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HEALTH INFORMATION SYSTEMS WITH SPECIAL REFERENCE TO  
PRIMARY HEALTH CARE AND COMMUNITY DEVELOPMENT

Paper for the Technical Discussions

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## 1 INTRODUCTION

The Regional Committee, at its twenty-ninth session, selected "Health information systems with special reference to primary health care and community development" (Resolution SEA/RC29/R3) as the subject for the technical discussions to be held during its thirtieth session.

The selection of health information systems is particularly topical. Several resolutions of the Executive Board and the World Health Assembly, and recommendations made at other meetings such as the Advisory Committee on Medical Research, have repeatedly emphasized the need for appropriate and timely information as an essential ingredient for good management. Country health programming, carried out in several countries of this region, had also revealed that existing national health information systems were not capable of supplying data suitable for good planning, administration and evaluation of health services.

Although the objective of a national health information system (NHIS) is to develop a country-wide system encompassing all the health services, the Regional Committee has decided that it preferred the discussion to concentrate on information systems in support of primary health care and community development, an area of health services which is generally considered a priority in the Region.

## 2 EXISTING SITUATION IN RESPECT OF NATIONAL HEALTH INFORMATION SYSTEM IN THE REGION

There is some kind of a health information system in every country of the Region and this contributes to planning, monitoring and decision making in respect of the country's health programme. The systems are, however, often based on standard statistical systems which have become passive and are often not very closely related to the needs of the users. Inadequacy of information is well recognized by both users and producers of information. Health planners and administrators have, however, often not clearly specified their needs in respect of information for the decision-making process. At the same time, health statisticians have shown insufficient concern for the usefulness and relevance of the data collected and for the efficiency of some of their procedures.

A systematic analysis of the decision-making process is needed to identify correctly the most critical needs for information. Based on this analysis, communication between users and producers of information should be improved to avoid incompleteness and/or redundancy. Provision must also be made for the timely processing of data; often, large volumes of data are collected, but their analysis is so slow that the information is obsolete when it reaches the decision maker. The efficiency and effectiveness of data collection and analysis must also be assured to correct imbalances between requests for information and the real need.

It should also be realized that the bulk of health information, statistical or qualitative, is generated by the health services, especially at the local level. Hence, the efficiency and coverage of existing health services will vitally affect and be reflected in the quality and coverage of the information generated. The development of a health information system cannot be considered as an isolated process as it must conform to the development of the health programmes it is supposed to serve.

For this reason, the programme for the development of the health information system must be an inseparable part of the programme for the strengthening of health services at all levels. When designing and implementing a programme of health information to serve a country's health programme, systems concepts and methods, with all their practical applications, should be kept in mind. The application of these modern tools has proved useful in many countries for developing concepts and approaches to solve problems in the setting up of national health information systems.

### **3 EXAMPLES OF SOME SPECIFIC EFFORTS IN DEVELOPING HEALTH INFORMATION SYSTEMS IN THE REGION**

Although there are few successful examples of a systematic development of information systems at the primary health care level in the Region, several countries have made efforts in this direction. No attempt will be made to give a complete list of all such activities, and there is no doubt that similar efforts are also being made in other countries. These examples are simply intended to illustrate the variety of approaches that have been adopted.

#### **3.1 Indonesia**

Finding the current health information systems unsatisfactory, especially those related to primary health care, the Health Services Research Institute, Surabaya, initiated a project in 1974 with the object of developing a model for an information sub-system at the health centre level as a part of the national health information system. Various decision levels were identified, and an attempt was made to determine the types of information needed at the different levels. Necessary formats for recording and reporting were developed in 1975 and are now being field-tested in 17 health centres in Central Java. Health centre personnel were trained in the use of the forms, in data processing methods and in the use of information for management before the testing started. The project has suffered from set-backs, however, due to many reasons including the fact that the amount of data collected was too much for the data processing capacity of the system. In order to remedy these limitations another research project was started in 1976 in West Java. Its objective was to develop a simplified information system with the emphasis on management. The work of the project is still continuing, and the results of the field tests are expected in early 1979. All ongoing projects in health information systems are now being co-ordinated by a Committee under the Ministry of Health.

### 3.2 Nepal

The health information system in Nepal, which is gradually being developed and extended geographically, reaches the first level of primary health care, that is, the junior auxiliary health worker. This system uses a village health register to record the population by household, vital events and immunization status. In addition, it records activities performed by the junior auxiliary health worker in family planning, nutrition and rehydration training. This register has been in use for over a year and has not proved difficult for this level of health worker to operate. Additional components including a daily summary of activities, referrals of important communicable diseases and follow-up of defaulted treatment, are to be introduced during 1977. The system, which in general follows the principles mentioned in Section 4, shows every indication of demonstrating, at the simplest level, the value of the concepts of information systems.

### 3.3 Thailand

In Thailand, it has been recognized that the development of a health information system is essential for managing, monitoring and evaluating the Provincial Health Care System which deals with the delivery of primary health care. An effort is being made to establish an information system to provide support at the primary health care level. Although details are yet to be crystalized, the system initiates the information flow at the village level with the health volunteers and health communicators. The information then reaches the district level, where a district information centre will be organized as an intermediate echelon in the national health information system. Village health volunteers and health communicators will maintain family cards for each household in their clusters. The local midwives and/or junior sanitarians can obtain information from these family cards for the purposes of managing programme activities, such as immunization coverage. These primary health workers will also collect information on vital events including births and deaths and pass it on to the higher echelon in the form of a monthly report. At the district information centre, data will be collected and forwarded to a provincial centre which will analyse and summarize the information and transmit it to the Central Information Centre.

## 4 CONCEPTS OF AND APPROACHES TO NATIONAL HEALTH INFORMATION SYSTEMS

### 4.1 Background Information

WHO has given support and assistance to health statistics services for many years. Continuing developments led to a discussion of the value of modern methods of management by the World Health Assembly in 1973 when the need for a complete reconstruction of the information system supporting health, including statistical services, was stressed.

In 1975, an inter-divisional group was established at WHO Headquarters to plan and implement, in conjunction with the WHO regional offices, a

programme for the development of national health information systems. As a first step, a programme proposal was prepared by WHO Headquarters, giving a critical review of the existing health statistics programme and formulating a concept for the national health information systems programme. The programme proposal was widely discussed within WHO, and further action has followed to refine the concept and work out ways of implementing it.

#### 4.2 Concepts

The scope of a health information system will cover health and biomedical information in quantifiable (statistical) form as well as unquantifiable knowledge, for example, policies, legislation, procedures and technology required by decision makers. The information system should help in the formulation and evaluation of policies, plans and programmes for the efficient and effective functioning of health services and provide a feedback to lower levels.

It must also include centres for information services, mechanisms for information flow and information processing, and the appropriate technologies to support these. The scope of the health information system is thus wider than that of health statistics.

At present, the whole national health information system may not be, and usually is not, under one administrative authority. In fact, it is seldom possible or desirable to achieve complete unification of the administration of the health information system. There should, however, always be close links and co-ordination between the various parts of the system.

#### 4.3 Approaches

A health service is a complex, dynamic, social system for protecting the health of a population, and in different countries has been influenced by various historic, economic, political and other factors. There is still a lack of understanding of the exact nature of the information required to support these services. The development of the health information system must therefore be a collaborative endeavour of information specialists and health statisticians with health planners and health administrators.

There will, however, always be gaps in the information available to guide the policy formulation and planning of health care. It is exceptional to find information that is completely relevant and also covers all questions which arise.

In countries which have engaged in broadly based health planning activities, priority areas within the health services will already have been identified. In such cases, it appears logical to direct attention to the development and/or strengthening of the health information system in these priority areas. The planning process itself may also have identified important gaps in the available health information.

In this context, an approach to the development of national health information systems may adopt the following steps:

- (1) an analysis of the systems in the health services and the present statistics/information system, to identify priority areas for development;
- (2) the location of decision-making points within the sub-systems at all levels of the health services;
- (3) the identification of the information needed for decision-making at the various levels of the health services;
- (4) the identification of sources of the needed information;
- (5) the development of lines of communication from originators of information to points of end-use (and appropriate feedback);
- (6) the development of methods of data processing and analysis at various levels of the health services, and
- (7) the evaluation of the system in terms of adequacy of information to the decision-makers, flow of information within the system, and effectiveness and efficiency of data collection.

## 5 PRIMARY HEALTH CARE AND COMMUNITY DEVELOPMENT

### 5.1 Principles and Practice of Primary Health Care

The coverage of health services and the quality of the care remain far from satisfactory in most countries of the Region. As one means of rectifying this deficiency and improving health care delivery, both in terms of coverage and quality, an alternative approach has been devised, known as "primary health care". This was defined by the Twenty-eighth World Health Assembly as a health approach which integrates, at the community level, all the elements necessary to make an impact upon the health of the people, as an integral part of the national health care system. It is an expression of response to the fundamental human needs: How can a person know of, and be assisted in, those actions that are required to live a healthy life? Where can a person go for relief from pain or suffering?

The scope, objectives and contents of primary health care must necessarily vary from country to country. The development of the programme will obviously be unique in each country to meet its own specific requirements, depending upon available resources, the existing health infrastructure, the accepted health technology, the capacity of the workers themselves and, above all, the political will of the government. The important role of appropriate technology, its development, application and acceptability are also recognized. The quality of service and the level of skill of the health workers may also vary widely.

In spite of differences due to particular national situations, the general principles in the approach should be applicable in most countries. But the main service components of primary health care should include simple medical care, maternal and child health and family health, nutrition, prevention (including immunization) and control of communicable diseases, basic sanitation and health education. The primary health care programme should form an integral part of the national health system as well as be fully integrated with the multi-sectoral community development activities. With an integrated approach, the programme envisages the use of primary health workers who can be the basic health workers of the government health services and/or voluntary health workers who belong to the community and who, after being trained in the community, work amongst them. This implies a heavy reliance on community initiation, community participation and community resources. It is now recognized that to improve health in the context of general development, health problems should be tackled in their totality, as an integral part of general socio-economic development, and as such the primary health care programme needs to be considered in conjunction with rural development at the community level.

## 5.2 Relationship between Primary Health Care and Community Development

The institution-building potential of community development based as primary health care is on community initiation, community participation and community resources may be exactly what is required for establishing the critical interface between available "health inputs" and their effective use by the community. The community development approach also meets the growing recognition that services directed to curing disease must take their proper place in relation to services directed to preventing disease and promoting health which is another vital element of primary health care. Public health measures are rooted not so much in medicine as in living habits which are largely determined by the general socio-economic conditions such as the degree of development of agriculture, water, housing, marketing, and arrangements regarding who has claim to what. These are precisely the daily and important concerns of members of the community who experience them as a relatively undifferentiated life-style as a whole. At the level of the community, sectoral differentiation has no meaning. Thus, the community, which has been "peripheral" to traditional sectoral concerns, is central to those who have been addressing themselves to community development itself. It is this coming together and super-imposing of problems and perspectives which has led to the idea of developing the primary health care programme as an integral part of the programme of rural development at community level, with community participation.

Often, the question is posed: "Is the community ready now to accept this concept?", but one cannot just wait for the day when, sharing the trust and credibility earned by all development inputs into the community, the community will spontaneously tackle their health problems. It is now increasingly recognized that although communities may not yet be developmentally ready, health authorities can provide a lead. In that case, the health authorities need to promote and skilfully offer for the



consideration of the community, their ideas on the provision of primary health care, but with the principles and skills of the community development worker very much to the fore. If one is able to demonstrate only the practical advantages of true community participation in health care, a significant contribution to the wider objectives of community development will be made which will pave the way for further action in this direction.

## 6 HEALTH INFORMATION SYSTEM AS RELATED TO PRIMARY HEALTH CARE AND COMMUNITY DEVELOPMENT

### 6.1 Problems

Keeping in view the concepts and approaches regarding national health information systems as well as primary health care in the context of community development, the problem areas in the development of a sub-system for health information as related to primary health care and rural development can be considered.

Some of the very obvious problem areas are as follows:

(1) The collection of information at the local level has to be done by a primary health care worker who, probably, has very limited formal education and essentially no idea of information concepts. His concepts of information will be limited by the cultural milieu in which he lives. The base of the information system will be this health worker who will have to collect, record and transmit original information and will receive as feed-back other information which he must be able to interpret and act upon. He is the key information link from the point of view of primary health care. Both as receiver and transmitter of information, he is largely dependent on oral media. In addition to this limitation, in many countries, linguistic and cultural variations make effective communication an extremely difficult task.

(2) The degree of accuracy of the information collected will, to a great extent, depend on the prevention of distortion of factual information. It is, however, well known that there is a great risk of distortion of information which is passed on orally from person to person. To prevent this, facts must be recorded at their place and time of origin, and transmitted through a written or mechanical medium with the absolute minimum of opportunity for subjective interpretation. This is applicable to the design of any information system but is of special significance in the case of primary health centre in view of the problems described above.

(3) The application of measurements to the information collected at primary health care level may pose a problem. Most information, if it is to be manipulated and analyzed, must be reasonably precise. This involves both the classification of information and the assignment of quantitative or qualitative values to it. Any classification scheme at primary health care level must respond to two questions. First, "Is the classification comprehensible?" Second, "Can the health worker

assign information according to the classification with the required degree of precision?" Once the classification scheme is selected, the question of assigning values arises. The values may be either descriptive (qualitative) or numerical (quantitative). Extreme caution should be taken to design the classification and values keeping in view the ability of the health workers. Measurements should be used only when they are meaningful and within the capabilities of the health workers. In this connexion, it is worth mentioning that WHO has been endeavouring to develop ways and means of improving lay reporting of morbidity and mortality statistics. A working group met in November last year to discuss this subject and came up with a number of recommendations (SEA/VHS/151, January 1977).

(4) Storage of information is another problem area which should be given due consideration. Information must be stored in a manner which is both efficient and accessible. In most countries of the Region, files and ledger books are the usual storage medium. They may be both inefficient and inaccessible if they are designed with the main purpose of ease of recording and storage, ignoring the importance of accessibility and the ability to respond to pertinent questions. While designing storage, the accessibility and retrieval mechanism must be given serious consideration.

(5) Communication of information may be a serious obstacle in developing the information sub-system for primary health care. Normally, communication within the community itself is not a problem, but difficulties in communication between local and more central levels may be encountered. This may be particularly true in areas where communication methods are very rudimentary. Physical constraints often make communication links in the Region unreliable and slow. They may also be burdened with redundant information. While considering transmission of information, appropriateness of content, timeliness and the channel must be given due consideration. In many instances, rapidity of transmission should be given priority over high degree of accuracy or comprehensiveness while in other instances just the reverse may be needed. In addition, the channel of communication is often undefined, too cumbersome or ineffective. Information systems should be designed to be able to respond to these needs.

(6) Data processing and analysis, while not important at the local level, may be a problem in the system as a whole. Information which is not available when decisions are to be made is effectively useless, except for historical purposes. Attention needs to be given, therefore, to establishing facilities for data processing and analysis which can provide the needed information to decision makers when and where it is required.

## 6.2 Development

Keeping in mind the problems mentioned above the development and strengthening of the information system at the primary health care level must be planned through a step by step examination of the existing situation and needs.

Some of the fundamental considerations in developing the health information system at the primary health care level are discussed below.

(1) If the health information is to be used as a tool for making well-informed management decisions, consideration must first be given to identifying what sort of decisions are expected to be made which may either demand information from or provide information to the primary health care level. This obviously points out the two-way flow of information in the system. It should be recognized that the decisions to be made can range from fundamental policy (for instance, what is the relative priority of medical care and health education?) to the most routine (for instance, which village should the health worker visit on a particular date?). Knowledge of what types of decisions are likely to be made needs particular emphasis because all too often there has been a tendency to demand more information from local levels than can be processed or used for central decision-making purposes. This leads to excessive time spent in collecting and processing information which is often too late and not infrequently too inaccurate to support improved decision-making at the higher level. In addition, thought has to be given to how information systems can service the decisions being made at all organizational levels of primary health care. A methodical identification, at each level, of decisions which have a primary health care content is the logical first step in building an information system to service primary health care through improved decision-making.

(2) The next step is to identify the information that will be required to support the decision-making process and lead to improved decisions. The needed information must be provided, while resisting the temptation to overwhelm the decision-makers with information of marginal importance and presented in a raw, unanalyzed form and outdated in its applicability. All the information problems reviewed in the previous section must be considered in determining the requirements for information. With respect to the primary health care worker as an information initiator, care must be taken not to overload the primary health care system with collection requirements.

(3) Timeliness must get special attention. The time required for the collection, transmission, processing and analysis of information must be considered in determining information requirements. Probably primary health care information systems should be based on incomplete reporting, using sample data techniques. Primary data collection activity for the health services should not become the chief function of primary health care.

(4) Information systems are support systems. They are justified if they improve the effectiveness of the health care organization in delivering its services. When the information system is of such a magnitude that it interferes with service delivery rather than providing a net improvement, it requires a careful review. This flaw has often occurred in systems designed to support health centres. It should not be repeated when primary health care systems are implemented.

(5) Another fact which deserves attention is the distinction between information and data. Information is processed data presented in a format which will lead naturally and easily to good decisions. This includes not only reworking of numbers into easily used forms but also, and particularly, their presentation. Graphic displays and verbal conclusions and instructions should be used where possible. This is of particular importance in the flow of information downward to the presumably less sophisticated and more practical minded field workers. Careful attention to the processing of information and the format of its output can have a profound impact on organizational performance at the most basic level. Instructions through information which cannot be understood can hardly be expected to lead to proper and decisive action.

(6) There is also a need to maintain the perspective of a total national health information system to ensure co-ordinated development of the information system for national health services. Most successful comprehensive information systems are, however, developed as a set of sub-systems which are fairly independent. An information sub-system that satisfies the information needs of primary health care services is probably the most promising approach to successful information system support. Focussing on the primary health care level, from the point of view of both its own information needs and the best way to provide information to more central levels, will increase the probability of success. Organizing and managing at this level is a difficult process, and the importance of an information system concentrated on the specific needs of primary health care cannot be over-emphasized.

### 6.3 Organization and Function

An organizational and functional framework relating the national health information system with the health services at different decision-making levels is shown in the Annex. This will obviously vary from country to country depending on the organizational structure of the health services, but an attempt has been made here to show possible organizational and functional links for a national health information system as a whole, indicating the position and function of the sub-system at the primary health care level.

## 7 CONCLUSION

The development of a well-planned national health information service based on a modern systems concept may initially appear to be a difficult task, especially at the level of primary health care, which itself still needs to be properly organized in the countries of the Region. In view of the importance of a need-based information system for the management of the health programmes, however, concerted efforts to plan and implement a health information system in a phased manner will indeed be worthwhile and ultimately rewarding.

POSSIBLE INFORMATION FLOW FROM AND TO DIFFERENT  
DECISION-MAKING LEVELS OF THE HEALTH SERVICES

The attached chart attempts to identify the links between the primary health care information system and the national health information system. It also puts the primary health care activities in the perspective of the national health system.

For this purpose the chart shows, for different levels from the periphery to the central level, a broad outline of:

- (1) the basic organization in terms of manpower, supplies, equipment and facilities;
- (2) its main functions, both in terms of the health service and health information components, and
- (3) the information content.

The items listed within the different boxes shown in the chart are only illustrative and are by no means exhaustive; nor do they bring out in full, the complexity of the inter-relationships between the different organizational units and the information required, analyzed and produced by them. Certain basic characteristics of the total system nevertheless become evident. These are:

- (1) at the local level, the health service organization and the health information organization are identical; that is the same person(s) that provide health care also generate the related health information;
- (2) both the organization and the functions of the health service and health information systems get increasingly more separated, diversified and specialized as one moves away from the local to the central level;
- (3) most of the information needed by a decision-maker at the central level for planning, management, monitoring and evaluation of health services is, in fact, generated at the local level in the form raw data. It is these raw data and the related organization needed for their successive screening, consolidation, and diversification, that constitute the subject matter of the various health information sub-systems.

POSSIBLE INFORMATION FLOW FROM AND TO DIFFERENT DECISION-MAKING LEVELS OF THE HEALTH SERVICES

