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EUR/ICP/PHC 620
5629v
ORIGINAL: GERMAN

INFORMATION NEEDS FOR MANAGEMENT DECISIONS IN HOSPITALS

Report on a joint WHO/German Hospital Institute/Bertelsmann
Foundation Working Group

Gütersloh, Federal Republic of Germany
1-4 December 1987



1989

EUR/HFA target 27

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TARGET 27

Rational and preferential distribution of resources according to need

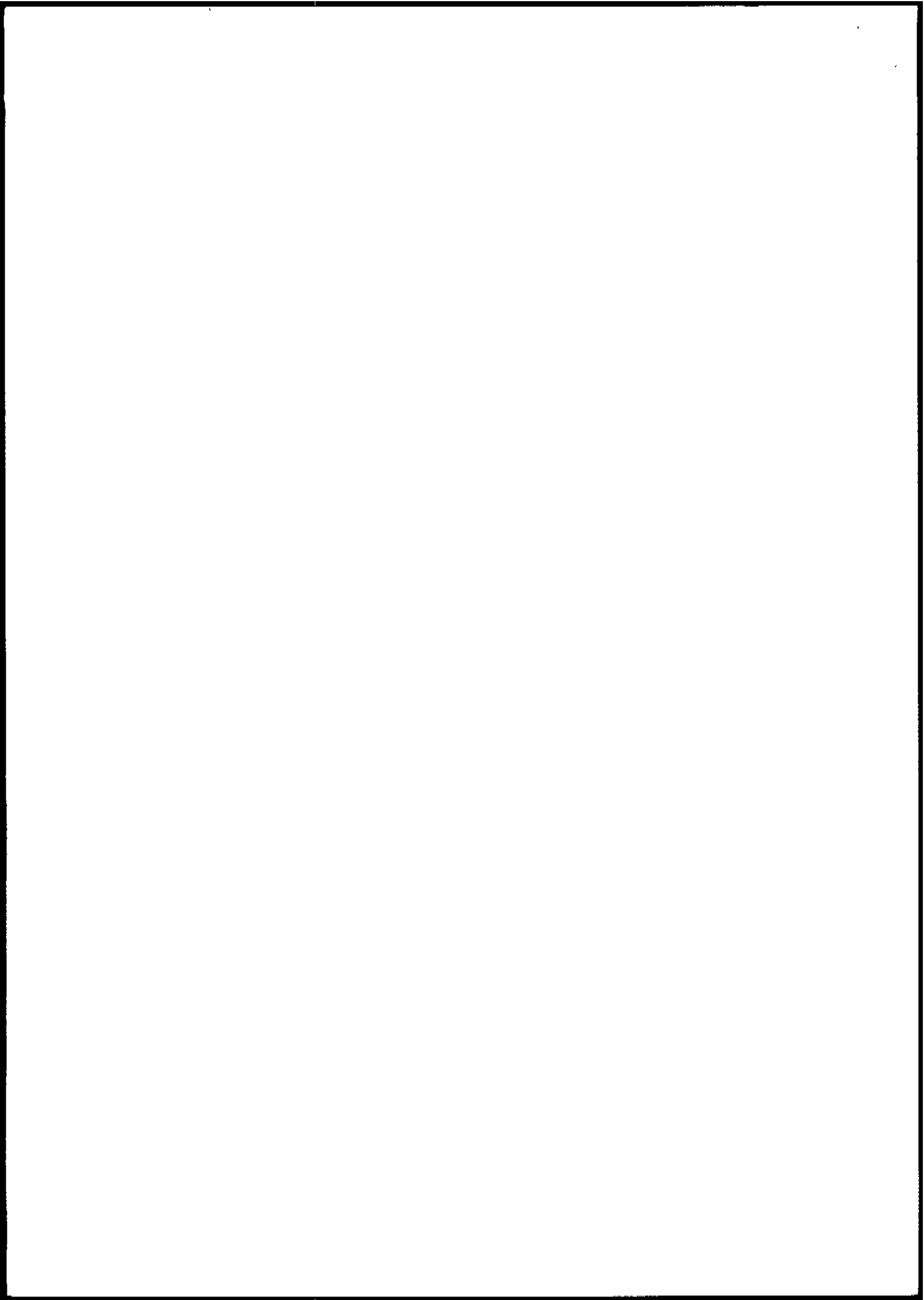
By 1990, in all Member States, the infrastructures of the delivery systems should be organized so that resources are distributed according to need, and so that services ensure physical and economic accessibility and cultural acceptability to the population.

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HOSPITALS
DECISION SUPPORT SYSTEMS, MANAGEMENT

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1. Introduction

The joint WHO/German Hospital Institute/Bertelsmann Foundation Working Group meeting took place in the Park Hotel at Gütersloh, Federal Republic of Germany, from 1 to 4 December 1987.

The participants were then welcomed by representatives of the Bertelsmann Foundation, the German Hospital Institute and WHO. This was followed by an outline of the scope and purpose of the meeting. Answers were to be found to the following questions.

- How can important information be extracted from among a mass of data?
- How can interfaces be established between the data from different fields of hospital activity, and also between the hospital and other health and policy areas?
- What possibilities are there to collect and compile information and to ensure that the relevant information is actually used, i.e. for management decisions?
- What recommendations can be made concerning the need for information as well as its collection and processing in the hospital setting?

The following three preselected topics were examined by three subgroups, and their findings were then discussed in plenum:

- topic 1: principles and demands for management decisions in hospitals;
- topic 2: identification of information needed for management decisions in hospitals;
- topic 3: appropriate use of information for management in hospitals.

2. Topic 1: principles and demands for management decisions in hospitals

It was clear right from the introductory presentation that important information is required for management decisions in hospitals, but what is important can be determined only in terms of the goals of the health system in general and the hospital system in particular. The main problem is how goals and objectives can be expressed in operational terms in ways that are suitable for decision-making. To be able to make statements, a model had to be drawn up that reflects the reality within a health system and its interplay with its environment. When setting goals for the health system, attention had to be paid to all relevant groups of interested parties, including patients, health care professionals, administrators, hospital owners and insurance companies.

The discussions in the subgroups confirmed that management decisions in hospitals should be goal-dependent and based on adequate information. Emphasis was placed on the fact that the goals that are important for the health system are identified and formulated not only "from above", by political pressure, but also "from below", through patients' expressed needs and the encompassing knowledge of physicians and other health care specialists.

So far as the process of goal identification from top to bottom is concerned, a distinction was made between national, regional and local levels. "From the national point of view, we see political pressure on health care expenditure and from the local level we see an array of demands from patients who want to be treated". These views are combined and optimized at regional level. It is, however, difficult to reach this state of affairs, and that is the main reason why health goals are not expressed in operational terms. Hospital managers must resolve these difficulties, which take the form of pressure from all sides (the national level, the local and political circumstances, health professionals and patients). In reality, and in view of "the rapid developments in medicine, medical technology and technology in general, as well as in response to continuous changes in social and political conditions ... the hospital has to be permanently adjusted to the changing environment".

Hospital management decisions are aimed at the setting and attainment of goals. With effective hospital management, decision-makers know which goals their resource decisions should be aimed at. Those involved in the goal-setting process represent a wide range of interests: central and local government, health insurance agencies, patients, colleagues, equipment suppliers, etc. Decision-making processes in the hospital are frequently decisively shaped by physicians' professional interests. Hospital administrators are also playing a larger part in these processes, however, as a result of the growing importance of economic and financial problems. In addition, nursing should be seen as a third factor in this equation. Some hospitals are run by a management board consisting of three people recruited from these professional groups. The actual power structure within this management board is of great importance for the goal-setting process. In other hospitals, the management consists of only one person, the better to overcome these problems. Of course, there is also a need for decisions and information at the lower management levels. Modern management techniques such as "management by delegation" and "management by exception" are fully applicable in the hospital setting.

Another question concerns the scope for decision-making which the management is allowed by the hospital owner. The latter has presumably reserved the right to make fundamental decisions, such as those concerning the type and size of individual departments, the areas of competence and appointment of individual members of the hospital management team. It is important for the efficient and effective operation of hospital management that it has enough scope for decision-making. Areas of responsibility and competence must overlap. It makes no sense, for example, to entrust the hospital management team with responsibility for economic losses if it is given little or no scope to manage hospital and nursing expenditure or to limit costs. In many countries, on the other hand, the state has already intervened extensively, at the stage of goal-setting, in the decision-making sphere of hospital management (an example of external limitations). The rationale for these incursions is that the hospital system should not be subject to free competition but requires government intervention. It is frequently argued that a market-oriented solution would yield socially undesirable results: "The necessary regional, chronological and need-oriented allocation of resources would not be ensured at a socially affordable cost". In this view, hospital facilities should be offered not only where favourable costs can be attained but also where actual needs exist. Optimizing this needs-oriented approach is admittedly no easy matter in view of the possibilities of supply-induced demand. The dangers of overcapacity and

undercapacity are ever present, and many countries are currently facing the funding problems that result from this dilemma. Solving the problem of matching the supply and demand of hospital services is thus of considerable importance. The actual need for information is strongly influenced by this.

3. Topic 2: identification of information needed for management decisions in hospitals

The above-mentioned structures and processes of management decisions in hospitals themselves define the information needed. Information is knowledge needed for a specific purpose. Only information which is important for management decisions constitutes real information need. Since hospital management decisions are aimed at goals and at the means for attaining them, both "goal information" and "goal-attainment information" may be needed. In the former category, a distinction may also be made between result-oriented, process-oriented or resource-oriented information. Goal information should make it possible to assess service delivery capability. Result-oriented goal information includes the supply of information on patient movements (length of stay, bed occupancy rates, number of days of nursing care) as well as the type and number of individual services delivered, e.g. operations, laboratory tests, functional diagnoses and care interventions. Ideally, however, the information available would cover not only the secondary level of services delivered but also the primary field of the patient's health status. Process-oriented goal information addresses the adequacy and relevance of the treatment process in the light of the treatment's aims and outcome. Information on desirable treatment profiles for diagnostic groups is needed here. Comparison with actual treatment information yields information on deviations. Similarly, information on nursing standards by diagnosis group can be used to evaluate service delivery capability. Admittedly, considerable difficulties can be caused here by using unquantifiable ethical, psychological and subjective criteria. Resource-oriented goal information focuses on the capacities of the hospital. Profiles showing service delivery readiness could be developed and used to measure the hospital's performance in this regard.

Information on economic performance, i.e. on the input/output relationships in a hospital, is even more difficult to obtain than that on service delivery capability. In addition, information is required on "service functions" (which input is required in order to achieve a given output) and on "cost functions" (what costs are involved in a given service). Information must be obtained not only on the service programme (type of services delivered), quantity of services, quality of services, temporal and spatial allocation of services, and service costs, but also on the appropriateness of the provision of such services; in other words, measurements must be available that can be used for the purpose of evaluation. In no other socioeconomic field is it so difficult to identify information on the effectiveness and efficiency of the measures taken as it is in the health sector. In a hospital, it is very often impossible to answer the questions of whether the measures taken really did help the patient, i.e. were effective, and whether the expenditure involved was commensurate. The identification of information on input/output relationships almost always stops with the question of whether what was done for the patient was all that could humanly have been done to ensure his or her recovery. In view of the explicit hospital goal of restoring patients to health, this is basically a shortcoming related to input information.

The work in the three subgroups, too, clearly showed that the information need must be structured in accordance with the hospital management level involved. Identifying and processing background or "milieu" information is of importance primarily for the top level of hospital management, since it is that level that has to react to changes in the external data set as flexibly as possible, provided it has the decision-making scope to do so. Hospital management must adjust to shifting trends in health risks and corresponding developments in certain types of disease, and especially to the sudden appearance of endemics and epidemics, e.g. AIDS. Strategic information of this kind lays the foundation for strategic decisions, which in turn are transformed into operational decisions on the basis of operational information. The information required within a hospital can be subdivided into that which affects the hospital as a whole and that which concerns only parts of it and/or individual decision-making fields. For instance, a distinction has been made between information that is not field-specific and which is used for organizational and services planning purposes, and field-related information on the personnel and material planning of individual specialist departments and functional areas. Another contribution to the discussion defined three major fields of information, namely activities, operational resources and working areas. Only information on aspects that can be modified (and where someone is responsible for doing so) should be identified. This should avoid the creation of "data graveyards". The costs of obtaining information were also considered, with participants asking whether these were justifiably related to the use made of the information.

One of the subgroups took the trouble to subject selected types of information to evaluation, i.e. to assess whether they were important/unimportant, essential/recommended, etc. There is no doubt that information on the actual bed occupancy rate in a ward, for instance, is important and essential for both strategic and operational decision-making by hospital management. In contrast to information on the measures to be applied in the care of a patient, however, information on bed occupancy rates is unimportant for the patients themselves. From the subgroup's deliberations, it may be inferred that virtually all information is more or less significant for hospital management. In the concluding plenary discussion, however, this view was strongly qualified: there should be no question of hospital management amassing as many data as possible for its decisions. A distinction must be made, above all, between data and information. The latter imparts goal-oriented knowledge and presupposes the selection of data.

It is frequently not clear whether a piece of information will actually be used. Often, too, information comes in too late. This was apparent, for example, in one country that had allocated a fixed number of surgical beds for patients with heart disease. The projections were rapidly exceeded when the method of dilatation of coronary blood vessels was introduced. Another country that had a central patient data register reported that sample surveys had since been found satisfactory, and that establishment of comprehensive patient data was therefore not regarded as necessary.

In addition to the problem of ensuring up-to-date hospital information, hospital management also has to deal with the complexity of the need for information. Although hospital management requires the most up-to-date and comprehensive information possible for its decisions, it must limit itself in its efforts to obtain information. Apart from considerations related to the expenditure in time and money, restrictions are also imposed by people's

limited capacity to collect and process information. In addition, and as a result of the poorly structured nature of many hospital management decisions, it is not possible to indicate precisely the extent of the information need. Hospital management frequently makes decisions on a purely implicit basis, i.e. on the strength of the information currently available, without extending it further. In practice, hospital management decisions are thus always taken with limited information.

The discussion also revealed, however, that the great complexity that is typical of strategic and milieu information, in particular, can be adequately handled by devising early indicators. In risk management in a hospital, one would be ill advised, e.g. to react to a trend of falling birth rates and communicable diseases in children only when the occupancy rates of paediatric beds in that hospital had become threateningly low.

There is a relative wealth of information about which secondary services are provided at what costs in a hospital. From the many hospital statistics it is even possible, in many cases, to identify which secondary services have been provided per patient, per diagnosis, etc. However, the main weak point in hospital information concerns the actual improvement obtained in the patient's health status. Not nearly enough attention has been paid to the information need directed towards this aspect.

4. Topic 3: appropriate use of information for management in hospitals

The problem of coping with the multitude and multiplicity of information was also a constant refrain in this part of the discussion. A wide variety of approaches are used to distinguish between usable and unusable or important and unimportant information. A medical expert system called "COMMES" was described. This system supports, but in no way replaces, the decisions taken by a physician. "COMMES" use is for health professionals who are challenged to (1) suitably assess patients in a wide variety of settings, (2) identify desired outcomes that define the health status that would be appropriate for the patient, (3) select suitable interventions typically associated with the nursing profession that permitted them to aid the patient, and (4) be alert to complications.

The system also addresses other information needs, including (5) patient teaching, (6) discharge teaching, (7) post-operative care and (8) supportive care.

Thus, the system is for nurses in a clinical setting, individuals involved in continuing education services for both nursing and hospital personnel as a whole, and other nursing services support individuals. Another important user group is health sciences faculty. Within the health sciences, it is especially suited for the nursing faculty as well as health science students, particularly nursing students.

The multiple users presented the challenge of an information explosion. Part of the principles to be presented come from our approach to serve several purposes in a unified yet modular fashion".^a From the ensuing discussion,

^a Evans, S. Appropriate use of information for management in hospitals. Copenhagen, WHO Regional Office for Europe, 1987 (unpublished document ICP/PHC 620/8).

however, it was clear that implementation of computer-assisted medical expert systems cannot be recommended until patient-related information has been aggregated and cases differentiated. Only then can important information be kept apart from unimportant information.

Considerable time was spent in the subgroups and in the ensuing discussion on examining the question of combining and aggregating information for decision-making purposes. It was important to decide not only whether computer support to hospital management decisions should be centralized or decentralized, outside or within the hospital, but also how computerization could be made acceptable to hospital management. Aspects of data protection and data security were addressed, as was the issue of the standardization of information. Should as many members of staff as possible have potential access to the computer-assisted information system? Is the data content consistent? In any case, information to be supplied by or to several institutions must be manually collected and stored only once, i.e. by the institution compiling it (avoidance of multiple collection). Even if data protection is not defined in the same way in different countries, information of this kind should be aggregated and made accessible in such a way that there is no infringement of the respective interpretations of data protection requirements. Standardized codes are of only limited value. It is a mistake to believe that they enable valid assessments and management decisions to be made (by government or health insurance bodies, for instance). Standardized codes merely act as markers when, for instance, they represent arithmetic means, and deviations from those means are observed using the institution's own figures. It must be realized that the information systems currently found in hospitals came into being as a result of the scarcity of funds and in order to analyse costs. It is the (external) pressure of lack of resources that has led to internal management in hospitals. The integration of internal and external management is taking place quite slowly. On the other hand, efforts are being steadily stepped up to ensure greater accountability in hospital activities.

For a long time, hospital information systems were organized in a one-dimensional way, in so far as they dealt with information on services and costs as supplied by those responsible, i.e. the different hospital departments. There was no linkage with product-oriented information, i.e. that which related to the diagnosis, treatment and nursing of the individual patient. There are sufficient reasons and possibilities for remedying this, even if one does not wish to introduce diagnosis-related groups. Patient-oriented aggregation of service and cost information can help to avoid the mistakes that often occur in interpreting statistical averages relating to the whole or part of an establishment. Aggregating information in this way necessarily involves a differentiation of cases that is desirable for a valid assessment.

Computer-assisted integration of information from different sources in the hospital has not yet been satisfactorily achieved in most countries, particularly as there are numerous organizational, financial and also acceptance and data protection problems. The inclusion of appropriate incentive systems helps to reduce organizational obstacles. Computerized surgical procedure statistics, for instance, can be used in many ways, including personal lists that specialists require for their further training. It is thus advisable, in introducing computerized information systems, to think about the possible ways in which those working with the systems will use them.

Apart from the problem of internal linkage of information relevant to decisions, there arises the question of interface with the information need of the other parts of the health system, including the institutions responsible for public health policy. There is as yet no answer to the question of what information should be compiled by hospital management for a "health report". The answer will vary according to the country for which the report is prepared. What information does hospital management receive in exchange for the "health report"?

The computerized information systems currently used in hospitals range from autonomous solutions through (part manual, part autonomous) network solutions involving commercial computing centres to independent mixed forms. It is expected that automation in hospitals will increase substantially, that functions of greater complexity (i.e. support for decision-making) will be automated and that, in the long term, all parts of hospitals will be covered and linked by computerized information systems.

5. Presentation of the Gütersloh project: "Decision-oriented information and reporting system in hospitals"

It was generally acknowledged that the decision-oriented information and reporting system used in the Gütersloh municipal hospital offered a solution to the problem under consideration, and the wish was expressed that that solution should be further extended.

In the Gütersloh municipal hospital, information is prepared and used in a hierarchical and time-structured way. Reports are drawn up daily, weekly, monthly, quarterly and annually. Depending on its hierarchical level and its technical structure, each unit receiving information is given differently aggregated information. Taking as an example the costs of medical equipment, the following description of the system was given: the persons in charge of a nursing ward receive, each month, a computer printout listing all drugs, disposable articles, etc., used, while the senior consultant, as head of a clinical department, also receives a list but showing only the total amounts for each of his or her wards, which together represent the total costs of the department. These figures are related to the number of nursing care days, and a comparison with the previous year is also given. The unit responsible for the hospital within the hospital funding body receives aggregate information in a way that shows the total targeted/actual costs of medical equipment for the hospital as a whole. A decision can then be made at the top level of management as to whether the deviations are so acute that their origins must be traced back to the "article level" or whether the information supplied is adequate.

The monthly final report or budget comparison is at the top of this hierarchically structured reporting system. This report basically consists of a comparison between targeted and actual values for bed occupancy, income, expenditure and services delivered. In addition, the following statistics and information are made available as background:

- diagnoses for each clinical department;
- length of stay and age structure for each diagnosis;
- structure of patients in the hospital (by ICD group for each clinical department);

- age structure, diagnoses, length of stay (dependent on the age of the patients and the number of disease patterns treated);
- secondary services delivered per diagnosis (with average profile of services for each type of disease, for quality assurance purposes);
- costs for each type of disease (technical costs, expenditure on nursing care, physicians' costs, accommodation and overheads).

Lastly, each senior consultant receives a comparison between targeted and actual values for his or her investment budget. To acquire external information, hospitals and physicians have formed associations or organized themselves into professional bodies. The information provided by those bodies on health policy, medical and legal developments, as well as comparative figures from other hospitals, are passed on to the appropriate recipients.

6. Conclusions from discussion of the Rapporteur's presentation

The essential points raised during the meeting were summarized by the Rapporteur in 15 items. The concluding plenary discussion again made it clear that the problem of information selection could not be solved at the supranational level. The view was held that preselection of relevant hospital management information should take place at national level, and a report on the subject should be drawn up. Check-lists had to be compiled to that end, setting out the criteria on which information should be selected. Another statement called for the development of indicators so as to increase the operational use to which information could be put.

There was agreement on the fact that efforts should be made in future to ensure that the use of computers met the actual information need and that the uncritical transfer of every computer application should be avoided. Investments in computer systems had accordingly to be guided in a meaningful way. To a certain extent, results depended on the quality of the software used, even if major firms were concentrating more on hardware. Hospital management should exercise influence on that development.

There was also extensive agreement with the view that information should be aggregated in terms of the patient, and in fact - given the current relationships in individual countries - in such a way that an overview of a patient's "career" from start to finish could be obtained. That meant covering not only the care of patients in hospitals but also the care dispensed beforehand and afterwards. This was the only way of countering the risk of implementing "one-off" solutions that were rational only in limited terms.

7. Recommendations

(1) An effort must be made to ensure that the development and supply of computerized information systems are geared to hospital management's need for information relevant to decisions.

(2) WHO should offer to act as an "information broker", stimulating progress in categorizing the need for information for hospital management decisions in each country and expressing it in a more precise way. In this respect, it is not a question of amassing a maximum of relevant information from the literature but, rather, of limiting the information to that which is relevant to decisions, under the particular conditions applying in each country.

- (3) WHO should have check-lists on the information need considered important in the different countries drawn up by its collaborating centres. In doing so, it should stress that the information must be processed in a patient-oriented way, so that it also covers the period before and after the patient's hospitalization.
- (4) Once each country's need for information relevant to decisions has been categorized in terms of structure and scope, efforts must be made to improve indicators so as to make strategic, goal and milieu information more useful for operational purposes. WHO could arrange pilot studies for this purpose.
- (5) Through information activities, WHO should help to improve knowledge about the interface between general management knowledge and informatics in the hospital.

In their final statements, the organizers again stressed that while an information system could not, of course, change anything directly, it could help indirectly to increase capacity and improve the situation with regard to costs in a hospital system, in particular by providing a sounder basis for decisions by hospital management. To that extent, information systems were instrumental in nature. However, it was also pointed out that having information available was synonymous with having more power and that only a well informed manager could manage properly.

Annex 1

LIST OF PARTICIPANTS

TEMPORARY ADVISERS

- Dr L. Bohigas
Assistant Director, Generalitat de Catalunya Securite Sociale, Barcelona,
Spain
- Mr D.J. Doherty
Chief Executive Officer, Midland Health Board, Central Office, Tullamore,
Ireland
- Dr S. Evans
Director, Instructional Science Research for the Health Sciences,
Creighton University, Omaha, United States
- Dr C. Favaretti
Deputy Medical Director, Ospedale Civile di Padova, Italy
- Dr F. Gouppy
Chef du Service des Etudes, Direction du Plan, Assistance publique
Hôpitaux de Paris, France
- Mr M. Häferli
Director, Kantonsspital Aarau, Verwaltungsdirektion, Switzerland
- Dr Peter Jäger
Betriebsleiter, Dr Horst Schmidt Kliniken, Wiesbaden, Federal Republic of
Germany (Rapporteur)
- Mr K.H. Keldenich^a
Verwaltungsdirektor, Marien-Hospital, Düsseldorf, Federal Republic of
West Germany
- Mr J.B.A. Lettink
Coordinator, Management Support, National Hospital Institute of the
Netherlands Hospital Centre, Utrecht, Netherlands
- Mr T. Mooney
Principal Administrator, Acute Hospital Services, Department of Health,
Dublin, Ireland
- Dr M. Oren
Director, Poria Hospital, Tiberia, Israel

^a Participation expenses not paid by WHO.

Ms E.S.P. Pluyter-Wenting

Assistant Director of Patient Care, University Hospital Leiden,
Netherlands

Dr J. Sas

Service de Gestion, Centre Hospitalier Paul Brien, Brussels, Belgium

Professor Barbara Schmidt-Rettig^a

Fachhochschule Osnabrück, Federal Republic of Germany

Professor W. Schneider

Director, Uppsala Data Central, Sweden

Dr H.-J. Seelos^a

Münsterstrasse 261, 4000 Düsseldorf 30, Federal Republic of Germany

Mr J.G. Tauch^a

Verwaltungsdirektor, Städt. Krankenhaus Gütersloh, Federal Republic of
Germany

Professor E. Waniewski

Chairman for the Committee for Application of Informatics in Medicine of
the VI Section in the Polish Academy of Sciences, Warsaw, Poland

Dr G. Wixforth^a

Stadtdirektor, Stadt Gütersloh - Stadtverwaltung, Gütersloh, Federal
Republic of Germany

Professor O. Weiss

1. Stellvertreter des Direktors, Institut für Sozialhygiene und
Organisation des Gesundheitswesens "Maxim Zetkin", Berlin, German
Democratic Republic

Dr J. Zilberg

Director, Jesrael Valley Medical Centre, Afula, Israel

^a Participation expenses not paid by WHO.

REPRESENTATIVES OF THE GERMAN HOSPITAL INSTITUTE

Professor S. Eichhorn
Managing Director (Chairperson)

Mr R. Riefenstahl

REPRESENTATIVES OF THE BERTELSMANN FOUNDATION

Mr R. Mohn
Chairman

Dr H.-D. Weger
Chief Executive Officer

WHO REGIONAL OFFICE FOR EUROPE

Dr W. Hubrich
Regional Officer for Primary Health Care

Dr J.O. Vang
Regional Officer for Hospitals (Secretary)