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DEFINITION OF SOME COMMONLY USED TERMS IN HEALTH SERVICES RESEARCH

COST-BENEFIT ANALYSIS

"The systematic comparison - in monetary terms - of all the costs and benefits of proposed alternative schemes with a view to determining
(a) which scheme or combination of schemes will contribute most to the achievement of predetermined objectives at a fix investment, or
(b) the magnitude of the benefit that can result from schemes requiring the minimum investment. The resources required per unit of benefit must be determined, account being taken of the fact that costs and benefits accrue with time."

See also cost-effectiveness analysis.

COST-EFFECTIVENESS ANALYSIS

"A procedure used when benefits are difficult to measure or when those that are measurable are not commensurable. It is similar to cost-benefit analysis (q.v.) except that benefit, instead of being expressed in monetary terms, is expressed in terms of result achieved, e.g. number of lives saved or number of days free from disease."

The following distinction between cost-effectiveness analysis and cost-benefit analysis was drawn by the European Conference on National Health Planning in 1974:

"Cost-effectiveness analysis is a powerful method of looking for the least expensive way of reaching a given target. It is concerned with the selection of a strategy, when costs and benefits are known and can be quantified. Cost-benefit analysis, in contrast, is aimed at and helps in the selection of objectives; this implies the making of subjective judgements as to the value of different health goals."

CRITICAL PATH ANALYSIS

A method of preparing the implementation of a project by estimating the time and/or cost for all the activities to be carried out in the project.

It may be helpful to supplement this somewhat compressed definition by quoting a recent British definition:

"An operational research technique used in management. The idea is to examine a project in detail with the objectives of (1) breaking it down into component parts, and (2) examining each part both in isolation and in its relationship to the other parts. By this means it may be seen how the project can be completed in the best possible way in the shortest possible time."

In practice this term is now interchangeable with PERT.

CYBERNETICS

"The study of communications systems in machines and also in the human brain; or the means of controlling an activity or a set of activities to keep them directed towards a particular goal."

DELPHI METHOD

"A method whereby weighting or index factors are assigned to parameters that are not readily quantifiable, on the basis of a consensus or majority opinion of a group of unprejudiced experts."

EFFECTIVENESS/EFFICACY/EFFICIENCY

Much effort has been devoted by WHO committees, working groups, etc., to defining these three terms and distinguishing between them.

Of the three terms, efficacy is the most limited in sense. It was defined as follows in the 14th Report (1971) of the WHO Expert Committee on Health Statistics:

"Efficacy: the benefit or utility to the individual of the services, treatment regimen, drug, preventive or control measure advocated or applied."

The meaning of effectiveness and efficiency, and the difference between them, can be illustrated by comparing three recent pairs of definitions.

14th Report (1971) of WHO Expert Committee on Health Statistics:

"Effectiveness: the effect of the activity and the end-results, outcomes or benefits for the population achieved in relation to the stated objectives."

"Efficiency: the effects or end-results achieved in relation to the effort expended in terms of money, resources and time."

Resolutions of WHO Executive Board, 1973:

"Effectiveness: the ratio between the achievement of the programme activity and the desired level which, during the planning process, the planners had proposed would result from the programme activity."

"Efficiency: the ratio between the result that might be achieved through the expenditure of a specified amount of resources and the result that might be achieved through a minimum of expenditure."

Terminology List prepared by WHO Secretariat for European Conference on National Health Planning, 1974:

"Effectiveness: the degree to which a plan, programme or a project has achieved its purpose within the limits set for reaching its objective."

"Efficiency: the skill with which resources have been used to achieve a given end."

Since these are ordinary English words and not technical terms it is perhaps unnecessary to elaborate their definitions unduly, and for most purposes the last and simplest of these pairs of definitions may be found adequate. The essential difference between the two terms is that effectiveness is related to the results achieved (or planned to be achieved) and efficiency to the cost, in terms of resources, of achieving those results. The latter term approaches the meaning of the technical term cost-effectiveness (q.v.). As noted in a study (1971) in the Public Health Papers series, there is no necessary relationship between the effectiveness and the efficiency of an activity or programme.

See also cost-efficiency, cost-effectiveness analysis.

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EVALUATION

Many definitions of this term have been proposed in WHO literature. The following definition adopted by the WHO Executive Board in 1973 may serve as a summary:

"Evaluation of health services: the systematic and scientific process of determining the extent to which an action or sets of actions were successful in the achievement of predetermined objectives. It involves measurement of adequacy, effectiveness and efficiency of health services. It renders possible the reallocation of priorities and resources on the basis of changing health needs."

Evaluation is to be distinguished from assessment and appraisal.

"Assessment and appraisal are used as more general terms than evaluation, connoting the drawing of conclusions from the examination of a situation or its elements. Evaluation, then, is a particular type of assessment."

The terms evaluational research and evaluative research have given some difficulty. The following definitions were proposed by Dr M.D. Warren for a EURO Symposium in 1967:

Evaluational research: "research work into methods of evaluation. The main concern here is with methodology and not with the evaluation of any particular services or programme."

Evaluative research: "research work carried out as part of the process of evaluation. It is additional to the routine collection of data, but after the completion of an evaluative research project some aspects of the work done may be incorporated as part of the routine surveillance of the programme and thereafter cease to be evaluative research in the true sense of the word."

FEEDBACK

"The flow of information from a later phase of a process to an earlier phase."

An alternative formulation is found in a recent English definition:

"The use of information produced at one stage in a series of operations as input at another stage."

GOAL/OBJECTIVE/TARGET

The meaning of this term must be considered along with the related concepts of goal and target. Some have despaired of achieving agreement on the definition of the three terms and their relationship to one another:

"Objective, goal and target are all defined as a desired end-state sought by a programme or sub-programme. (Since there are widespread differences in the way in which various administrative systems relate these terms to each other - as to which are more general and more specific - this rather gross generalization seems unavoidable.)

The attempt has, however, been made to distinguish the three terms. There appears to be a fair measure of agreement that goal is the most general of the three, target the most specific and objective intermediate between the two. Compare two recent sets of definitions used in WHO documents:

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Goal	Goals
"A specific state towards which actions and resources are directed. Unlike objectives and targets, goals are not constrained by time or existing resources, nor are they necessarily attainable, but are rather an ultimate desired state towards which action and resources are directed."	"Broad definitions of policy, e.g. services will be provided to maintain and improve the health of pre-school age children".
Objective	Objectives
"A measurable and attainable state that is expected to exist at a predetermined place and time, as a result of the application of certain procedures and resources (instruments). It should include a description of the state desired, the extent to which it is desired, when it is expected to be attained, where it is expected to exist, and to whom it refers."	"More precisely defining policies than goals; giving broad management decisions, e.g. the services to be provided for the health of pre-school age children will include health centres accessible to the whole population and will provide immunization programmes against diphtheria, pertussis and tetanus for pre-school children."
Target	Targets
"The desired end-result of certain activities, as distinguished from an objective, which specifies the effect of an activity on a problem. Targets are thus concerned with the factors involved in a problem, whereas objectives are concerned directly with the problem itself. Targets represent the measurable and attainable aims directed towards objectives, which, in turn, are directed towards the ultimate goal."	"Specific indicators for programme achievement on the basis of earlier assessment of the capabilities of the service to carry out the programmes, e.g. health centres will be provided at the rate of one per two thousand population over a period of 3 years; immunization against diphtheria, pertussis and tetanus will have reached 100% of the pre-school age population within 5 years and will be incorporated into the health centre programme."

Similar distinction between goal and target (with no reference to the intermediate term objevtive) was made in the Report on a EURO Symposium in 1967:

Goal: "The intended outcome of a programme; (it) does not necessarily have to be quantifiable or measurable in operational terms."

Target: "A defined end result of specific public health activity to be achieved in a finit period of time. Targets are stated as definite aims or outcomes, which should be quantitatively measurable - they may be long-range, intermediate or short-range."

HEALTH NEEDS/DEMANDS

The relationship between need and demand has been the subject of much discussion in WHO documents. A recent statement is contained in the Official Records of WHO, 1973:

"Health needs may be defined as scientifically (biologically, epidemiologically, etc.) determined deficiencies in health that call for preventive, curative and eventually (where appropriate?) control or eradication measures."

"Health demands are usually measured in terms of the actual utilization of

health services. Consideration must be given to the fact that all felt needs by a population (most usually in curative medicine) cannot be translated into expressed need or demand for various reasons (absence of accessible health services, lack of information, lack of confidence, low income, etc.)."

A more defined classification was proposed by the WHO Expert Committee on Health Statistics in 1971:

"(a) Perceived need: the need for health services experienced by the individual and which he is prepared to acknowledge. Under certain conditions it may exceed the professionally defined need.

"(b) Professionally defined need: the need for health services recognized by a health professional from the point of view of the benefit obtainable from advice, preventive measures, management or specific therapy. Under certain conditions it may exceed the perceived needs.

"(c) Scientifically confirmed need: the need confirmed by objective measures of biological, anthropometric or psychological factors, expert opinion or the passage of time. It is generally considered to correspond to those conditions that can be classified in accordance with the International Classification of Diseases.

"(d) Potential demand: the demand for health services corresponding to whichever is the greater of the perceived and professionally defined needs for each particular condition or for all the conditions affecting a given population.

"(e) Expressed demand: the demand actually made on the health services available to a population. It may be greater than the actual utilization because of the existence of waiting lists, limited resources or differences between patients' perceptions of their needs and professionals' definition of those needs."

HEALTH INFORMATION SYSTEM

The following definition was adopted by the 3rd European Conference on Health Statistics (1971) and the European Conference on National Health Planning (1974):

"A mechanism for the collection, analysis and distribution of health statistical information required to enable health planners to assess priorities, and to assist them in deciding how to meet particular priority needs and finally to enable health administrators to measure their achievements."

A variant of this definition was used by a EURO Conference on Health Information Systems in 1973:

"A mechanism for the collection, processing, analysis and transmission of information required for organizing and operating health services, and also for research and training."

The 1971 Conference on Health Statistics agreed that the basic constituents of a modern health information system were indicators of the state of health of the population; measurements of the utilization of health services; statistics on the resources available; socio-demographic data on the population; environmental data, both on the natural environment and on pollution of various kinds; and means of obtaining information on the outcome of treatment or preventive measures, including information on residual disability.

HEALTH MANPOWER DEVELOPMENT

Health Manpower Development is a process embracing all the basic functions involved in the planning, production and management of health personnel of all categories.

Health Manpower Planning is the process of estimating the number of persons and the kind of knowledge, skills and attitudes they need to achieve predetermined health targets and ultimately health status objectives. Such planning also involves specifying who is going to do what, when, where, how, and with what resources for what population groups or individuals so that the knowledge and skills necessary for adequate performance can be made available according to predetermined policies and time schedules. This planning must be a continuing and not a sporadic process, and it requires continuous monitoring and evaluation.

Health Manpower Production is concerned with all aspects related to the basic and post-basic education and training of the health personnel. Organizationally it is often part of the education system and is not under the health system's sole control.

Health Manpower Management covers all matters relating to the employment, use and motivation of all categories of health personnel, and largely determines the productivity and therefore the coverage of the health services system and its capacity to retain staff.

HEALTH PLANNING

For definitions of planning in general and different types of planning, see planning.

Health planning or national health planning, has been defined as "the orderly process of defining community health problems, identifying unmet needs and surveying the resources to meet them, establishing priority goals that are relaistic and feasible, and projecting administrative action to accomplish the purpose of the proposed programme."

The Report of the WHO Expert Committee in 1970 noted that:

"When fully developed, national health planning is concerned not only with the adequacy, efficacy and efficiency of health services, but also with those factors of ecology and of social and individual behaviour that affect the health of the individual and the community."

The Terminology List prepared for the European Conference on National Health Planning in 1974 distinguished between two types of health planning:

"Planning for health or national health planning: this has been taken to mean planning for the optimal use of all the scarce national resources available for improvement of health (or health status) over a given period, whether those resources lie within the so-called health sector or outside it.

"Planning for health services or planning for the delivery of health care: this implies planning for the most effective means of providing health services or delivering health care over a given period with the predicted limited health resources likely to be available."

The Conference noted that the form which health planning took in different countries - in line with the former (wider) definition or the latter (narrower) one - would depend on the administrative structure and characteristics of each country.

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HEALTH SERVICES RESEARCH

"Health services research can be defined as the use of the scientific method in investigating problems of planning, organization and administration (including management and evaluation) of health services. Its broad purpose is to study and analyse systems for the delivery of health care and other health services, with a view to ascertaining what the optimal organization might be, to indicate where and how improvements may be made, and to support health service planning."

"Health services research is concerned with organizational problems, with the management, planning, logistics and delivery of health care services. The problems of clinical-pathological medicine and biomedical science therefore lie outside its province. The application of the results of research in biomedical science to individual patient care, ethiological studies, pathology, questions of biometrics and human physiology, and laboratory procedure also belong elsewhere, though they all contribute to the body of knowledge and methods that health practice research takes into account and uses. Although health practice research overlaps to some extent with epidemiology and often makes use of the epidemiological method, epidemiology as such is outside its scope."

The Global Advisory Committee on Medical Research at its 18th Session (1976) defined Health Services Research as "Systematic investigation and evaluation of a country's health services in terms of both their interrelationship with all health related factors and such measures as feasibility, need, coverage, effectiveness, utilization, cost and efficiency. Health services research is multidisciplinary in nature and ideally should result in the improvement of the decision-making process and the optimization of the use of resources."

HEALTH SURVEY

"A programme for studying a population or a particular segment of the population, in order to assess its health problems or to detect conditions to which preventive measures may be applied."

"The term 'health survey' has a much wider connotation than 'morbidity survey', the latter being, in fact, only one element in the full range of possible components of a health survey. A general health survey is capable of providing information on one or all of the following broad subjects:

(1) Health status of the population: this includes such subjects as general morbidity, morbidity from one disease or group(s) of diseases, impairments, anthropomorphic measurements and mortality.

(2) Conditions influencing or influenced by health: among the conditions to be considered are socio-economic conditions, nutrition, environmental factors, living habits and genetic factors.

(3) Health services and medical care: subjects included are the need for health services, the availability and utilization of health services, the evaluation of health programmes and the measurement of expenditures in connection with the prevention and/or treatment of illness.

"Morbidity surveys usually comprise only the first two sub-items mentioned under (1) above, although information may be obtained upon some of the other items so as to provide a background to the morbidity information."

LINEAR PROGRAMMING

One of the techniques of operational research (q.v.).

"A form of mathematical programming whereby limited resources are allocated among a set of activities so as to optimize some (given) measures of effectiveness."

"The use of linear (one-dimensional) equations to predict the effect of changing certain factors (variables)."

MODEL

"This usually refers to a representation of an actual situation in miniature. In planning jargon it may mean: (a) a representation of a country situation through an 'average region' which bears characteristics close to those of the whole country; (b) a replica in miniature showing the physical characteristics of a building structure, for example, as used in planning; (c) a mathematical representation of major characters of an economic, health or other situation which can be manipulated to examine consequences of various actions."

Various types of model are classified by Grundy and Reinke in their study of health practice research in the Public Health Papers series, which notes that a model may be figurative or non-figurative; deterministic or stochastic; static or dynamic; descriptive, predictive or prescriptive.

Mathematical model: "A representation of a system or process in mathematical form, equations being used to simulate the behaviour of the system or process represented."

Simulation model: "A simplified mathematical representation of a system through which a number of alternative choices can be run whereby the outcome of the various choices can be demonstrated."

NETWORK ANALYSIS

"A technique whereby objectives are identified, the activities and tasks involved in attaining the objectives are determined, and the interrelationships between tasks, activities and objectives are presented graphically in the form of a network and used as a basis for determining the sequence of activities and tasks and the allocation of resources."

Critical path analysis and PERT (qq.v.) are forms of network analysis.

OPERATIONAL RESEARCH

This term (operational research in British usage, operations research in America) has been variously defined:

A paper prepared for a EURO Symposium on Methods of Evaluating Public Health Programmes (1967) quoted an American definition:

"Operational research has been defined as 'the application of scientific methods, techniques and tools to problems involving the operation of a system so as to provide those in control of the system with optimum solutions to the problems'. Operational research uses mathematical models based on a set of

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equations which reflect different aspects of the working of the system to predict the consequences of alternative policies or allocation of resources and to produce the 'optimum' solution as defined in terms of the objectives to be achieved."

A variant of the definition quoted in this passage was adopted by the WHO Executive Board in 1973:

"The application of scientific methods, by interdisciplinary teams, to problems involving the control of any aspect of an organized system so as to provide solutions."

Two further definitions were considered by a EURO Seminar on Health Operational Research in 1969:

"Operational research is the application of any or all the disciplines of science to the problems of decision-making in organizations or systems."

"Operational research is the application of rational tools of analysis to decision-making."

A recent study in the Public Health Papers series uses the following definition:

"By operations research is meant any formalized quantitative analysis whose purpose is to improve efficiency in a situation where 'efficiency' is clearly defined."

This study notes that the techniques of operational research include network analysis (PERT, critical path analysis), linear programming, computer simulation procedures and applications of queueing theory (qq.v.), as well as statistical analysis, projection and extrapolation methods, budgetary and accountance methods, including in particular cost-effectiveness analysis (q.v.), work study (q.v.) and, perhaps more controversially, applications of decision-tree theory and gaming exercises.

PERT

The Programme Evaluation and Review Technique (PERT) is used to determine whether a plan is logical, whether all necessary activities and tasks have been considered and whether the programme is proceeding as planned. It is a form of network analysis used for the control of time and cost in complex projects. PERT requires a detailed analysis of a programme, the listing of all activities and tasks that must be performed in order to achieve a predetermined overall objective, and their presentation in the form of a network showing sequential relationships between them.

In practice this term is now interchangeable with critical path analysis.

PUBLIC HEALTH FIELD STUDIES

"Research projects conducted in the community, usually outside the hospital, and directed towards objectives of public health importance."

SYSTEM

"A set of inter-related elements brought together to achieve a purpose in the environment in which the system exists."

"A group of elements (persons, organizations, equipment, concepts, etc.) which are related in such a way that they influence each other and the behaviour of the elements as a whole."

"Any recognizable delimited aggregate of dynamic elements that are in some way interconnected and interdependent and that continue to operate together according to certain laws and in such a way as to produce some characteristic total effect. A system, in other words, is something that is concerned with some kind of activity and preserves a kind of integration and unity, and a particular system can be recognized as distinct from other systems to which, however, it may be dynamically related. Systems may be complex; they may be made up of interdependent sub-systems, each of which, though less autonomous than the entire aggregate, is nevertheless fairly distinguishable in operation."

SYSTEMS ANALYSIS

The following definition of this term was used by the WHO Executive Board in 1973:

"The examination of various elements of a system with a view to ascertain whether the proposed solution to a problem or problems will fit into the system and, in turn, effect an overall improvement in the system."

A EURO Conference on Health Information Systems in 1973 used the following definition:

"The analysis of an activity in order to determine precisely what is required of the system, how this can best be accomplished and in what ways the computer can be useful."

A recent study in the Public Health Papers series gives the following definition:

"'Systems analysis' refers to any formal analysis whose purpose is 'to suggest a course of action by systematically examining the objectives, costs, effectiveness and risks of alternative policies or strategies - and designing additional ones if those examined are found wanting. It is an approach to or way of looking at complex problems of choice under uncertainty; it is not yet a method.' The broad purposes of the systems approach are the following:

(1) to formalize complex problems by providing value-free (objective) data and increasing the value-free element in decision-making;

(2) to indicate the probable consequences of alternative courses of action;

(3) to inform debates on values, objectives and the allocation of resources whose purpose is to find ways of improving performance, reducing costs or economizing in the use of manpower or resources;

(4) to compare results achieved with objectives specified;

(5) generally, to assist the decision-making process in planning and management, i.e. in making adjustments to the components, structure, apparatus for information

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and communications, and decision-making procedures of an existing organization, in order to improve its performance."

VALIDITY

"The extent to which a method provides a true assessment of that which it purports to measure."

"An expression of whether a response or measure actually respresents what it purports to; essentially a measurement of 'truth' within the terms of reference."

WORK STUDY

"A method (or methods) whereby the operations of an individual or group are studied systematically in order to find whether efficiency can be improved or production increased."

This is in line with the definition given in the ILO "Introduction to Work Study":

"Work study is a term used to embrace the techniques of method study and work measurement which are employed to measure the best possible use of human and material resources in carrying out a specified activity."

Method study and work measurement are defined as follows:

"Method study is the systematic recording, analysis and critical examination of existing and proposed ways of doing work and the development and application of easier and more effective methods."

"Work measurement is the application of techniques designed to establish the work-content of a specified task by determining the time required for carrying it out at a defined standard of performance by a qualified worker."

Definitions on similar lines have been used in recent WHO and EURO documents.

In British usage the term work study has replaced the older term time and motion study. In American usage the term motion and time study is usual; and motion study is used with the same meaning as method study.

For the distinction between work study and operational research, see the latter term.