

# Health statistics

Report on the Fourth European Conference

Luxembourg  
28-31 August 1979

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# WHO FOURTH EUROPEAN CONFERENCE ON HEALTH STATISTICS

*Luxembourg, 28-31 August 1979*

## 1. INTRODUCTION

The Regional Office for Europe of the World Health Organization, in collaboration with the Government of the Grand Duchy of Luxembourg, convened the Fourth European Conference on Health Statistics in Luxembourg from 28 to 31 August 1979.

Previous conferences on health statistics have been held in Copenhagen (1962), Budapest (1965) and Turin (1971). At the last conference the main topics discussed included the development of national health information systems and health statistical services, the use of measurements of morbidity in health services and the assessment of priorities in the control of diseases and disability. Since that time numerous activities have been developed in the field of health information at both the national and the international level. Health and health-related statistics have become more frequently and more widely used in the programming and management of health services. New approaches to health planning have been developed, linking the solution of health problems with overall socioeconomic development.

However, these developments have not always been accompanied and adequately supported by corresponding developments in health information. The following criticisms are often made: there is no master plan for health statistics; development of research in health statistics is incomplete and is frequently uncoordinated with routine data collection; considerable effort is devoted to collecting data, while little is given to analysis; user requirements are inadequately specified; the quality and accuracy of the data are not always established; attention is focused on information on institutional care, often to the exclusion of primary care; better information on the health status of the population, not in terms of the user but in terms of need, is urgently called for; adequate and feasible measurements for evaluating health care are lacking.

Certainly, even if it endeavours to meet as many of the above-mentioned needs as possible, the science of health statistics cannot hope to satisfy all the requirements at all times. It was intended, therefore, to use the Fourth

European Conference on Health Statistics as a forum for discussion of the most urgent and important topics faced by health information systems and services in the light of the support needed for the programming and management of health services.

There were 42 participants, representing 17 Member States, 3 intergovernmental organizations, WHO headquarters and the Regional Office (for list of participants see Annex III). The Conference was opened by Dr A.A. Weber, Director of Health Information, on behalf of Dr Leo A. Kaprio, Director of the WHO Regional Office for Europe. Dr E. Duhr, Director of Health, welcomed the participants on behalf of the Government of Luxembourg. Dr R. Beckers was elected Chairman of the Conference, Dr F. Hatton, Dr J. Otto and Dr P. Petkov serving as Vice-Chairmen. Dr A. Barr acted as Rapporteur.

The agenda items are reflected in the section and subsection headings of this report. One main topic was considered on each full working day. A plenary session was held each morning, followed by group discussions in the afternoon. Except on the opening day, the plenary session received from each group a report on the previous afternoon's discussions. The final session considered and approved the conclusions and recommendations of the Conference (see sections 5 and 6 below).

## **2. NEED AND DEMAND FOR AND UTILIZATION OF HEALTH SERVICES**

While the concepts of need and demand are useful and essential, the practical task of constructing a valid, objective and reliable yardstick for measurement is immensely difficult. So far, no generally accepted definition of need exists. Demand tends to be equated with the volume and range of treatment undertaken, irrespective of whether the care is beneficial or otherwise or whether more urgent needs have been ignored. Given our present state of knowledge, the most useful strategy would appear to be the development of different approaches as represented by health interview surveys, assessment of patients' need for primary and hospital care, and indices of health status.

### **2.1 Health interview surveys**

Health interview surveys are conducted in many Member States of the European Region, but the objectives and definitions as well as the methods of data collection and processing differ between countries. The advantages of interview studies may be summarized as follows:

- (a) population-based data of this nature permit comparison with the selected data, derived from institutions, which refer to selected parts of the population only;
- (b) they provide a measure of the seriousness of illness (for example, incapacity) and its socioeconomic consequences;
- (c) they indicate social differences with regard to health status and the use of health services; and
- (d) they make possible the collection of data about the consumers' perception of and satisfaction with health services, and about the acceptability and accessibility of these services.

The disadvantages of health interview surveys include the following:

- (a) they have limited value for making specific morbidity estimates since they can only provide subjective information about symptoms that is based on the patient's knowledge of disease; and
- (b) the restricted knowledge of the interviewer with regard to diagnosis and treatment makes it difficult to verify the respondent's answers.

In view of the above considerations, the Conference felt that the inclusion of questions about health in general household surveys of the multi-purpose type should be restricted to general questions which permit comparisons with other social censuses. Further, these questions should be aimed primarily at defining health strategies and health status and their consequences in terms of the consumption of health services. Health interview surveys are a suitable tool for specific problems, but they cannot be taken in isolation from the range of routine statistics; they are part of the general armamentarium of the information system. There is an inherent danger in data banks which expand without limit. Each item of information must be carefully assessed before being requested and all data, whether routine or *ad hoc*, must be reviewed critically at regular intervals, in order to ensure that the most appropriate use is made of the resources available for health and that the information available is relevant.

## 2.2 Matching needs with resources

Operational studies, such as a critical examination of bed utilization, are invaluable to health administrators and planners and these need to be extended to other aspects of the service so as to show the effects of a change in one particular type of service on the functions of other services. For this to

be effective, it is necessary to establish a close link between the administrator and the planner on the one hand and the research worker and the data analyst on the other. Unless there is close liaison between those directly concerned, the data collected will be meaningless or misleading and the outcome disappointing. Real progress can be made only when the administrator becomes familiar with the scientific jargon and the scientist becomes involved in the practical problems which face administration. Those concerned with action must not resort to intangible statements as a camouflage for personal bias; similarly, the data analyst must provide and explain methods which are appropriate to a solution of the problem under review.

It is generally recognized that some patients are misplaced in the health care system. This is not necessarily the fault of a weak or indifferent administration; more often than not it reflects an imbalance in the resources available — for instance, there may be too many acute beds or too few convalescent and long-stay beds. The extent of this imbalance, as judged by professional opinion, varies from country to country and from one area to another within a country.

Some recent studies in Northern Ireland indicate that in nonpsychiatric hospitals one third of the patients required the facilities of an acute hospital, almost one half of the patients could be cared for in a community hospital providing nursing care, and nearly one fifth could be cared for at home if domestic and domiciliary services were available. These proportions were observed when the criteria for classifying patients' needs were lenient. Stricter criteria would have moved more patients from the acute hospital to the less acute areas; this underlines the inevitably subjective nature of the analysis.

A patient's discharge from hospital is a value depending on professional experience and public expectation. Over the past two decades, a general decrease in the length of stay of hospital patients has been noticeable in most European countries, but the rate of decline is slowing down in some areas, as indeed it will in all countries eventually. The fact that the average length of stay has declined so consistently points to possibilities of further savings or, more realistically, to a wider use of the available resources.

### **2.3 Primary care**

The International Conference on Primary Health Care, held in Alma-Ata, USSR, in 1978, stressed the urgent need for national action and commitment to develop and implement primary health care throughout the world, and particularly in developing countries. Primary health care addresses the main health problems of the community, providing promotive, preventive, curative and rehabilitative services. Accordingly, the Alma-Ata Conference agreed that the translation of the principles of primary care into action would require the priority allocation of budgetary resources to primary health care, better distribution and use of existing resources and the improvement of managerial

processes and capabilities at all levels for planning, implementing, budgeting, monitoring, supervising and evaluating, supported by a relevant information system. The fact that so little attention has been paid to primary health care generally, as compared with institutional care, is a matter of some concern.

The Alma-Ata Conference, like the Fourth European Conference on Health Statistics, saw considerable advantages in countries sharing and exchanging information, expertise and experience in the development of primary care as part of the general technical cooperation between countries. In this regard, international organizations have an important part to play in encouraging and supporting national strategies. There is still considerable difficulty in measuring health. When mass screenings have taken place with this goal in mind, opinions have differed as to whether a person should be classified as sick or healthy. While it is possible to compare diagnostic conditions, this is only a small part of the total spectrum. There is a need to consider the treatment provided in relation to the type of health care facility used and the short-term and long-term outcomes. It is here that international agreements would be invaluable.

#### **2.4 Health status and its indicators**

Although indicators of health status are not new, there is still some confusion over terminology. For instance, what is to be understood by "health indicator" as compared with "health index"? Are these terms synonymous? The Conference considered the health index to be, generally speaking, an amalgamation of health indicators. There was a general consensus among the participants concerning the desirability of three types of indicator:

- (a) indicators of health status which need to be developed gradually from a general measure towards more specific concerns, for example, disability indices;
- (b) output-oriented indicators of the use of health services; and
- (c) indicators of the available health resources, expressed in monetary and nonmonetary terms.

When taken together, these indicators are useful for recording the state and progress of a nation's health and for the formulation of health service policy. Valid indicators are only useful in the context of a permanent and comprehensive health information system, of which health statistics form an indispensable element. Internationally agreed standardization of all three types of indicator, involving unification of concepts, definitions, operational classifications and statistical presentations, is highly desirable.

As a means to this end it may be useful to form national steering groups made up of experts from different disciplines. Inevitably, much of the information has political overtones, so it is essential for politicians to indicate what they require. At the same time, the status of the statistician should be high within the national hierarchy, not only to ensure accurate and comprehensive interpretation of the data, but also to enable him to participate in the debate on the most appropriate measurements.

### 3. RESOURCE ALLOCATION IN HEALTH CARE

Understandably, more interest is now being taken in health care expenditure because of the rising cost of providing services, coupled with the current worldwide recession. The halcyon days of the 1960s, when expansion was the rule rather than the exception, may not be encountered again for some time. That being so, the need to obtain value for money will become an increasingly critical factor. National health accounting, costing care modules, manpower planning and econometric modelling are some of the means by which current and future costs of the service can be explored and understood.

#### 3.1 National health accounts

In Europe, only a minority of Member States possess health accounts or are in the process of developing a system of health accounts, but in many countries in-depth studies on particular subjects are made on an *ad hoc* basis. Where health services operate on a fee-for-service basis, potentially valuable data are available, though unfortunately in some instances they appear to be incomplete or unreliable. Health accounts are being recognized as an important means of allocating national resources among competing services and of setting priorities; in this connexion, there is a need for coordination between the "spending" departments. Each department uses its resources of men, machines, material and money to produce an output of services or goods.

Overlapping can and does occur between the different economic activities and the various departments or functions; for example, education contributes to health by training doctors and by the provision of health and dental clinics in schools, industry contributes to education by sponsoring training schemes, and so on. The total amount spent on any one function is the aggregate of the contributions from the various sources.

While such a system gives rise to a number of difficulties, such as double counting, intermediate delivery and boundary problems, it is essential for

governments to obtain a realistic and accurate assessment of, say, health expenditure, both in the narrow field of direct cost and in the broader sense, i.e., including the cost of education, prevention, research, social services and so on. The insight gained from this analysis should form the basis for the allocation of funds to the different functions. In addition, each specific department may require further analysis on the basis of activity. For instance, the field of health care may be specified in terms of the facilities used for different types of service. An interesting approach to the development of national health accounts, based on experience gained in the Netherlands, is described in Annex I.

### 3.2 Costing care modules

National accounts, however, have little relevance at local levels. There is a need to extend the costing system to show the effectiveness of health care expenditure, and this is of primary concern at local levels. There are good grounds for believing that the clinician is interested in costs, therefore succinct costing information may change his attitudes and practices. It is pertinent that costing should be associated with modules of care to which a clinician can relate his activity, rather than be simply a presentation of gross expenditure in terms of beds or bed-days. A reasonable estimate of a health care module can often be obtained from relatively few diagnostic categories, and by considering specific groups it is possible to examine the costs across the whole range of primary and hospital services. This micro-level financial information should exist within the health statistical services since it is integral to the value-judgements made by administrators and clinicians.

While care modules provide insight into the performance of local services, a more general approach at national or regional level is necessary to take account of the interaction between the different components of the service and the influences of uncontrollable factors arising outside the health care system. This is the role of econometric analysis. A model is essentially a simplification of the real-life situation. The model must be designed to represent all the relevant mechanisms, while eliminating those that are irrelevant. Though model-building uses a logical, objective method, it remains an art and not a science. Unless the model reflects the problem faced by the planner and the administrator, it will be little more than an academic exercise. For this reason, an effective model must combine the experience of the planner with the scientific knowledge of the research worker. The availability of sophisticated computers has greatly increased the scope of econometric models for allocating resources in health services, and the use of such models will become much more prominent in the analysis as statistical systems become more comprehensive. A few practical examples of the costing of health care models are presented in Annex II.

### 3.3 Manpower planning data base

Manpower is fundamental to a viable health service. An insufficient number of doctors, nurses or technicians limits the scope and development of treatment and care, while an excessive number of staff in these categories results in a waste of valuable human resources. Of the various categories of health service personnel, the medical staff require the longest education and training period, lasting for seven or more years from the time of entering a university. This may be contrasted with a period of two or three years for a nurse. The long training time for a doctor means that changes in the number of doctors within a country cannot be made rapidly and, for that reason, future estimates of the number required are important. The general basis for medical staffing is the number, distribution and age structure of the population, the extent of the medical care need which can be met from national and private resources, and the medical care organization. With this information manpower estimates can be calculated. In the USSR, for example, the estimated number of doctors needed for ambulatory care is defined as:

$$D = \frac{NP}{F}$$

where: D is the number of doctors,  
N is the need for ambulatory care expressed as a norm,  
P is the catchment population, and  
F is the annual productivity of one doctor.

The productivity of a doctor is the number of patients seen per unit of time. The advantage of normative planning is that there is no need to carry out complex calculations each year. The results are applied to a particular period, which creates stability. Corrections can be built into the long-term plans so that norms can be revised in the light of experience.

Apart from estimating long-term manpower requirements, there are other more immediate problems associated with the allocation of skilled personnel. One of the most important of these, which exists in many countries at the present time, is the uneven distribution of doctors in relation to the population. Often doctors are unwilling to work in rural or remote areas where the need for medical care is greatest. Financial incentives provide only a partial answer. Another possibility is for student doctors to undertake the work in these less attractive areas as part of their educational programme. At the other extreme, some European countries are experiencing a surplus of doctors. It would be a convenient solution if the additional doctors could meet the needs of the less fortunate regions, but problems of language and culture prevent this goal from being achieved.

### 3.4 Econometric models

The health system, like economic and physical systems in general, cannot be represented exhaustively. In order to analyse its operation one can only construct models which describe it in an approximate fashion.

The quality of the model may be determined by its descriptive ability, its possibilities for use in management and the assistance it gives to planners responsible for taking measures to ensure that in the future the health system will increasingly respond to expectations, namely to raise the health level of the population at the least cost and with the minimum of social tension.

Simplification of an excessively complex reality may be carried out at various levels, corresponding to models of the micro-economic or macro-economic type, according to the information available and the envisaged use. Micro-economic models are concerned with the individual behaviour of agents, consumers or production units; macro-economic models take into account aggregated variables representing averages. All the intermediate situations are, of course, possible.

The construction of models depends on the selection of a number of variables and on determination of the functions characterizing the relations between those variables. The variables selected should thus be chosen both for their economic significance and by virtue of the statistical possibilities for measurement.

The relations of the model may be of various types. They range from the strict functional relation, which sometimes corresponds only to a definition, to the relation whose parameters are calculated according to more or less sophisticated statistical methods. Where resource allocation is concerned, they may be classified schematically as follows:

- relations of definition: for introducing various measures (volumes, prices, duration of activities, etc.);
- relations of aggregation (production factors, consumption);
- relations of compatibility and substitutions (with the general economic and demographic context, between subsectors of the health care system);
- relations of organization, specifying the technical and economic conditions for the production of care services.

The choice of the type and number of relations and of their form has to be decided on the basis of the possibilities offered by the statistics. Generally speaking, the complexity of the models will increase as the precision and amount of information available increase.

There is thus an interaction between “statistical information” and “models”. The model should be capable of improvement in proportion to the development of the statistical information; it also points out the needs

for new information. Statistical information leads to evaluations of the model, and makes it possible to assess its ability to represent past reality and to make prognoses for the future.

The dialogue with the planners should lead to a more systematic integration in the models of variables whose development may depend on "options"; models would thus make it possible to test the effect on health services development of certain decisions (manpower limitation, development of external consultation) before they are actually applied.

#### **4. CHALLENGES FACING HEALTH INFORMATION SYSTEMS**

Health information systems face enormous challenges from every part of society. Information is wanted increasingly for policy making, planning services, distributing resources, evaluating treatments and predicting future requirements. Many present-day statistical services are collecting information that was necessary yesterday, but much of which is outdated today and will be irrelevant tomorrow. It is essential that information systems should be sensitive, cohesive and flexible enough to take account of new problems.

##### **4.1 Master plan**

Many countries have master plans which contain substantive programmes but often linkage of data is impossible and key analyses cannot be made. These problems of coordination call for national committees, whose terms of reference might include:

- (a) definition of medium-term and long-term objectives of a master plan;
- (b) formulation of a strategy for attaining these objectives;
- (c) securing the means in terms of personnel, resources and external services.

Planning of this kind is useful in giving direction and purpose to information services. More often, however, national statistical systems evolve piecemeal, with local administrators obtaining the information required by the central authority. Often this "from the top downwards" approach proves unsatisfactory because the information results in little or no action. In considering any information system it is essential to ask three questions: For what is the information required? Will it be used? Is it worth the cost of collecting it?

The greatest benefit is likely to be obtained from an information system when the data are related to local problems with diminishing amounts passing to the central government. This "from the bottom upwards" approach ensures that only economically useful information will be obtained.

The question whether health statistics and information should be regarded as a branch of general statistics or as part of health management cannot be answered unequivocally. Since health statistics are primarily used as an aid to decision making, the latter arrangement seems to have merit, though it would clearly be advantageous if a master plan for a health information system, if developed, fitted within the overall general statistical framework of a country.

#### 4.2 *Ad hoc* and current data

The collection of routine statistics, which are the lifeblood of a health information system, is by its very nature likely to be a static process. Once established, it tends to continue unnoticed. While standardization is necessary for comparisons, it is imperative that all statistical systems should be kept under constant review and those which no longer fulfil their original purpose should be eliminated.

Each statistical form should be subjected to a critical appraisal every five years or so. If this critical appraisal is not applied, the information system will develop a mass of tangled undergrowth which is not only expensive to maintain but also inhibits the real purpose of the system.

Of course, the information system is not limited to gathering routine statistics; *ad hoc* studies form an important component. It is sometimes difficult to distinguish between the routine and *ad hoc* approaches and there seems to be no particular advantage in doing so. A more realistic categorization might be that shown in Table 1.

#### 4.3 Evaluation

Both routine and *ad hoc* surveys are required in the evaluation of health care. Evaluation has been defined as "the process of assessing the achievement of the stated objectives of a programme, its adequacy, its efficiency, and its acceptance by all parties involved".<sup>a</sup> Evaluation is an essential element in any field of human activity. It requires the systematic measurement of achievement as compared with previously established objectives, goals, targets or performance, and the better these have been defined, the easier evaluation becomes.

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<sup>a</sup> *Methods of evaluating public health programmes*: report on a Symposium. Copenhagen, WHO Regional Office for Europe, 1968, p. 34.

Table 1. Categorization of data by frequency of collection and reporting

Data	Report	Content
current	routine	data collected and reports produced routinely (for example, mortality statistics)
current	<i>ad hoc</i>	data collected routinely and reports published intermittently (for example, national cancer survey)
<i>ad hoc</i>	<i>ad hoc</i>	data collected for special purpose requiring special procedures (for example, patients' satisfaction with hospital treatment and care)

Health is a complex entity. The aims and priorities of a health service are not easy to define. Moreover, it is affected by many external factors such as social conditions, public expenditure and financial liquidity. The European Conference on National Health Planning pointed out that "one key to evaluation is money, not only for carrying out the evaluation itself, but also as an indicator of success or failure".<sup>a</sup>

Sometimes bad or ineffective care can be recognized by simple observation: unnecessary hospital admissions, inappropriate medicines, treatment in the wrong type of institution, poor patient scheduling, and superfluous diagnostic tests are but a few examples. Studies that have been made on national health expenditure do not show any clear positive association between an improvement in health and increases in investment.

The overall conclusion from a number of studies is that health service factors are relatively unimportant in explaining differences in mortality. As a corollary, it could be argued that there is probably a considerable element of inefficiency in the way some developed countries allocate their resources.

International comparisons are important, but they are only practical when there is a common agreement on definitions and practices. At the present time such studies are limited to a few diagnoses, e.g. of cancer. WHO, in cooperation with other international agencies, is acting as a catalyst in

<sup>a</sup> *European Conference on National Health Planning*: report. Copenhagen, WHO Regional Office for Europe, 1974, p. 24.

promoting greater international comparability of methods and practices. Meanwhile, national and local studies of the cost and effectiveness of health care policies are essential.

In the long term, perhaps the most effective and fruitful approach is the local randomized control trial which sets out to assess the benefits and costs of specific treatments. Various examples of this method are available. These *ad hoc* studies require a multidisciplinary approach, otherwise they will be unevenly balanced and will not present the comprehensive analysis that is required for sound decision making.

#### 4.4 Presentation of statistics and feedback

Lastly, health service information systems face the major task of making statistics attractive and understandable to clinicians, planners and decision makers. At present, it is customary to spend 10% of the budget and time on data acquisition, 70% on collecting and processing it, 15% on statistical analysis and the remaining 5% on presentation. It is also usual to consider the presentation of statistics as the last step and, consequently, of lower priority. While the demand for information is increasing, there is no evidence that all the information collected, tabulated and made available is really used.

Keeping in mind the cost-effectiveness of statistical support, the purpose of statistical presentation should be to meet the needs for information which will afterwards be used, e.g., for taking a decision, influencing it, facilitating it, and supporting it. With regard to the presentation of health statistics, decisions to be taken on the basis of these relate primarily to the health system, health services and health programmes.

Two main groups of decision maker may be identified: (1) populations and their representatives, and (2) those responsible for health service management. For a health politician, health planner or health manager, statistics are an indispensable tool for formulating health policies, setting priorities, allocating resources and managing or evaluating services. Populations should be provided with statistical information which will enable them to base their demands for health services on justifiable grounds, as well as to guide them in taking decisions regarding health and lifestyles. The kinds of statistics provided to the two groups and the ways in which those statistics are communicated to them will, of necessity, vary considerably.

There is no universal method of presenting statistics in the best way. Specific requirements, specific objective orientation of the data presented, the differing backgrounds and fields of competence of the consumers who are to be provided with statistics, and the different areas of decision making which statistical information is intended to support -- all these factors call for a specific approach in the presentation of data. A specific approach may thus be regarded as one of the guiding principles in the presentation of statistics.

The practical application of statistics is another basic principle to be borne in mind. A message transmitted by means of statistical data should be clear enough to facilitate a decision on the part of the user and enable him to judge what action, if any, should be undertaken. A statistical table without an explanation or a complicated graphical presentation is without significance to many users of statistics. A statistical table is where the duty of presenting data begins, and is not an end in itself. Brevity and clarity of presentation are more likely to convey the required message to the user than a long list of data presented in the form of measures which a person not expert in statistics cannot understand.

Timing is another guiding factor in the presentation of data. A less elaborate presentation of data, delivered on time, is more useful than sophisticated data provided late. The time factor should also be taken into account when deciding about data collection and processing techniques. The requirement to provide statistics at regular intervals is again something which clearly affects the manner of their presentation.

A statistical presentation, including feedback to various categories of user, should be planned and incorporated in any statistical programme. When the assessment of statistical needs begins, the form of presentation of statistics and feedback should also be decided upon. The needs for information dictate the contents of data presentation, the level of precision of the statistics, coverage, etc.

Adequate feedback, provided promptly and at regular intervals, constitutes an important channel of communication between the statistician, the user of the statistics and the producer of basic data. Feedback stimulates interest in collaboration and in improving the quality of data, and also contributes to greater participation in the development of health statistics. Feedback, especially when organized on a regular basis and providing selective information, encourages the use of statistics in decision making and, in fact, justifies the need for statistics and statisticians.

## 5. CONCLUSIONS

(1) In most of the countries represented at the Conference, the expansion of health services, which was rapid in the 1960s and early 1970s, is subject to growing financial restraints and may not continue at the same rate. Increased efficiency and the rational allocation of resources are therefore major concerns everywhere.

(2) The need for routine statistics will continue. Data collection should be developed further, and complemented by *ad hoc* in-depth studies, including

health interview surveys. Sometimes decision makers accuse statisticians of supplying useless or irrelevant information. On the other hand, statisticians complain that they cannot discover what decision makers want from data. The outcome is that information collected is frequently not used. Close cooperation between those involved within a flexible system would resolve many of the difficulties. The reliability of data and their eventual use depend on the analysts' understanding of the problems of the providers of information, just as it is necessary for the providers to be familiar with the analytical techniques. In this respect there is a need for an extensive education programme for all levels of staff, particularly medical staff.

(3) Member States are increasingly concerned about the development and evaluation of local and national policies which, to a large extent, determine the form of the health statistical systems. Despite major differences in the structure of health services between countries and variations in the definitions and terminology used, international comparisons of data should be attempted, in order to evaluate alternative systems of health care. Exchange of information at national levels should be promoted.

(4) Mortality statistics and hospital-based statistics are generally more widely available than other health information, although they may be insufficient and require expansion. A considerable effort needs to be made in developing information on primary care. In addition, useful data are available in the sickness benefit and social insurance schemes of many countries, and greater use should be made of them.

(5) To facilitate decision making, it is necessary to develop a series of health indicators in both monetary and nonmonetary terms to serve as yardsticks of performance and outcome. Indicators of health status and the use of health services are also required. Such indicators are, however, only applicable within a permanent and comprehensive system of health information, including health statistics. Wherever possible, the indicators should be standardized by international agreement. This would involve the harmonization of definitions, operational classifications and modes of statistical presentation.

(6) To improve cost-effectiveness and resource allocation, new quantitative approaches to the measurement of input, process and outcome of health services should be developed. There is also a need to construct models specific to health services, which take into account their association with related sectors or with the entire socioeconomic system. Cost-benefit or cost-effectiveness studies should be made of medical procedures, treatment patterns and prescriptions, to determine the optimal modes of delivery of health care. Randomized trials should be made for this purpose, taking into

account comprehensive social costs. In this way it may be possible to construct health care models for the provision of acceptable treatment at reasonable cost.

(7) The development of models presupposes the existence of relevant data which will, however, vary in scope and content, depending on the type of health care system. In fee-for-service systems, detailed costs can often be determined, but they are less specific if the service is free at the point of delivery. Most countries recognize the need for accurate costing, but little is done in the way of collection or standardization of the necessary data. Attempts are being made in some countries to make good this deficiency. Since data on costs are often less developed than those on patients, it would seem opportune to design forms of national health accounts which Member States could incorporate in their general accounting systems. These national accounts would be of value for health planning in the country and for wider comparisons.

(8) Health statistical systems must be developed in accordance with a master or strategic plan, containing medium-term and long-term objectives and operational goals and specifying the manpower and other resources necessary for their attainment. Experience seems to indicate that the best approach is first to determine what data are required at the primary level, so that they may then be summarized for use at the secondary and higher levels. In this way there would be a greater chance of the information being used, while the frustration existing at present among some data providers and data analysts could be significantly reduced. Ultimately, health care management calls for action, which in turn requires decisions, and these must be backed by sound information if conflict is to be avoided.

## 6. RECOMMENDATIONS

(1) WHO should undertake a study of current information systems in the light of their objectives; this could then be considered by Member States with a view to developing a common basis for international comparison of data. There is also a need for continued review of the existing health statistical systems within the context of the general information services of the Member States, with the aim of identifying and eventually eliminating redundant and ineffective procedures and adopting those systems which practical experience has shown to be effective for health management and planning and the evaluation of health care.

(2) While continuing to support the development of mortality statistics, WHO, in cooperation with other international and regional agencies, should expedite the development of new criteria for the utilization of different types and levels of care, the construction of health indicators and the adoption of costing modules.

To promote international comparability of data, WHO should develop standard classifications, definitions and nomenclatures for health information systems and encourage Member States to adopt them. The *International classification of diseases* shows what can be achieved in this field. WHO has also issued a provisional *International classification of procedures in medicine*, and it is recommended that it be used on a trial basis to enable the publication of a definitive version based on the comments of users. Similar classifications are desirable for health personnel, medical establishments, etc. The advantages of the international acceptance and use of such classifications are evident.

(3) WHO should develop guidelines on the formulation of master or strategic plans for the development of health information as a matter of urgency. Such guidelines should be acceptable to Member States and take into account the need for international comparison of data.

(4) WHO should study the feasibility of setting up a health information research and development unit for the European Region, which would (a) act as a clearing-house for ideas and experience relating to health information; (b) conduct research on selected aspects of health information; and (c) advise on the development of information systems.

(5) WHO should take an increasing interest in the costs of health care and, for this purpose, could promote the development of national health accounting systems.

(6) WHO should continue to provide a framework for the international exchange of information and experience among health statisticians, epidemiologists and other scientific workers and between those professionals and clinicians, planners, administrators and decision makers.

(7) In view of the accelerating change in social and economic conditions, WHO should consider holding technical meetings and multidisciplinary conferences on health information topics more frequently than in the past.

(8) There is a tendency in many countries for statisticians in health information systems to be concerned with the input of information for processing, to the detriment of analysis of results and their presentation

in a form that can be understood and applied by users and that allows feedback to data producers and, ultimately, the general public. WHO should give a lead in this field by providing guidelines on the preparation of model reports.

## Annex I

### NATIONAL HEALTH ACCOUNTS

*Dr J.T.P. Bonte<sup>a</sup> & Dr W.G. Oosterhoff<sup>b</sup>*

#### 1. Introduction

In a system of national accounts, economic activities form the basis of the classifications used. In this system it is possible to identify the production of institutions providing health care. However, the total consumption for all aspects of health and health care cannot be derived completely from this production-oriented system. For more efficient health management and planning there is also an urgent need for more problem-oriented financial data such as financial data by target groups of the population, disease-oriented data and data relating to specific health care programmes.

In this paper a basic framework is presented for the development of a problem-oriented system of health accounts, taking into consideration the requirements of a system of national accounts. It can thus be regarded as a general outline of some basic principles and guidelines for an "ideal system" which can be developed gradually.

#### 2. Health accounts and national accounts

In the standard national accounting system the relations between creation, distribution and expenditure of income are expressed in monetary units. The starting-point is the combination of production factors leading to a national product, of which consumption expenditure is a result. In functional or purpose accounts — of which health accounts are only one example — the starting-point is final consumption expenditure, apart from the sector by which this expenditure is incurred (e.g. government, private, nonprofit institutions).

Consumption expenditure may be subdivided by function into expenditure on health, education, social welfare, recreation, etc. No agreement about such a purpose classification, either at international or at national level has

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been achieved so far. For a comparison of production data and consumption data (the functional approach) a one-to-one relationship between the classifications used is not a necessary condition. Normally a purpose classification is the basis for the delimitation of the various fields of data collection, processing and analysis.

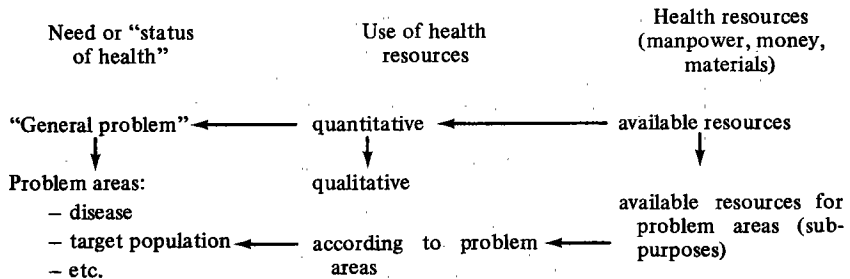
A general purpose classification might correspond approximately to the macro-sectors of social life, which in a system of social indicators are also referred to as "concerns". In fact, they reflect aspects of the "quality of life" or, in other words, describe the qualitative aspects of a population.

For each purpose a particular system of services and resources is established. Thus each country has its proper health care system, being a systematic structure of physical and financial resources (operationally defined in section 4).

However, the general purpose "Health" can be further subdivided on the basis of specific questions posed by particular groups of diseases (e.g. cardiovascular diseases, cancer, traffic accidents), target groups of population (e.g. mothers and children, adolescents, elderly people, the physically handicapped) or multipurpose classifications (e.g. traffic accidents in young age groups). Hence, for an optimal allocation of means it is desirable to split up data according to these specific questions or "subpurposes". In section 4 more will be said about the classification of subpurposes of health.

### 3. A system of health accounts as part of a comprehensive system of health statistics

The overall framework for a comprehensive system of health statistics can be schematized as follows:



The "problem" is attacked by using particular facilities of the health care system. Generally, the existing statistics on health resources focus, on the one hand, on the available resources (in terms of manpower, money and materials) and, on the other hand, on the use of the available resources and facilities in quantitative terms (number of visits, admissions, etc.). However,

a problem-oriented approach requires a specification of the use according to the identified problem areas (e.g. population groups, diseases). Consequently, the statistics on available resources have to be rearranged according to the same identified problem areas.

This approach leads to the following distinctions in health resources statistics.

(1) Statistics on available resources

(a) Physical means or facilities (type and number of services and their characteristics)

(b) Value of and investments in physical resources (monetary data — this can also involve allocated budgets)

(c) Available manpower

(2) Statistics on the use of resources in quantitative terms

(a) Use of physical means or facilities (e.g., occupation rate, number of patients served)

(b) Cost and financing of the health care system

(c) Active manpower

(3) Statistics on the use of resources in qualitative terms

(a) Use of physical means by type of diagnosis or target group, etc.

(b) Cost and financing of the treatment for certain diagnoses or target groups

(c) Time spent by medical and other personnel in treating patients, in relation to certain diagnoses or target groups

It is important to realize that statistics on the use of available resources in quantitative terms (item 2) have a limited value. First, data have to be specified according to qualitative aspects in terms of “subpurpose” (diagnosis, type of treatment, socioeconomic characteristics of the patient, etc.). These qualitative aspects equal the “subpurpose classification”, and consequently data about services rendered in qualitative terms are an essential element in a comprehensive health statistics information system, providing an essential link between needs and resources.

#### 4. A system of national health accounts

In order to describe national health accounts an operational definition regarding the delimitation of the field of data collection is essential. The definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"<sup>a</sup> is so broad that a more operational definition based on this underlying concept has to be determined for the specific purpose of health accounts.

The concept of care is taken as a starting-point. This concept can be defined as organizations, institutions and independent workers rendering services in terms of prevention, cure and care, in which a central position is held by the physician. Even using this operational definition to delimit the purpose "Health", arbitrary decisions have to be taken with respect to boundary areas. In fact, there are three main areas of confusion:

- (a) consumption expenditure, which cannot be allocated to a single purpose such as the testing of drinking-water; by mutual agreement this sort of expenditure is considered to have been incurred for the purpose "Health";
- (b) central government expenditure for administration, planning and control; this expenditure is assigned to purposes by mutual agreement;
- (c) the so-called multiple functions, such as education of medical personnel; this expenditure can be assigned to the purpose "Education" as well as to the purpose "Health". In the first case, "Health" is considered in a narrow sense; in the second case in the wider sense, also covering education and research in the field of health care. It can be argued that, if health care is considered in the narrower sense, teaching in hospitals is inherent to their functioning and therefore belongs to the purpose "Health".

In the presentation of data by function — for instance, in an input-output table — the expenditure for multiple functions should be arranged in a way which enables health to be considered in a narrower as well as in a wider sense. The function "Health" can, as mentioned earlier, be further specified according to various aspects into:

- curative care, preventive care, and after-care;
- care of certain groups of the population (target groups); and
- care of different groups of diseases.

Additional cross-classification and differentiations can be made according to other aspects.

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<sup>a</sup> Constitution of the World Health Organization.

For pragmatic reasons, health care may be further specified on the basis of economic (production) criteria in inpatient care, outpatient care and other care (see Table 1). It should be noted that the first set of statistics referred to in Table 1 can be specified according to function (e.g. facilities in the field of health education). Further specification of these data into "subpurpose" is often not possible. This is, however, possible for the second group of data (use of facilities in quantitative terms), although not completely. The basis for the third group of data (use of facilities in terms of services rendered) is the "subpurpose" classification, so that this group of data can be arranged according to subpurpose.

The groups of data in Table 1 show an increasing possibility for specification according to subfunction. However, there is also increasing difficulty concerning data collection. Data on operational income and expenditure are collected from institutions active in the field of health care. These data ought to be corrected for intermediate deliveries in order to avoid double counting. When, for instance, a physician rents outpatient treatment facilities from a hospital, such costs can be considered only once as the cost of health care, even though they are entered in the operating accounts of both hospital and specialist. In an input-output table, however, these intermediate costs will have to be shown.

It may be observed that the occurrence of double counting and intermediate deliveries is a problem which results from the fact that, for pragmatic reasons, the production (output) of institutions is measured to determine consumption expenditure. Were it possible to collect the data according to subfunction from the consumer of health care, this problem would not arise.

Together with corrections for double counting within a purpose, a differentiation of data also has to be made sometimes according to purposes. When, for instance, a laboratory incurs expenditure partly for health purposes and partly for the purposes of education or environmental hygiene, a functional differentiation should be made.

Functional accounting in institutions might enable this differentiation of costs into purposes and subpurposes. Preferably, this should be done in collaboration with statisticians responsible for the collection of data on other purposes, in order to avoid double counting between functions and to establish a complete system which includes all consumption expenditure.

## **5. Conclusion**

Generally speaking, in the field of health care no market mechanism is available to ensure equality of supply and demand. In many cases only supply can be influenced by the government regulating the quantity and quality of facilities and by influencing the financing, whether directly (budgeting) or indirectly (social security provisions).



In order to establish adequate management and planning regarding health care needs within the financial possibilities available, an analysis from the view of final consumption is desirable. Apart from using it for programme evaluation, the central government can employ a functional system of health accounts to estimate the financial implications of various alternative proposals and to specify priorities within the means available according to different purposes.

The proposed system, in combination with demographic projections provides information on expected developments regarding morbidity and anticipated developments in the field of prevention, efficacy of treatment and technology, thus forming a more comprehensive basis for health planning.

However, the proposed system of functional health accounts faces a singular problem, since payments or fees in health services generally do not reflect the real costs involved in the cure and care of particular diseases. Charges for treatment, laboratory tests and physicians' fees are agreed averages derived from total running costs. Operational research can contribute to the development of the proposed system of health accounts in particular and of a more adequate health statistical information system in general.

## Annex II

### COSTING OF HEALTH CARE MODULES

*Dr H. Poulsen<sup>a</sup>*

#### 1. Introduction

In this paper I intend (a) to discuss the concept of care modules, i.e. the separate components of health care, (b) to consider some of the problems involved in the costing of care modules, (c) to illustrate the limited results achieved in this field by a few practical examples, and (d) to raise some questions in relation to the subject, which might serve as a framework for subsequent discussion.

#### 2. What are health care modules?

It is generally agreed that a "care module" is the definition of a component of total health care, though it seems difficult to agree on how large a component the module comprises. In the United Kingdom care modules seem to be identical with health care groups. The total health care programme is broken down in large modules comprising the following groups:

- general and acute hospital services,
- community health services,
- services mainly for the elderly,
- services for the young physically handicapped,
- services for the mentally ill,
- services for the mentally handicapped,
- services mainly for children,
- maternity services.

In the United States the phrase "care module" is not widely used and so far I have been unable to find an American definition of the concept. In the Scandinavian countries care modules are usually identified with groups of care activities that form part of medical care programmes.

A "medical care programme" is defined as an action programme for examination, diagnosis, treatment and follow-up related to a specific disease

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or syndrome. Within a given medical care programme, a care module may comprise activities in the prophylactic, diagnostic, therapeutic or after-care phases respectively.

Throughout the world attempts are now being made to break down the programmes and activities that are taking place within the health and social sector into units which are unmistakably definable. The main reason for doing this is the wish to separate, evaluate and control the cost-determining factors which in our future planning of the health and social services enable us to obtain the highest possible effect from the limited financial resources which are available.

Depending on the data available, large care modules may be broken down into smaller modules, using a higher degree of specification. In the United Kingdom the health care groups listed above are usually specified in several subgroups, for example:

*General and acute hospital services*

Mainly acute inpatients

    regional specialties

    subregional specialties

    other specialties

Day cases

Acute outpatients

Accident and emergency

Ambulances

Other hospital services

A breakdown of this type is the first step towards well defined programme budgeting. It is significant that these categories do not attempt to define medical characteristics.

In Scandinavia the small care modules described above are often summed up in a larger care module comprising the medical care programme for a given disease as a whole. A care module of that size is the ideal unit for true programme budgeting.

### **3. Costing of health care modules**

In most European countries health statistics at present are characterized by insufficient data on cost-related factors. An improvement of the cost-accounting system, which not only presents more data, but arranges and processes these data in such a way that every activity of an institution or service can be judged on its resulting costs, may be considered an extremely efficient management tool.

In order to meet this objective it is essential that the hospitals, etc., not only record their costs by category (what types of expense are incurred in relation to investments, personnel, materials) but also by cost location, in other words, where the costs are incurred in the institution. Finally, one should, for special purposes, be able to record for which activities the expenses, whether accountable or not, have been incurred.

If the above-mentioned requirements are fulfilled, the hospital will tend to adopt the so-called clear unit cost system. A number of European countries have new, efficient cost-accounting systems in preparation, but only a few countries report that a unit cost system has been introduced generally.

The costs of health care modules may be controlled in several ways:

- by the use of norms, i.e. a fixed ratio of beds or other facilities per 1000 inhabitants for health care groups (e.g., acute patients, geriatric patients, mental illness); such norms are used in Denmark, the United Kingdom and other countries, and serve as cost limitation factors;
- by the use of cost prices, based on information of what use is actually made of materials, facilities, personnel, etc., weighted against an average; this latter approach to the costing problem is primarily a cost control method, but indirectly it may serve cost limitation aims, through the publication of data which are comparable.

The analysis of health care costs is essential, and in the long run a good costing system can act as a motivator for greater efficiency and better planning. What should be done, then, to improve the state of hospital costing? The problem is simply: How far should we go towards perfection?

It would be incautious to conclude that a major increase in expenditure on costing is necessary. Costing is itself a costly activity, and since it is likely to be subject to diminishing returns in improving decisions, it will not be worthwhile to abolish our ignorance entirely. It is approximate information that should be sought rather than perfection. A modest approach would be to examine closely the balance of effort within existing costing activities. In my opinion, more time and effort should be spent on research projects in this field and less on routine costing. An improvement in the quality of costing information from a small representative sample of hospitals might more than compensate for a deterioration in its overall quantity.

#### **4. Practical examples of costing care modules**

I should like now to give examples of the different systems I have mentioned: first, what I shall call the “norm-based” module costing system. This is, I believe, widely used in the United Kingdom, and I am aware that many participants at the Conference have experience in working with the system and therefore know it much more intimately than I do.

In the United Kingdom, as I understand it, the control of hospital costing and hospital planning is to a great extent based on the use of norms derived from statistical material, cost and provision norms being applied to the different modules or care groups.

The extent of provision is usually set out as follows:

### *Beds*

Acute	2.4 beds per 1000 inhabitants
Geriatric	2.8 beds per 1000 inhabitants aged 65-74
	18.0 beds per 1000 inhabitants aged over 75
Mental illness	0.65 beds per 1000 inhabitants
Elderly mentally infirm	3.0 beds per 1000 inhabitants aged over 65
Mental handicap	0.68 beds per 1000 inhabitants
Maternity	23.3 beds per 1000 live births

### *Day places*

Nonpsychiatric	2.0 per 1000 inhabitants aged over 65
Mental illness	0.49 per 1000 inhabitants
Elderly mentally infirm	1.9 per 1000 inhabitants aged over 65
Mental handicap	0.12 per 1000 inhabitants

### *Nursing staff*

Acute	1.06 nurses per bed
Geriatric	0.8 nurses per bed
Mental illness and elderly mentally infirm	0.85 nurses per bed
Mental handicap	67.78 nurses per 100 000 inhabitants
Maternity	48.76 nurses per 1000 live births
Primary care	33 health visitors per 100 000 inhabitants
	40 district nurses per 100 000 inhabitants

The cost implication of these provisions is again set out statistically on a historical basis, i.e. by control of accounts. An example is given in Table 1.

It could be said, on the basis of this material, that norm costing provides at a central level material for controlling the extent of provision and therefore the costs of provision, at the same time giving the opportunity to ensure that a consistent level of facility is maintained. However, I should be very interested to know how the quality of provision is controlled, and how changes in the type of provision are incorporated.

Next, a Danish example. At my institute — the Danish Hospital Institute — we are at present carrying out a project in which we are trying to describe or define the “production process” in both hospitals and primary health care. Based on an evaluation of different clinical situations, the aim is

Table 1. Typical data used for norm costing

	District/area		
	Kettering	Oxford region	England
Catchment (in 1 000s)	210	2 315	46 417.4
<i>Average available beds</i>			
Number	453.3	6 118.9	151 783
Beds/1 000 population	2.16	2.64	3.27
<i>Discharges and deaths</i>			
Number	15 530	182 470	4 033 637
Discharges/1 000 population	74.0	78.8	86.9
Average daily occupancy (%)	74.6	72.1	72.8
Average length of stay (in days)	8.0	8.8	10.0
Throughput (cases/bed)	34.0	29.6	26.6
Unit cost (£ per case)	319	300	327

to describe fully the typical diagnosis, treatment and nursing processes which will then be scheduled with cost prices. Our intention is to provide information on the "production process" which can then be used as a basis for negotiations between politicians, doctors and administrators. We are, of course, aware that there are several projects of this nature going on at present in the European Region. What we think is rather unique in our work is that we are using quite detailed information on the activities which take place for specific ailments – diabetes, inguinal hernia and arterial hypertension, for example. The activities are set up in different modules according

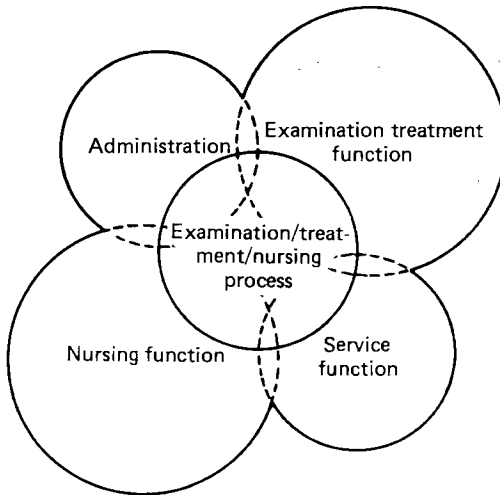
to department/ward/unit. The modules defined serve to describe medical care programmes which are then used partly for professional discussions among doctors and partly for costing purposes.

With regard to the costing part of the project, our aims are in line with the recommendations set out in a recent WHO document.<sup>a</sup>

The basic costing methodology that we use was first developed in a project which dealt with the scheduling of cost prices for clinical laboratory procedures, where we calculated in detail the cost prices for every single laboratory test found in the repertoires of five different laboratories.

The main difficulty we have experienced with our costing methodology is that it is essentially based on the departmental accounting procedure, which at the moment is only used extensively in Danish university hospitals. Part of the work in which we are at present engaged consists of reconstructing these accounts for other kinds of hospital.

Fig. 1. Elements to be taken into account in the costing procedures



Of the elements shown in Fig. 1, we are at present concentrating on the diagnosis, treatment and nursing functions, but we intend in the future to incorporate the other elements, i.e. the "general overheads", in the calculation of total costs for the different medical care programmes.

<sup>a</sup> *The role of health economics in national health planning and policy-making: report on a Working Group. Copenhagen, WHO Regional Office for Europe, 1978 (unpublished document ICP/HSD 039).*

The costing procedure itself is very much like that used in a multi-product manufacturing concern in the private economic sector. I would like to show you briefly how the results of the project will be formulated. I must warn you, however, that many of the figures contained here are theoretical.

Fig. 2 illustrates the medical care programme and costing procedure for inguinal hernia.

## 5. Questions

I shall conclude by setting out some questions which I think are central to a discussion on the costing of care modules. They are as follows:

### 1. What are the main aims in the costing of care modules?

- Balance of care?
- Programme budgeting?
- Cost-benefit versus cost-efficiency?

etc.

### 2. Which elements are most important in a costing system and how are they best provided for?

- Comprehensiveness?
- Flexibility – easy to bring up to date?
- Easy to administrate at all levels?

etc.

Fig. 2. Medical care programme and costing procedure for inguinal hernia

Day no.	Ward	Danish kroner	Operation department	Danish kroner	X-ray department	Danish kroner	Central laboratory	Danish kroner	Other	Danish kroner
1	ambulant	120			thorax	23	haemoglobin, haematocrit, sedimentation rate		records	250
							electrocardiogram	18		
							serum creatinine	12		
							blood group	9		
							Wassermann reaction, gonococcal reaction	21		
								20		
2	bedfast	300	herniotomy	1200						
3	bedfast	300								
4	ambulant	120								
5	ambulant	120								
6	ambulant	120								
7	ambulant	120								
8	ambulant	120							discharge	
Other costs <sup>a</sup>								125	12	22
General overheads										8 days @ 110 kr.
Total		1320		1325		35		102		1245

<sup>a</sup> Costs for diagnosis-connected activities which are not included in the typical programme.

## Annex III

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<sup>a</sup> Participation expenses not paid by WHO.

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<sup>a</sup> Participation expenses not paid by WHO.

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