of, say, referrals to more specialized medical care, but objective measurement requires a specified sample of individuals, professionals, or other service units. Such measurement can often be substituted by expert opinion (or "guesstimates"). Medical audit systems are closely related to this type of measurement.

MEASURING THE LEVEL OF HEALTH FOR COLLECTIVE PURPOSES

Another chain of decisions can be centred round the problem of how to serve *collective needs* in the health field. In this case the focus of interest is not the individual patient but more the efficient use of available resources that could lead to correct distribution of services produced. The organization serving the health interests of any society selects objectives and goals that are as close as possible to its ideal, stated in the Preamble to the WHO Constitution as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity."^a Need would then be represented by the difference between this ideal and the situation as it exists. Collective interests and pragmatic planning require that this difference be defined using terms that are as exact as possible.

In decisions relating to an individual patient there is relatively great flexibility in use of resources but the community as a whole has strict limits to its resources, at least within short periods of time. Because sufficient resources are rarely available an order of priorities must be established. In a practical sense this means that the main problem in decision making is how to choose one particular action rather than another. Different choices may not be diametrically opposed, but should be resolved within limits which are in proportion and acceptable. The essence of the problem of decision making therefore lies in determining the proportions in which different objectives should be combined.

The description of planning given above is especially applicable to strategic decisions, but there are numerous occasions when simpler reasoning is justified. Again, it is appropriate to start from the smaller, more limited ones and select some examples. The philosophy of a service unit dictates the way in which the concept of need influences the decisions that guide the actions. If the unit, such as a local practitioner or regional hospital, has no defined boundaries or known clientele its responsibility to provide services is limited to those who, more or less by accident, become patients.

The needs are seen quite differently if the unit is obliged to serve a specific group of people and medical need is the sole criterion for establishing priorities when selecting patients for treatment. This situation of *distributional responsibility* is typical of countries where society is entirely responsible for providing services. Consumption of services, if properly subsidized, corresponds more closely to the "real" needs but it is difficult to pay enough attention to other values such as the individual's right to select a physician.

It is obvious that the general principles on which the community health services are organized decide to a marked extent what information is appropriate for describing needs and what requires to be measured to indicate the level of health of the population. It is worth remembering that in developed countries, where service systems have for a long time been adjusted to the prevailing concept of needs, decisions requiring an objective and exact determination of the level of health are not often made.

^a *Basic documents*, twenty-sixth ed. Geneva, World Health Organization, 1976, p.1.

CONCLUSIONS

Information planning is a complicated process and the difficulties are made apparent in the description above. It is worth repeating the steps that might be applied in a more or less rudimentary form. It is logical to start from the analysis of information needs, in other words, to decide what should be known. When information needs and qualities like exactness, reliability, and timing are clarified, it is relatively easy to indicate the methods that should be applied and to organize the information service on a practical basis.

The problem of knowing what should be known has received rather limited attention and, contrary to general belief, it is the most difficult one to solve. Only few formal decision makers can describe what information they actually use. Detailed information is often not used directly but serves as the "environment" in which decisions are made.

To specify which information items are relevant it is logical first to analyse what has been decided: the activities may possibly be analysed as systems, and crude conceptual models of these systems can be constructed. The next step is to simulate what might happen if something is known or is not known.

The terms "model" and "simulation" should both be understood properly. It is not necessary in this case to construct quantitative mathematical models but only to have a codified way of thinking to enable understanding of the functions of the system, and simulation in this connexion is the application of logical reasoning in the analysis rather than use of elaborate procedures. In order to solve the problem of knowing what should be known relatively crude methods are satisfactory, but to answer other questions sophisticated models and simulation procedures are needed. It has to be stressed that responsibility for these steps, which can be called "content planning", lies with the users of information, not with the statisticians, research workers, and data-processing specialists who produce the information, though they should, of course, participate in model construction.

Another part of information planning relates to technical and methodological problems. Here, the more exact and specific the information, the greater the resources required. In such circumstances compromise and "bargaining" for information are often resorted to because research, being an expensive and scarce resource, should only be used where it is essential. Routine statistics are inflexible and data banks expensive, while expertise is not always readily available.

Considerable economies in cost can be achieved if there is continuing dialogue between information users and producers. But the advantages of such dialogue are not only economic; there should also be greater understanding about problems and the information produced should be more reliable. As a result, from isolated activities an information service is created that fulfils the vital functions entrusted to such a system by modern management.

In this chapter little attention is given to practical problems such as how information systems should serve local and/or central authorities; also, no mention is made of the confidentiality of information or of data linkage. These matters are dealt with in subsequent chapters, particularly in the presentations of practical applications.

Annex

MODELLING AND DECISION SIMULATION APPLIED TO PLANNING AN INFORMATION SYSTEM FOR NATIONAL ORAL HEALTH SERVICES^a

A.S. Härö & H. Tala

Introduction

The basic steps for planning information services for a programme or "decision area" are as follows:

- set up a team whose members know the problems and are interested in developmental activity;
- let the team describe the activities performed, that are expected to be performed, or are intentionally not performed;
- formulate a crude, but logically constructed, model of these elements with the focus of interest on points where decisions are possible;
- select relevant indicators or items of information needed in decisions;
- balance with ("bargain") the limited resources and the pragmatic exactness requirements in mind;
- organize data collection and processing services (subsystems).

Here, we describe how these steps were applied in a well-defined area for decision making – the oral health services. This model was made in Finland where oral care is organized by the state up to the age of 19 years. Private practice provides care for the rest of the population but there is no general system for subsidizing this care. However, oral health education, quality control of materials, etc., are seen as responsibilities of the state.

The team

The team was composed of two senior administrators in the Office of Dental Health of the National Board of Health. Both had a degree in dentistry as did the managing director of the National Dentistry Association, who also participated. A medically qualified senior planner functioned as moderator and the fifth team member was an economist trained in health planning. Only the two planners had experience of the method used.

^a Modified from *Planning information services for health administration: decision simulation approach* (12).

The work began with a short methodological survey. As a first step it was decided that it could be assumed that all relevant formal and informal functions and interactions form some kind of *system*, which may be completely hypothetical but which can be made fairly comprehensible. System boundaries can mostly be selected according to expected use. The problem can be presented partly as a *model*; that is, as a simplification of reality, which means that some details of the real-life situation will be imperfectly represented. The more complex the problem, the greater the range of relevant models that can be proposed for it.

The participants were not trained in, or oriented towards, modelling activities or mathematical statistics. Therefore, it was stressed that decisions on important and complex problems are based on "mental" models, which are mainly synonymous with experience, intuition, inside views, estimates, and their subjectively weighted relationships. It was also stressed that models are often identical with hypotheses, and that at this stage the main purpose was to form a rough comprehensive framework. Primarily, this helps us to consider what input data serviceable models require. Even when a formal, or generally agreed, model does not actually exist there may be an urgent need for information, and its collection can be justified even when the sole purpose is to support or validate aspects of subjective mental models developed by responsible decision makers. Some examples were given and it was stressed repeatedly that no decisions or opinions on how to behave are required at this stage, but *solely opinions concerning relevant information* needed in such situations.

Introductory session for technical arrangements

The meeting began with a general discussion of oral health. Whenever an item of information was mentioned for the first time it was written, in one or two words, on a small card. Examples of these items of information are "use of sugar", "eating habits", "oral health manpower", and "efficacy of oral health education". Later, when the same item of information was referred to, the card was displayed and if necessary the wording was modified or a new card covering a different aspect of the same information item was prepared (for example, "female dentists").

The team started with generalities and moved on to specific questions, where opinions differed more often. This cycle was repeated several times. After about three hours there was a substantial number of cards on the table and the team agreed that it was now time to draft a logical overall picture. The cards were moved from one activity group to another and some cards were duplicated because the same information was used in more than one activity group. The result was the draft diagram given in Table 1.

The meeting could be called "an organized brain-storming session". Because the objective was well defined it was not difficult for the moderator to keep the discussion within reasonable limits. There was much discussion of possible appropriate action, what should be studied, and the research required.

Table 1. Oral health programme: problems and activities

| Indicators grouped by activity | Comments |
|---|---|
| A. Oral health situation (1–8) | |
| Deficiencies in dental health: | |
| <ol style="list-style-type: none"> 1. caries 2. edentulousness 3. periodontal tissue 4. malocclusions 5. dental injuries 6. congenital malformations 7. oral diseases (other) 8. hospitalization morbidity due to stomatological diseases | Minimum requirement for items 1–7: statistics by age (birth, year, cohort), in schools by local area. Item 8 exists in individual data (ID) systems for hospitals. Items 1 and 2 require <i>ad hoc</i> research. |
| B. Environmental factors (9–11) | |
| <ol style="list-style-type: none"> 9. quality of water (fluoride content, etc.) 10. food quality, minerals 11. other relevant environmental factors (social, attitudes, etc.) | <i>Ad hoc</i> research required; age, sex, locality, and social circumstances important. The same information is needed for other health problems. |
| C. General preventive action (12–15) | |
| <ol style="list-style-type: none"> 12. dietary habits 13. nutrition 14. health education 15. pregnancy (preventive measures during) | Items 12 and 13 are important research areas for other reasons. Item 14, measurement of efficacy needs research statistics by locality. Item 15, maternal and child health (MCH) statistics provide this information. |
| D. Oral hygiene programme (16–18) | |
| <ol style="list-style-type: none"> 16. plaque control 17. periodontal surgery 18. others | Items 16 and 18, statistics from MCH and schools are satisfactory. Item 17, data for hospitalized patients are included in ID system, others are aggregated as school health statistics. |
| E. Specific preventive actions (19–23) | |
| <ol style="list-style-type: none"> 19. fluorides added to water or other vehicles 20. topical application of fluorides 21. dental sealants 22. anticariogenic sugars 23. prevention of malocclusion | Item 19, available from statistics on water purification. Item 20, statistics available. Items 21–23, <i>ad hoc</i> research required. |
| F. Primary oral care (24–26) | |
| <ol style="list-style-type: none"> 24. incremental care 25. acute dental treatment 26. irregular dental treatment | Items 24–26, statistics available by locality. |
| G. Specialized oral care (27–29) | |
| <ol style="list-style-type: none"> 27. periodontics (ambulatory) 28. orthodontics (ambulatory) 29. oral surgery (hospitals) | Items 27 and 28, summary statistics available from polyclinics, by locality. Item 29, exists as ID system (hospital discharge reporting system). |
| H. Manpower policy (30–32) | |
| <ol style="list-style-type: none"> 30. students accepted, finishing 31. students in foreign countries 32. curriculum, training | Items 30 and 31, data from statistics and manpower registers. Item 32, expert opinions. |

Table 1 (contd)

| Indicators grouped by activity | Comments |
|---|--|
| I. Personnel resources (33–36) | |
| 33. dentists (active/non-active) | Items 33–35, aggregated statistics needed; a manpower register exists. Item 36, yearly reports by locality required. |
| 34. other oral health personnel (chair-side assistants, dental technicians) | |
| 35. private practitioners | |
| 36. vacancies (existing, filled, public, private) | |
| J. Productivity of personnel (37–39) | |
| 37. visits or contacts (by type) | Items 37–39, data from aggregated statistics by locality (ages 1–19 years). |
| 38. working hours (dentist/auxiliaries) | |
| 39. technical production (fillings, extractions, etc.) | |
| K. Dental material and equipment (40–44) | |
| 40. consumption of dental materials | Item 40, estimations needed. Item 41, cooperation in Nordic countries through the Nordic Institute for Testing Dental Materials (NIOM). Item 42, specified information unacceptable. Item 43, specific studies needed. Item 44, estimations needed; usual pharmacy control exists. |
| 41. registration of dental materials | |
| 42. quality control of dental materials and equipment | |
| 43. facility planning and control | |
| 44. drugs prescribed by dentists | |
| L. Working conditions (45–46) | |
| 45. ergonomics | Item 45, <i>ad hoc</i> research needed. Item 46, X-ray safety controlled; other <i>ad hoc</i> research needed. |
| 46. safety aspects (X-ray use, etc.) | |
| M. Quality control of dental treatment (47–49) | |
| 47. complaints | Items 47–48, individual reports. Item 49, a list of research activities is needed. |
| 48. inspections | |
| 49. continuing education (new methods and techniques) | |
| N. Users of oral health services (50–51) | |
| 50. users/non-users | Items 50–51, surveys by age, sex, locality, type of service, etc., needed. |
| 51. social background of users/non-users | |
| O. Technical resources (52–53) | |
| 52. facilities | Items 52–53, statistics by service units needed. |
| 53. equipment | |
| P. Financing of oral care (54–59) | |
| 54. salaries | Items 54–57, aggregated statistics by service unit needed. Item 58, ID system exists. Item 59, major investments listed individually; others shown as aggregated statistics by locality. |
| 55. charges | |
| 56. costs | |
| 57. subsidies | |
| 58. insurance | |
| 59. investments | |

Other sessions

A few days later the results of the first session were scrutinized. The diagram (Table 1) was available in typed form and the cards were arranged in a comparable way. The team restudied the activity groups, formulating names for information items and adding new ones. When this was finished attention was focused on the requirements for exactness and on timing. To assess these each activity group was studied separately and participants described the possible role of information in decisions and in real-life situations. It was not difficult to agree what should be known in theory but it was more difficult to agree on the importance of more uncertain factors. Alternative decisions or policies were simulated until it became fairly clear what information was needed and why. The relevant approaches (or submodels) were documented and the exactness, timing and other criteria for different information items were described, much attention being devoted to minimal requirements.

“Bargaining” sessions

In the earlier sessions resource limits were taken into account to some extent. In the next session an experienced health statistician, who had studied the proposals, joined the team. Each proposed information item was analysed from a technical point of view to show the amount of work involved and the costs. Limitations in exactness, difficulties in timing, and other constraints were discussed and alternative solutions proposed. In some cases acceptable surrogates existed or could be developed; in others even the minimum requirements seemed to be impossible to meet. Sometimes, a different, and better, alternative was found. Cooperation with other sectors or services was taken into account.

The Nordic Medical Statistics Commission (NOMESCO) has prepared a symbol language for use in describing exactness and other methodological criteria for information (9). This is not used here owing to the limited space and because the same ideas can be expressed in words. It is particularly important that different items of information should be described exactly. Since the aggregation level must be known there is a clear statement about individual data registers (identification systems, data banks) from which facts can be estimated and which require *ad hoc* research or control activities.

The team also indicated the type of submodel they had in mind: for example, goal-oriented, control, quantitative, or mental. Important correlated factors were also represented – age, sex, locality, institution, or specialty (dentists by age, sex, and locality), for example. Table 1 gives the proposed items of information along with some important comments.

Application

This model is partly valid for other societies but the information items to be collected, especially exactness, timing, and all the possibilities for linkage are very specific and reflect, for example, national legislation, organizational structures, the responsibilities of different decision makers, and to some extent existing statistical routines.

In this presentation the *content* of information is *not* important as such; what is important is the approach to initiating a dialogue between users and producers of information. In this respect "decision simulation" was a successful activity in which differently oriented experts could express their opinions without being afraid of criticism. The concept that a mental model is as important as any mathematical algorithm was a psychologically important prerequisite for cooperation.

On a practical level, some of the obvious gaps in available information were filled immediately, others were filled after methodological trials jointly with other innovations. The limitations of codes, classifications, and definitions are becoming a practical obstacle in proceeding to more satisfactory information systems for the oral health services.

REFERENCES

1. WHO Technical Report Series, No. 137, 1957 (*Measurement of levels of health: report of a Study Group*).
2. WHO Technical Report Series, No. 472, 1971 (*Statistical indicators for the planning and evaluation of public health programmes: fourteenth report of the WHO Expert Committee on Health Statistics*).
3. *Social and demographic statistics: draft guidelines on social indicators*. New York, United Nations, 1976 (mimeographed document E/CN.3/488).
4. Tambouri, G. & Mouton, P. Social security indicators. *International labour review*, 114: 155 (1976).
5. *List of social concerns common to most OECD countries. Social indicator programme*. Vol. 1. *Manpower and social affairs*. Paris, Organisation for Economic Cooperation and Development, 1973.
6. *Measuring social wellbeing: a progress report on the development of social indicators*. Paris, Organisation for Economic Cooperation and Development, 1976.
7. WHO Technical Report Series, No. 596, 1976 (*Application of systems analysis to health management: report of a WHO Expert Committee*).
8. Purola, T. et al. *Health services use and health status under national sickness insurance*. Helsinki, Social Insurance Institution (Finland), 1974 (publication A:11/1974).
9. *Decision simulation approach in planning information services for health*. Stockholm, Nordic Medico-Statistical Committee (NOMESCO) (in preparation).
10. Holder, H.D. & Hallan, J. System approach to planning alcoholism programs in North Carolina. *American journal of public health*, 62: 1415 (1972).
11. Härö, A.S. Methods of determining community health needs. In: de Dombal, F.T. & Gremy, F., ed. *Decision making and medical care*. Amsterdam, North Holland Publishing Company, 1976, pp. 311–322.
12. *Planning information services for health administration: decision simulation approach*. Stockholm, Nordic Medico-Statistical Committee (NOMESCO), 1973.

THE INTERFACE OF HEALTH AND SOCIAL SERVICES

J. Kostrzewski

INTRODUCTION

The basis of any programme, and the starting point for both short-term and long-term planning for the work of the health and social welfare services, should be an evaluation of the state of health of the population and a determination of its health care and social needs based on a system of measurements. Such measurements should also be used to evaluate the fulfilment of plans.

Measurement of the physical state of the health of individuals and communities already has a long history. For this purpose methods of examination in medical physiology and pathology have been used to establish positive and negative indices of health. Morbidity and mortality rates are most frequently taken as a basis, making use of data from the documentation of health service institutions or obtained by specially organized inquiries, using the International Classification of Diseases (ICD) (1).

The evaluation of mental health is more complex. For this also, analyses of morbidity and mortality are used as a basis, but in order to obtain a proper evaluation we must go beyond strictly medical examinations within the fields of physiology, pathology, and epidemiology and have recourse to methods of psychological and sociological examination. Mental health is influenced by both biological and social factors; it is subject to variation and fluctuations of degree. The WHO Expert Committee on Mental Health discussed the concept of mental health in its second report in 1951 (2), stating that "... the committee's conception implies the capacity in an individual to form harmonious relations with others, and to participate in or contribute constructively to changes in his social and physical environment."^a Such a conception determines the methods of evaluating state of health and leads to a definition of this state in medical, social, and psychological terms. The Twenty-Ninth World Health Assembly meeting in May 1976 extended these discussions to new lines of study demonstrating the influence of various psychosocial factors on

^a See also Hogarth (3).

human health and recommended that methods of gathering information on mental health and psychosocial factors affecting health should be developed (3).^a

The concept of social wellbeing, the third element in the definition of health given in the Preamble to the WHO Constitution,^b has not been clearly defined with respect to evaluation of health in man and may vary in different countries.

People's relationships with others and their social position and usefulness may also vary among the population of a single country, and there is still greater variation between populations of different countries. This variation results from differences in the socioeconomic and cultural development of a country and from differences in the cultural background, education, religion, and wealth of individuals.

Objective evaluation of social wellbeing is much more difficult than evaluation of the physical and mental health of a population. Nevertheless, the requirements for planning health protection and social assistance and for evaluating the results of the work of the social services demand that we should:

- (1) define the links between human health (of individuals and the community), social situation, and social wellbeing;
- (2) establish methods for determining the social care needs of a population in connexion with its health status;
- (3) determine the links between the work of the health and the social welfare services;
- (4) establish methods of measurement used to develop social care programmes and to evaluate the fulfilment of such programmes.

HEALTH OF A COMMUNITY IN RELATION TO SOCIAL WELLBEING

Physical and mental states of health have a great influence, not only on the physical and mental development of an individual, but also on his or her social position and function. On the other hand, psychosocial factors and the individual's socioeconomic situation greatly influence his or her state of health.

The smaller the social group, the stronger the interaction between health factors, on the one hand, and mental, social, and economic factors on the other, and also the stronger the bonds between the members of the group. The strongest interaction of these two sets of factors may be observed within

^a See also *Psychosocial factors and health*, report by the Director-General. Twenty-ninth World Health Assembly provisional agenda item 2.5.1 (document A29/8, 29 March 1976).

^b *Basic documents*, twenty-sixth ed. Geneva, World Health Organization, 1976, p. 1.

the family. These reciprocal influences are not just restricted to the economic sphere, but reach much deeper.

Physical or mental disease may cause the break-up of a family, warping the children's development and interrupting their education. A drastic example of this is alcoholism in the father or mother, especially if there are several children. Another example is a family burdened by a severely handicapped member. In particular, a severely disabled child who is unable to develop normally, compelling the family to provide constant care, affects the development of the siblings and especially of the parents. It is usually the mother who is the victim and who often sacrifices her career and her happiness to care for the disabled child.

All illness resulting in severe, long lasting, or permanent disability leaves traces in the psyche of the patient and in the disposition of those nearest to him or her. Disability often involves serious social consequences, condemning the victim to depend constantly on help from those around him, necessitating a change in the occupation he or she was trained for, increasing expenses, and often drastically decreasing his or her income.

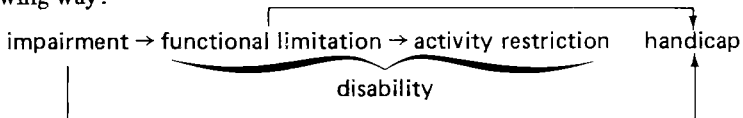
These examples show that programmes for the protection of health cannot be limited to the analysis and evaluation of biological and medical aspects of health status, but must consider also a wide range of social conditions.

Health service administrators are in general accustomed to a model of the organization of health protection that is limited to problems of health promotion and disease prevention, diagnosis and treatment of disease, and medical rehabilitation. In such a model there is no room for vocational rehabilitation and social adaptation of the handicapped, or for social welfare. Yet all these elements should be integrated in a broadly conceived system of care for promoting the physical, mental, and social health of the individual.

Failure of the health services in one of these spheres has its impact on the others. For example, lack of prevention or inefficient prevention of disease or injury makes treatment more difficult; failure in treatment prolongs the period of illness or leads to permanent disability, and this in turn impedes the complex of rehabilitation procedures. In the case of ineffective rehabilitation and social adaptation of an individual afflicted with some handicap, the persistent results burden the relatives as well as the social welfare services. In this complex of problems the question of care for the elderly raises a special issue.

If we wish to obtain a complete picture of the complex of medicosocial problems we must take into account the concept of reciprocal relations of dysfunction of the human organism as a consequence of disease or injury leading to disability, as well as the social dysfunction connected with illness in an individual, i.e., the incapacity connected with disease or disablement.

The process of dysfunction leading to disability may be presented in the following way:^a



^a From Wood, P.A.N. *Classification of impairments and handicaps* (unpublished document WHO/ICD9/REV.CONF./75.15), p. 14.

The effect of dysfunction caused by disease or disablement on the social activity of the individual and on those surrounding him is shown in the following table.

Table 1. Consequences of disability or handicap

| Individual consequences | Family consequences | Social consequences |
|-------------------------|--------------------------------|------------------------------|
| Decrease of: | Need for care | Demand for care |
| independence | Disturbed social relationships | Loss of productivity |
| mobility | Economic burden | Disturbed social integration |
| leisure activities | | |
| social integration | | |
| economic viability | | |

If we assume that it is the duty of the state to ensure full health protection for the population the assurance of preventive and therapeutic care linked with medical and vocational rehabilitation, as well as the social adaptation of the disabled, are included among the fundamental tasks in an expanded programme for health protection together with provision of social care for individuals and families requiring assistance.

With respect to the organization of health services and social assistance countries may be divided roughly into two groups. One group includes countries where the health and welfare services are more or less interconnected and form an integrated system; the second includes countries where the health and welfare services act independently and usually come under separate ministries (or departments). If a single ministry (or department) is responsible for both health and social welfare there is not necessarily close cooperation between the two different areas. The degree of organizational integration, as well as the functional connexions between the state and the social and voluntary institutions and other bodies concerned with health protection, rehabilitation of the disabled, and social welfare, may vary, depending on the structure and, in particular, the administration of the health and welfare services at the central, intermediate, or local levels.

THE COMMUNITY NEEDS FOR REHABILITATION AND SOCIAL ADAPTATION SERVICES

It is difficult to construct sufficiently comprehensive indicators of health and social need for individuals and the community. Kalimo, in discussing the strategic approach to needs (see Chapter 5, section III), presents a typology of a population on the basis of three concepts of need — namely, medically

defined need, perceived need, and use of health services. In this typology medically defined need is considered also in the category of socially determined need. Taking into account the necessity of close cooperation between the health services and social assistance, the concept proposed by Kalimo should include a spectrum of social assistance need.

When considering the natural history of handicap or disability we must also remember its origin. Thus handicapped and disabled people may be divided into three groups: those with congenital defects; those who acquired disability as a consequence of illness or injury at various stages in their life; and elderly persons with a disability accompanying the aging process.

The fundamental question we must answer is how many people are so affected by disability that it is impossible for them to take an active part in the life of the community, restricting their participation in social activities and preventing their leading an independent life appropriate to their age. In answering this question the natural history of the disability and the degree of restriction should be taken into account since on these depend the programme and prospects for rehabilitation and the social adaptation of the person to the handicap.

The natural history approach is also important for strategic reasons. A substantial amount of handicapping and disability in any population can be prevented. Measurement of handicap and disability related to congenital defects, acquired as a consequence of illness or injury, and accompanying the aging process should provide a basis for programming prevention of disability, care for the handicapped and social assistance.

To obtain information on the first of these we must determine the frequency of the various congenital defects causing severe disability among live births in a given year. Considerable difficulty is experienced here because only some congenital defects are manifested in the first months of life, and screening is necessary to obtain complete information on the various defects. Calculating the frequency of congenital defects in particular age groups makes it possible to detect trends, and on this basis to anticipate the needs of the population for rehabilitation and social adaptation of those handicapped by congenital defects such as congenital blindness, deafness, Down's syndrome, and oligophrenia.

It is easier to determine the frequency of the second group of disabled persons, that is, those who in the course of their lives have acquired disability as a sequel to illness, injury, or poisoning, since much of the necessary information is found in the routine documentation of health service institutions. Here, however, difficulty arises because medical documentation is adapted to the treatment needs of patients and does not take into account a number of items necessary for epidemiological analysis of disability. It is important to know not only whether patients died or were "cured", but also whether on the completion of treatment the patients' state of health allowed them to perform their everyday activities and continue their education or occupation just as before the illness or injury occurred. In addition, it is important to know if the disability is reversible by appropriate rehabilitation, and possibly also the range of actions and the type of occupation to which patients may be adapted if occupational retraining is necessary.

The third category of those requiring rehabilitation or social assistance comprises the elderly, often chronically ill, in whom the physiological process of aging, possibly accelerated or intensified by illness, causes disability and dependence. On the basis of demographic data and trends of aging in the population we can anticipate the number of persons of advanced age, a certain proportion of whom will require social assistance. Estimation of the needs of the population for rehabilitation and social assistance is, however, very complex; it does not depend merely on the number of elderly people but also on evaluation of their physical and mental health status, their personal relations with those around them and especially with their families (and conversely on the relations of families with the elderly), and on the satisfaction of their material needs. These basic conditions, together with many others of lesser importance, contribute to the need of the elderly for social assistance.

MEASUREMENTS OF NEED FOR REHABILITATION OF THE DISABLED AND SOCIAL ASSISTANCE

Until now most of the information collected and used for planning health care and social welfare in connexion with disability has been the product of administrative action and requirements rather than information prepared for studies on community health. The lack of suitable classifications for physical and mental impairment in man and for the consequences of this impairment in restricting the functioning and social role of the individual, have been a serious obstacle in epidemiological studies intended to determine the needs of a population for rehabilitation and social care.

The additional classifications recently prepared within the framework of the ninth revision (1975) of the ICD are particularly helpful in this respect. They include two lists, *Classification of impairments* (code I) and *Classification of handicaps* (Code H). The purpose of these additional classifications is to facilitate the study of certain sequelae to illnesses and injuries. They have been prepared as a numerical system to permit identification of the type and degree of impairment or handicap as well as retrieval of data in the documentation for statistical elaboration and epidemiological studies. The latter should be particularly useful in evaluating the needs of the population and in programming health protection and social assistance.

In the context of health care "impairment" is a generic term that embraces any disturbance of, or interference with, the normal structure and functioning of the body, including the systems of mental function. Impairment is characterized by a permanent or transitory psychological or anatomical loss or abnormality, and includes the existence or occurrence of an abnormality, defect, or loss in a limb, organ, tissue or other structure of the body, or in a functional system or mechanism of the body.^a

^a From Wood, P.A.N. (see footnote a, p. 37). See also *WHO policy and programme for disability prevention and rehabilitation* (document WHO/SHS/75.1, 1975, pp. 2,3).

The definition of handicap reflects the value attached to the status of an individual when this "... departs from the norm. In the context of health care, handicap is the disadvantage that is consequent upon impairment and disability. Handicap is characterized by a discordance between the individual's performance or status and the expectations of the particular group of which he is a member... Handicap thus represents the social and environmental consequences to the individual stemming from the presence of impairments and disability."^a

The classification of impairments (code I) is a list of 3-digit codes from 100 to 199, distinguishing 10 groups of states of impairment: (1) mental and behavioural impairments; (2) impairments of special senses; (3) impairments of internal organs and special functions; (4) impairments of head and trunk regions; (5) mechanical impairments of limbs; (6) paralysis of limbs; (7) other motor impairments of limbs; (8) sensory disturbance and disfigurement of limbs and other impairments; (9) transverse deficiencies of limbs; (10) longitudinal deficiencies of limbs.

To define the nature of the disability a fourth digit supplement to code I has been prepared, which for each of the 10 main classes of impairment mentioned indicates the restriction of the functions that have the greatest influence on the mode of life of the disabled person and on his or her degree of independence. For example, the class of mental and behavioural impairment includes inability to walk, incontinence, and behavioural disorders; the class of paralysis of limbs includes inability to walk, incapacity in manual activity, incapacity in arm function, and incontinence.

In the classification of handicaps (code H) the dimensions of the damage sustained by the individual are defined with reference to independence (physical), mobility, occupation, social integration, and economic self-sufficiency.

Based on the definition of the dimensions of disadvantage, assumptions may be made about the existence and survival of the individual as a social being and as an active member of the community. Active members of the community are expected to be able to: (1) preserve their independence as regards essential bodily needs, that is, to feed and dress themselves, observe personal hygiene, and so on; (2) move freely about in their surroundings; (3) spend time in a manner appropriate to their age, sex, and daily domestic or occupational duties, taking into consideration also the physical movements connected with recreation; (4) take an active part in the life of the community and maintain friendly relations with others; (5) maintain activity and socioeconomic independence through education, housework, or gainful employment.

The classification of impairments (code I) and the classification of handicaps (code H) have enabled epidemiological studies of defects and disabilities to be undertaken. These will be of immediate use in the programming of health protection and social welfare as documentation can be prepared in the health and welfare service institutions, providing information on the numbers of disabled persons in various categories needing rehabilitation or social care.

^a Wood, P.A.N. (see footnote a, p. 37).

From these data it will be possible to make epidemiological analyses comprising calculations of indices and determinations of the frequency of occurrence of particular categories of disability and their distribution in relation to population, place, and time.

PROGRAMMING THE SOCIAL SERVICES AND EVALUATION OF PROGRAMME IMPLEMENTATION

The active policy of the state as regards health and social services for the disabled and physically or mentally handicapped should be to enable all those under care to lead as full and as useful a life as possible. The health and social services should provide appropriate support for all persons in need of assistance. The disabled and handicapped should play an active role in the community, and the elderly should remain in the community for as long as possible. To achieve this goal the social assistance programme should be closely connected with programmes of health care and rehabilitation of the disabled.

Certain categories of people, however, cannot expect improvement in either their health or their social activity, and for these the state should provide suitable assistance and care. The largest category comprises the aged, especially the lonely aged, who have no family or relatives or who receive no support from their families. Another category for which the state should ensure full care is the severely physically or mentally handicapped, who vegetate rather than live and who, even when the greatest efforts are made to cure or rehabilitate them, are not able to play an active role in the community. Within this category there are two large and important groups: handicapped children and the elderly.

Evaluation of the need for social welfare should therefore follow from analysis of the numbers of the physically or mentally disabled, who on account of their handicap, state of health, or age cannot lead an independent life in the community or return to such a life. In this analysis family circumstances and socioeconomic status should also be taken into consideration.

As already stated, the elderly who, on account of advanced age and the chronic illnesses accompanying old age, cannot live independently and have no family to support them or whose families are unable or unwilling to care for them form the largest category of those needing care. Planning the tasks of the social welfare services with special reference to the elderly requires knowledge concerning their state of health and activity in daily life and of the capacity of persons in this category to perform such activities as are necessary for maintaining their own homes. In this analysis also the family situation should be taken into account.

To evaluate the success of the social welfare services in fulfilling these tasks it is necessary to calculate how many people among those needing care or assistance have received help, and the nature of the assistance given: financial assistance, help in obtaining meals or clothing, help with housework, amusements and leisure activities, or social contacts (especially important for

lonely people), and finally placement in homes for the aged for therapy, rehabilitation, or care according to their state of health. In addition, as it is the task of social welfare programmes to ensure that those under their care can continue to play an active role in the community for as long as possible, and as evaluations of programme fulfilment should take this into account, an analysis should be made of the extent to which the social welfare services help those receiving care and assistance to maintain contact with, and take an active part in the social life of, their own communities. Only those who are severely disabled physically and mentally (chiefly children) and who have no hope of improvement require to be admitted permanently to special institutions without any attempt being made to integrate them into the life of the community. For humanitarian reasons the state should ensure appropriate care for these patients and lift the burden of immediate care from the family.

CONCLUSIONS

Programming the tasks in rehabilitation of the disabled and in social welfare should follow from the actual and anticipated health status of a given population. Lack of a suitable classification for epidemiological studies on populations as a whole has been the chief obstacle to undertaking studies for determination of the character and frequency of disability, and for establishing, on this basis, the needs of a population for social welfare and rehabilitation of the disabled.

This difficulty can be overcome by use of supplementary classifications of impairment and disability (codes I and H) developed within the framework of the ninth revision of the ICD. Development of these classifications is, however, only the first step towards systematic epidemiological research on impairment and disability. Codes I and H should be treated as preliminary attempts that require to be confirmed in different countries and in different systems of health protection and social welfare.^a

Classification of impairments and handicaps according to ICD codes I and H should be introduced into the documentation of health and social welfare service institutions in selected areas and used in epidemiological investigations to determine the needs for rehabilitation of disability and for social welfare in a population. These studies should be carried out at different organizational levels of the health services – local, intermediate and central. They should be of an international nature and take account of different systems for the organization of health protection and social welfare.

^a *Report of the International Conference for the Ninth Revision of the International Classification of Diseases*. Twenty-ninth World Health Assembly, provisional agenda item 3.9 (document A29/32, Geneva, 22 March 1976).

Ideally, programmes for such pilot investigations should be agreed at the international level and include both economically developed countries and those that are still developing, as well as countries with well-developed health services and those still in the process of building up a service. In any such programme of international studies priority should be given to conditions of special social importance such as blindness, deafness, and severe physical or mental impairment.^a

REFERENCES

1. **World Health Organization.** *Manual of the international statistical classification of diseases, injuries, and causes of death*, 1975 revision. Geneva, 1977
2. WHO Technical Report Series, No. 31, 1951 (Second report of the WHO Expert Committee on Mental Health).
3. **Hogarth, J.** *Glossary of health care terminology*. Copenhagen, WHO Regional Office for Europe, 1975 (*Public Health in Europe*, No. 4).
4. WHO Official Records, No. 234, 1976, pp. 272 et seq. (Psychosocial factors and health).

^a WHO policy and programme for disability prevention and rehabilitation (see footnote a, p. 40).

PLANNING, ALLOCATION, AND MONITORING

D. Mowbray

INTRODUCTION

Planning, allocation, and monitoring can be considered as three discrete activities, which when linked together form a continuum in a model of decision making.

In a simple model three interlinked activities can be identified. First, there is the activity concerned with obtaining and using technical or objective information, which can be described under two headings: the direct or outcome measures giving information about the state of health of individuals; and information from indirect or process measures reflecting the activity of the health services (1). Second, there is the information relating to the administrative processes of decision making. This is derived from legal procedures, contracts, official circulars, and regulations. Finally, there are the political aspects of decision making; the information used here reflects the opinions of those concerned with the decision and it is used to persuade people to support a particular decision (2).

This chapter describes the measures used to obtain technical information, which can be used for the purposes of planning, allocation, and monitoring.

PLANNING

Planning can be described as “the process of deciding how the future should be better than the present; what changes are necessary to make these improvements and how the changes should be implemented” (3). It may focus on two types of objective. First, there is the objective of improving the general state of health of populations. Within this objective may be “subobjectives”, perhaps the eradication of a disease like tuberculosis or improvement in general care for, say, the terminally ill. Second, there is the objective of developing health services: this objective is the means by which the first objective may be attained. For example, the development of a child psychiatric service may require the establishment of a specialist inpatient unit operated by so many staff to cater for a stated number of patients in any one year.

In pursuing the planning objective of improving the general health status of populations, measurements requiring to be made include outcome of patients' contacts with services. If the objective was to improve health care for old people, to identify the outcome of different packages of care currently provided for the elderly, measures of outcome must be established that are sensitive enough to record small changes within the category of the elderly. Kaufert (4) grouped the conditions used in assessing outcome under five headings: (1) functional ability and capability for self-care; (2) range of personal mobility; (3) psychological status and level of social adaptation; (4) physical environment, and (5) overall social environment.

Table 1 gives examples of questions used to obtain measures of outcome for each condition. The functional ability questions are assessed against a scale indicating whether the patient can perform the task alone, with minimal untrained assistance, with a trained helper, or if he is unable to perform the task. Personal mobility questions are assessed against a scale reflecting restriction in accomplishing the tasks.

By using such questions measures of the level of disability or impairment can be obtained, and if the situation of the individual patient is considered outcome can be determined in relation to the package of care provided. Thus, in the planning perspective the objective would be to identify the facilities or package of care that would provide the "best" outcome in terms of the variables considered.

However, in pursuing objectives to develop the health services process measures are used predominantly. One of the early stages in defining objectives in this context is the preparation of a profile of current resources and of the population under study. Table 2 shows the types of information forming a health district profile (5). It provides basic process information, which in the United Kingdom can be obtained without mounting special studies.

Measures that reflect the physical environment in which people live include population density in terms of persons per hectare, the type of accommodation available, and the population density in the different types of accommodation. Further measures might be the amount of open space or industry in a specified location.

Measures of lifestyle include the proportion of illegitimate births, the number of single homeless adults and the facilities catering for them, and estimated numbers of alcoholics and drug-dependent persons and the facilities providing treatment or care. Tables of the principal causes of deaths may also reveal particular aspects of lifestyle, particularly if compared with national figures; for example, in the St Thomas' Health District the figure for cancer of the lung is higher than the national figure but that for heart disease is lower.

In addition to initially compiling a resource profile it is necessary to examine the functioning of the health services in comparison with the overall service objectives. For a national health service the objective is provision of comprehensive health care that is free to the user at the point of service provision. Hence, the concept of equal access and equal resource distribution is implied.

Access can be determined by the following process measures. First, access to health services at the primary care level depends on the number of general

Table 1. Questions used in obtaining measures of outcome^a

-
1. *Functional ability and capacity for self-care*
 - (a) Can you prepare your own meals,
without help (i.e., can you plan and cook full meals yourself)?
with some help (i.e., you can prepare some things but are unable to cook full meals yourself)?
or are you completely unable to prepare any meals?
 - (b) Can you handle your own money,
without help (i.e., can you write cheques, pay bills, etc.)?
with some help (i.e., you can manage day-to-day buying but need help with managing your cheque book and paying your bills)?
or are you completely unable to handle money?

 2. *Range of personal mobility*
 - (a) Can you walk,
without help (except with the aid of a walking-stick)?
with some help from another person or with the aid of crutches?
or are you completely unable to walk?
 - (b) Can you get in and out of bed,
without any help or aids?
with some help (either from a person or with the aid of some device)?
or are you totally dependent on someone else to lift you?
 - (c) Do you have trouble getting to the toilet on time?
No
Yes
Have a catheter or colostomy.

 3. *Psychological status*
 - (a) How often would you say you worry about things — very often, fairly often, or hardly ever?
 - (b) In general, do you find life exciting, pretty routine, or dull?
 - (c) Is your mental or emotional health now better, about the same, or worse than it was 5 years ago?
 - (d) Do you wake up fresh and rested most mornings?
Yes, no.
 - (e) Is your sleep fitful and disturbed?
Yes, no.
 - (f) Even when you are with people do you feel lonely much of the time?
Yes, no.

 4. *Physical environment*
 - (a) Can you get to places out of walking distance,
without help (can you travel alone on buses, in taxis, or drive your own car)?
with some help (do you need someone to help you or to go with you when travelling)?
or are you unable to travel unless emergency arrangements are made for a specialized vehicle such as an ambulance?
-

^a Adapted from OARS Multidimensional Functional Assessment Questionnaire, Duke University Center for the Study of Aging and Human Development, Durham, NC, USA.

Table 1 (contd)

-
4. *Physical environment (contd)*
- (b) Can you go shopping for groceries or clothes,
without help (taking care of all shopping needs yourself, assuming you
have transport)?
with some help (do you need someone to go with you on all shopping
trips)?
or are you completely unable to do any shopping?
5. *Social environment*
- (a) Are you single, married, widowed, divorced or separated?
(b) Who lives with you?
(c) How many people do you know well enough to visit in their homes?
(d) About how many times did you talk to someone – friends, relatives or others –
on the telephone in the past week?
(e) Do you have someone you can trust and confide in?
(f) Is there someone who would take care of you as long as needed, or for only a
short time, or only someone who would help you now and then?
-

Table 2. Information contained in a district profile in the United Kingdom

| | |
|---|--|
| <i>Population</i> | Age, sex, distribution, density, birth rate, fertility rate, mortality rates, crude death rate, projection by age and sex over 5 years, country of origin, marital status, socio-economic groups, numbers of handicapped, mortality rate by principal causes of death, psychiatric morbidity. |
| <i>Environment</i> | Changes in occupied floor space, relocation of industrial and commercial firms, housing stock and types of dwellings, redeployment areas, general improvement areas. |
| <i>Provision of specialty health services</i> | Proportion of resident population served by specialty health services; proportion of population from outside the resident population served by specialty health services. |
| <i>Resources</i> | Number and types of hospitals, numbers and types of personnel, total financial resources, types of services provided, total number of beds by specialty, location of services in relation to population density, activity of hospital facilities in terms of turnover, length of stay, discharges, and deaths. |
| <i>Indicators of shortfall</i> | Number of people on waiting lists for services, provision of services compared with a stated norm, statement of social indicators of deprivation such as homelessness and single-person households. |

practitioners per head of population. The number of patients registered with a general practitioner varies according to the following classification of list size:

- (1) closed — an average of 1800 patients or less;
- (2) intermediate — an average of 2200–2500 patients;
- (3) designated — an average of 2500–3500 patients.

Hence a measure of access can be obtained by comparing the average number of patients registered with a general practitioner with the number who should be registered according to the classification for that locality.

Length of waiting lists can be used to measure access to hospital services, both for outpatient consultations and for inpatient admission for specified conditions. These lists can be examined in two ways. First, the number of people on a waiting list can be noted for specific periods throughout the year; this figure would then be analysed by condition taking into account any changes in available medical staff. The second approach is to record waiting time by condition for outpatient consultation or inpatient admission. This measure needs to be related to an agreed standard so that access can be assessed.

Another method of assessing access is to examine the place of residence of patients seeking consultation as outpatients or admission as inpatients. One purpose of this analysis is to ascertain whether a proportion of patients who require services come from a wide catchment area; local residents may tend not to seek local services because of the wide catchment area for a particular hospital. St Thomas' Hospital in London, for example, receives about one-third of its inpatients from the immediate locality and two-thirds from elsewhere. As St Thomas' Hospital has facilities to provide services for a population roughly the size of its strictly "local" population it is doubtful that the local population and patients from further afield have equal access.

Distribution of resources can be assessed by the application of norms. Some norms are derived from averaging the total provision of resources throughout the health services; others are somewhat more complex. Within the National Health Service of the United Kingdom norms do not exist for all resources, but Table 3 gives some that are in use. Comparison with these norms is supposed to offer local health services some guidance about the shortfall or over-provision of facilities. The application of norms to assess resource equality reveals variations in the provision of facilities either for particular services or in particular geographical areas.

Table 4 indicates the measures used in establishing bed norms per specialty, which are used for guidance in planning bed provision or in making alterations in bed numbers. The application of bed norms should indicate the extent to which health services in different places are over- or under-provided with beds for any specialty. This idea embodies the notion of "average activity", and hence may be of only limited interest where particular services are highly active. Nevertheless, by applying norms it is possible to illustrate the varying distribution of beds.

Table 3. Some norms used in the National Health Service of the United Kingdom

| | |
|---|--|
| <i>Psychiatric services</i> | |
| Day-hospital places | 65 places per 1000 population |
| Long-term accommodation | 24 places per 1000 population |
| <i>Psychogeriatric services</i> | |
| Assessment places | 10–20 places per 250 000 population |
| Day-hospital places | 25–40 places per 100 000 population |
| <i>Geriatric services</i> | |
| Residential-home places | 25 places per 1000 population |
| Sheltered-housing places | 2.5% of population aged 65 years and over |
| <i>Mental handicap services</i> | |
| Day-centre places (community hospital) | 150 places per 100 000 population (10 places per 100 000 population) |
| Residential places (community hospital) | 60 places per 100 000 population (55 places per 100 000 population) |
| <i>Primary care services</i> | |
| General practitioners (list sizes) | Closed — 1800 patients or less Intermediate — 2200–2500 patients Designated — 2500–3500 patients (list size is dependent on classification of locality) |
| Health visitors | 1 per 3000 population |
| District nurses | 1 per 2500 population |

Table 4. Measures used in assessing bed norms in the United Kingdom

1. The total number of discharges and deaths by each health district is calculated for each specialty by area of residence of the patient and by age.
2. From this it is possible to calculate discharges and deaths for patients living in one health district who received hospital services in another.
3. It is assumed that total discharges are directly related to resident population. For example, if in one place with a population of 50 000 there were 100 discharges and deaths then 1 discharge or death is equivalent to a catchment population of 500.
4. Population outflows from a health district are calculated by subtracting the population equivalents of residents discharged from hospitals outside their district of residence. Population inflows are calculated by adding the population equivalent of deaths and discharges of patients from hospitals outside their district of residence.
5. The formula for assessing the number of beds is: percentage occupancy X 365. This is calculated for each specialty and by age group.
6. The bed formula is then applied to the age-specific catchment population, which has been determined using paragraphs 1–4 above.

ALLOCATION

Resource allocation may be approached in two ways. The first is to use existing resources as a base where allocation is merely a repetition of the previous allocation, with necessary allowances made for cost inflation and any development. Table 5 shows some of the measures used in this approach to allocation.

Table 5. Measures used in resource allocation based on existing resources

-
- (a) Inpatient and outpatient attendances at hospitals, classified by specialty and by new and old attendances over the year before the allocation
 - (b) The number of personnel employed, classified by discipline over the year before the allocation
 - (c) The total number of facilities administered by the health service
 - (d) Facilities likely to be opened within the year of the allocation, including staffing and equipment requirements
 - (e) The amount of building and equipment replacement likely to take place in the allocation year
 - (f) Allowance for inflation
-

The second approach, which is described more fully, was developed in the United Kingdom to achieve a political objective of equal distribution of resources. In this approach financial allocation is based on populations; the current provision of resources is excluded from the formula. The allocation formula proposed for the National Health Service of the United Kingdom is divided into allocation of revenue, described below, allocation of capital, and a supplementary allocation for teaching purposes.

The aim of revenue allocation is to develop a formula that is responsive "objectively, equitably and efficiently to relative need" (6). There are two steps in developing target financial allocations; first, assessment and quantification of "need", and second translation of need into financial targets.

In identifying "need" the base is taken to be the population weighted by certain factors. For nonpsychiatric inpatients the weighting factors are (1) age and sex, (2) the national bed utilization figure for each condition, and (3) the standardized mortality ratio for conditions classified according to the International Classification of Diseases (ICD) (7). There are, however, reservations about the use of factor 2 because a norm suggests that we know what the needs are. In fact, norms are simply values based on experience but rarely on proper experimentation. They are derived from current utilization data, which may or may not be appropriate. Standardized mortality ratios for conditions, such as skin diseases, that are unlikely to lead to death are not used. Table 6 lists the ICD chapter headings of broad groups of conditions used in the resource

Table 6. ICD (7) chapter headings of broad groups of conditions used in the resource formula for the United Kingdom

| | |
|----------|--|
| Group 1 | Infective and parasitic diseases |
| Group 2 | Malignant, benign, lymphatic, haematopoietic and unspecified neoplasms |
| Group 3 | Endocrine, nutritional, and metabolic diseases |
| Group 4 | Diseases of blood-forming organs |
| Group 5 | Mental disorders |
| Group 6 | Diseases of the nervous system, eye, ear, and mastoid process |
| Group 7 | Rheumatic fever, hypertensive, and heart diseases |
| Group 8 | Diseases of the respiratory system |
| Group 9 | Diseases of the digestive system |
| Group 10 | Diseases of the urinary system, male genital disorders, and diseases of the breast and the female genital system |
| Group 11 | Diseases of the musculoskeletal system and connective tissue |
| Group 12 | Congenital abnormalities |
| Group 13 | Certain causes of perinatal morbidity |
| Group 14 | Symptoms and ill-defined conditions |
| Group 15 | Other injuries and reactions, fractures, dislocations, and sprains |

allocation formula. For more details about how the formula was developed, see Part III, Example 10.

For day patients and outpatient services the formula recommends that the population should be weighted to reflect the national pattern of service use by age and sex, adjusted in the case of nonpsychiatric patients by standardized mortality ratios. To reflect "need" for community services the formula recommends weighting the population to reflect the national pattern of use of these services by age, and adjusted by standardized mortality ratios.

For mental illness the measures of "need" are (1) population by age and sex, (2) bed utilization pattern by age and sex, and (3) marital status. "Marital status" has been introduced into the formula because unmarried people place a heavier demand on mental health services. For mental handicap the measures are (1) the regional population by age and sex and (2) the mental handicap bed utilization pattern by age and sex.

The formula has been developed in response to data availability. It is acknowledged that the measures used may inadequately reflect the population's need. However, without research to find more specific measures for "need" the formula cannot be further refined. Some deliberations on the measures to be used in the formula are described in Part III, Example 10.

The significance of the formula in measurement terms is that it largely depends on direct or outcome measures. This compares with the more traditional allocation method based on previously available resources, which relies on indirect or process measures.

MONITORING

Monitoring is the process of comparing events with plans (or objectives) and making the necessary corrections where events have deviated (8). Monitoring is possible in whatever circumstances plans and objectives exist.

The monitoring process has been described by Yates (9) as follows. First, the measurable characteristics in the objective or outcome are determined; then there is comparison of observed performance with the measure of objective or outcome; finally, any discrepancy between the two is reported. Ashford & Riley (1) have described an approach to monitoring based on comparison of the quality of maternity care in different populations: the measure of outcome used was perinatal mortality rate. Table 7 shows the measures used to determine variables within populations.

Table 7. Measures reflecting variables within populations

1. *Descriptive variables*

These include proportion of the population by age group, changes in the structure of the population, and description of households

2. *Conditions relating to the health care system*

These include number of available facilities for services, length of waiting lists, and number of available beds in relation to the local authority population size

3. *Conditions relating to health service practice*

These include bed occupancy of health facilities, number of deaths and discharges, number of births, and average length of stay

Ashford & Riley identified a few conditions that were associated with a large proportion of variation in the outcome of care (i.e., perinatal mortality). While no causal relationship is inferred between perinatal mortality rate and these variables, these authors suggest that this approach to monitoring may help to identify the condition most likely to influence the perinatal mortality rate.

DISCUSSION

Recent interest in the impact of health services on populations has been heightened by the publication of studies showing the effect of certain forms of health intervention on disease and, with the changing economic circumstances of countries, the time is now appropriate for continuing and increasing public debate about the effectiveness of health care and, especially, the use that can be made of health facilities. Health services of various kinds are fast becoming an integral part of all societies; it therefore seems inevitable that countries will seek to expand their services on the basis of "more of the same".

Where health services are poorly developed there are signs that new services are being implemented along the lines of those in more advanced health delivery systems. From the growing body of knowledge about the impact of interventions on diseases it is clear that such trends need careful examination and critical appraisal.

In this context those involved in health planning and management carry particular responsibilities. It would appear that it is no longer sufficient to plan health facilities simply on the basis of what has gone before; wider considerations must now be brought into play. These would particularly include the need to make health services available equitably among populations, including those that are sparsely distributed and geographically isolated. While health services have traditionally grown up as a response to local initiative, where governments now take a major administrative responsibility for funding and organizing the health care delivery system local initiative must be tempered by the considerations of the less self-stimulated local populations where services have not been developed or expanded. This movement towards equitable distribution of services requires, as a first step, a method for equitable allocation of central funds.

The use to which funds are put is of interest to a large majority of people. In countries where the commercial element is eliminated from the methods of funding the health services there is ever-present concern that money allocated for this purpose should be optimally used. With increasing costs, reflected particularly in the cost of running hospitals, the pressure to utilize facilities fully becomes intense. Paradoxically, such pressure may have the effect of increasing overall costs, thus creating a disincentive to optimizing resource use.

In order to prepare for possible escalation of costs criteria should be established against which the performance of the health services can be measured. Although this is no defence against escalating costs, it is a method of gaining general acceptance of the likely expenditure over a given period. It would appear, however, that there are only limited and generally unacceptable courses of action for reducing costs if these are shown to be rising above expected levels.

Though it is an achievement to find a method for allocating funds equitably and to measure the expenditure of those funds against the performance of activities, it is altogether another matter to establish the impact of those

funds on the health of populations, this latter issue being bound to attract much interest and give rise to public debate. Measuring the effect of health resources and procedures on populations is difficult and consequently this has not developed to a level where it is automatically considered in health service planning. Yet in countries where the total financial resources available for health services are limited, static, or decreasing it would seem essential to ask whether the health services provided have a positive impact on the health of the population. In countries with adequate financial resources the question might not be so important, but it should still be asked.

This chapter describes some of the types of information that are available and used in the United Kingdom to develop the resource allocation formula for distributing resources equitably on the basis of population. It also describes some of the information used to measure utilization of health facilities and how utilization is monitored. Finally, it considers some of the complexities surrounding the development of measures that could help answer the question of the impact of health facilities on populations.

On the basis of this short discussion it might be possible to establish priorities for those whose task it is to develop information systems and services. Development of measures of outcome is of the greatest importance in those countries where resources are severely strained, but it may be hoped that countries where there is less demand on the resources will also do the same.

REFERENCES

1. **Ashford, J.R. & Riley, V.C.** An approach to monitoring the quality of health care in measuring for management. In: McLachlan, G., ed. *Quantitative methods in health service management*. London, Oxford University Press (for the Nuffield Provincial Hospitals Trust), 1975.
2. **Levin, P.H.** On decisions and decision making. *Public administration*, **50**: 19 (1972).
3. **Bispham, K. et al.** Planning for health. *The hospital*, March 1971, pp. 1–6.
4. **Kaufert, J.** *Evaluation of alternative models for the provision of intermediate care and rehabilitation services for geriatric patients*. London, St Thomas' Hospital Medical School, Department of Community Medicine, 1975.
5. **St Thomas' Health District.** *District profile*. London, 1977.
6. **Resource Allocation Working Party.** *Sharing resources for health in England*. London, Her Majesty's Stationery Office, 1976.
7. **World Health Organization.** *Manual of the international statistical classification of diseases, injuries, and causes of death*, 1975 revision. Geneva, 1977.
8. **Hicks, H.G.** *The management of organizations. A systems and human resources approach*. New York, McGraw Hill, 1967.
9. **Yates, J.M.** Monitoring in the hospital service. *The hospital and health services review*. September 1973, p. 322.

