DOCUMENT RESUME

ED 333 884 IR 053 628

TITLE	The Role of Research and Information Systems in Decision-Making for the Development of Human Resources for Health. Report of a WHO Study Group (Geneva, Switzerland, November 13-17, 1989). Technical Report Series No. 802.
INSTITUTION	World Health Organization, Geneva (Switzerland).
REPORT NO	ISBN-92-4-120802-3; ISSN-0512-3054
PUB DATE	90
NOTE	60p.
PUB TYPE	Collected Works - Conference Proceedings (021) -- Viewpoints (Opinion/Position Papers, Essays, etc.) (120)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Allied Health Personnel; *Decision Making; Foreign Countries; Information Needs; *Information Systems; International Cooperation; *Labor Force Development; *Professional Training; *Research Needs; Research Utilization
IDENTIFIERS	*World Health Organization

ABSTRACT

A study group meeting was convened by the World Health Organization to enable participants to share their expertise and experience in the areas of research and health personnel information systems, and to identify strategies for the better use of information and research in decision-making for human resources for health (HRH) development. This report provides information on that meeting in 13 sections: (1) Introduction (background information and goals); (2) Conceptual Framework (developed by the group to guide its work); (3) Development of Human Resources for Health in Support of Health for All; (4) Obstacles to HRH Development; (5) Decision-Making (levels of decision-making and information needs, use of information by decision-makers, and factors affecting decision-making); (6) Strengthening Decision-Making; (7) Information Support and the National Health Information System (types of information needed to support decision-making, national health information systems, and framework for an HRH information system); (8) Strengthening Information Systems (standardizing definitions of data, integrated versus coordinated systems, feedback, development and use of indicators, mechanisms for collecting information and use of informatics, and optimizing the contribution of information systems); (9) Research (decision-linked research, contribution of research to decision-making, and research priorities); (10) Strengthening Research (why little research is done and more effective utilization of results); (11) Approaches and Strategies To Strengthen Information Systems and Research; (12) Conclusions; and (13) Recommendations (to member states and to WHO). An illustrative example of essential HRH data is appended. (12 references) (BBM)

Report of
WHO Stu

IR 053628

The World Health Organization is a specialized agency of the United Nations with primary responsibility for international health matters and public health. Through this organization, which was created in 1948, the health professions of some 165 countries exchange their knowledge and experience with the aim of making possible the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life.

By means of direct technical cooperation with its Member States, and by stimulating such cooperation among them, WHO promotes the development of comprehensive health services, the prevention and control of diseases, the improvement of environmental conditions, the development of health manpower, the coordination and development of biomedical and health services research, and the planning and implementation of health programmes.

These broad fields of endeavour encompass a wide variety of activities, such as developing systems of primary health care that reach the whole population of Member countries; promoting the health of mothers and children; combating malnutrition; controlling malaria and other communicable diseases including tuberculosis and leprosy; having achieved the eradication of smallpox, promoting mass immunization against a number of other preventable diseases; improving mental health; providing safe water supplies; and training health personnel of all categories.

Progress towards better health throughout the world also demands international cooperation in such matters as establishing international standards for biological substances, pesticides, and pharmaceuticals; formulating environmental health criteria; recommending international nonproprietary names for drugs; administering the International Health Regulations; revising the International Classification of Diseases, Injuries, and Causes of Death; and collecting and disseminating health statistical information.

Further information on many aspects of WHO's work is presented in the Organization's publications.

* * *

The *WHO Technical Report Series* makes available the findings of various international groups of experts that provide WHO with the latest scientific and technical advice on a broad range of medical and public health subjects. Members of such expert groups serve without remuneration in their personal capacities rather than as representatives of governments or other bodies. An annual subscription to this series, comprising 12 to 15 such reports, costs Sw. fr. 100. (Sw fr 70. in developing countries)

IR

This report contains the collective views of an international group of experts and does not necessarily represent the decisions or the stated policy of the World Health Organization

The role of research and information systems in decision-making for the development of human resources for health

Report of a
WHO Study Group

World Health Organization
Technical Report Series
802

World Health Organization, Geneva 1990

WHO Library Cataloguing in Publication Data

WHO Study Group on the Role of Research and Information Systems in Decision-Making for the Development of Human Resources for Health
The role of research and information systems in decision-making for the development of human resources for health : report of a WHO study group.

(World Health Organization technical report series ; 802)

1.Health manpower 2.Decision making, Organizational 3.Information systems 4.Research I.Title II.Series

ISBN 92 4 120802 3 (NLM Classification: W 76)
ISSN 0512-3054

PRINTED IN SWITZERLAND

90/8572 - Schuler SA - 6000

CONTENTS

WHO STUDY GROUP ON THE ROLE OF RESEARCH AND INFORMATION SYSTEMS IN DECISION-MAKING FOR THE DEVELOPMENT OF HUMAN RESOURCES FOR HEALTH

Geneva, 13–17 November 1989

Members

Dr Bui Dang Ha Doan, Director, Centre for Medical Sociology and Demography, Paris, France

Dr V. Cucić, Professor of Social Medicine, Institute for Social Medicine, Belgrade, Yugoslavia

Dr A. Gani, Faculty Member, School of Public Health, University of Indonesia, Depok, Indonesia

Professor Kim Yong-Ik, Assistant Professor, Department of Health Policy and Management, College of Medicine, Seoul National University, Seoul, Republic of Korea

Dr R.-L. Kolehmainen-Aitken, West Newton, MA, USA (*Rapporteur*)

Dr Siraj-ul-Haq Mahmud, Senior Chief (Health & Nutrition), Planning and Development Division, Ministry of Planning and Development, Islamabad, Pakistan

Dr A.A.A. Nasher, President, Central Corporation for Scientific Research, Aden, Democratic Yemen

Dr R. Owor, Professor of Pathology, Makerere University Medical School, Kampala, Uganda

Dr G. Soberón Acevedo, Executive President, Mexican Health Foundation, Mexico City, Mexico (*Chairman*)

Secretariat

Dr F.H.T. Goon, Director, Division of Health Manpower Development, WHO, Geneva, Switzerland

Dr H. Nakatani, Scientist, Human Resources Policy Analyses, Division of Health Manpower Development, WHO, Geneva, Switzerland (*Secretary*)

Mr V.J. Peel, Head, Centre for Health Informatics, Health Services Management Unit, University of Manchester, Manchester, England (*Temporary Adviser*)

THE ROLE OF RESEARCH AND INFORMATION SYSTEMS IN DECISION-MAKING FOR THE DEVELOPMENT OF HUMAN RESOURCES FOR HEALTH

Report of a WHO Study Group

A WHO Study Group on the Role of Research and Information Systems in Decision-Making for the Development of Human Resources for Health met in Geneva from 13 to 17 November 1989. The meeting was opened by Dr E. Goon, acting Assistant Director-General and Director, Division of Health Manpower Development, who welcomed participants on behalf of the Director-General.

Dr Goon recalled that another WHO Study Group, on Implementation of Integrated Health Systems and Health Personnel Development, had met the previous week (*1*). Many issues remained to be resolved in human resources: he hoped that the Group would be able to decide on ways of improving decision-making for the development of human resources for health (HRH) in order to contribute to the resolution of those issues. The Group would consider the type of information needed for decision-making and whether problems were due to a lack of such information, a lack of research to provide it, or a lack of systems to link information and decision-making.

1. INTRODUCTION

> "Finding solutions to the problems of human resources for health calls for innovation and experiment ... There are no global panaceas. We can only stress that the solutions must be realistic and sustainable."
>
> Dr H. Nakajima, Director-General of the World Health Organization (*2*)

Human resources for health (HRH) previously referred to as "health manpower" are the corner-stone of any health system. Problems in the development of HRH need to be solved as quickly and efficiently as possible if adverse effects on the health system are to be avoided. The traditional focus of HRH development has been

on improving planning, education and training; not enough attention has been paid to management and the personal needs of health workers. Improved housing, better working conditions and greater opportunities for continuing education and career development can act as powerful incentives and lead to higher productivity. Innovative research is needed to determine how decision-making in all aspects of the HRH development process can be made more relevant to the needs of communities and the goal of health for all by the year 2000.

Mindful of the lack of accurate and up-to-date information and research to guide decision-making in HRH development, the Fortieth World Health Assembly adopted a resolution (WHA40.14) in May 1987 on the promotion of "balanced health manpower development" in which, *inter alia*, it requested the Director-General.

"1. To cooperate with Member States in strengthening their health manpower systems, including manpower planning, consistent with the strategies for health for all.
2. To promote urgent research into the fast-growing problem of health manpower imbalances and the exchange between Member States of relevant information and indicators concerning such imbalances."

Pursuant to that resolution, WHO has helped countries to strengthen their capacity to develop and implement information systems and research relevant to the HRH development process, which consists of policy formulation and planning, education and training, and management of health personnel. This collaboration has helped to develop national information systems on health personnel, increase research on national priority problems and ensure that decision-makers in a number of countries use information and research results more effectively.

The Study Group was convened in order to share expertise and experiences in the areas of research and health personnel information systems and to identify strategies for the better use of information and research in decision-making for HRH development.

The Study Group's specific objectives were:

1. To identify priority problems in HRH development which require urgent decisions.
2. To identify factors affecting those decisions.

3. To decide how *information systems* (which provide a means of collecting and making accessible existing information) and *research* (problem-related activities whose findings can provide new information) can best contribute to decision-making for HRH development.
4. To identify priority areas of information-gathering and research which must be strengthened in order to improve decision-making.
5. To propose systematic approaches and appropriate strategies to enable governments and WHO to strengthen national information systems and research.

2. CONCEPTUAL FRAMEWORK

In order to guide its work, the Study Group developed a conceptual framework which links the three components: (1) decision-making in the development of HRH, (2) research, and (3) the information system, as shown in Fig. 1. It also attempted to clarify the relation between the information system and the research process, which is shown in Fig. 2.

The development of HRH is brought about by the three interconnected processes of policy formulation and planning, education and training, and management. In all three processes, problems or issues inevitably arise which require decisions to be made at various

Fig. 1. Interrelationship of decision-making, research, and the information system in HRH development

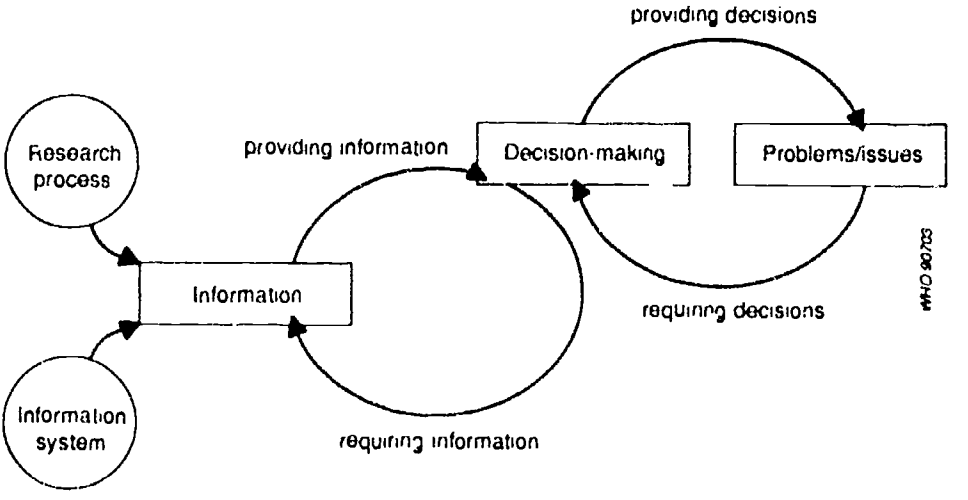
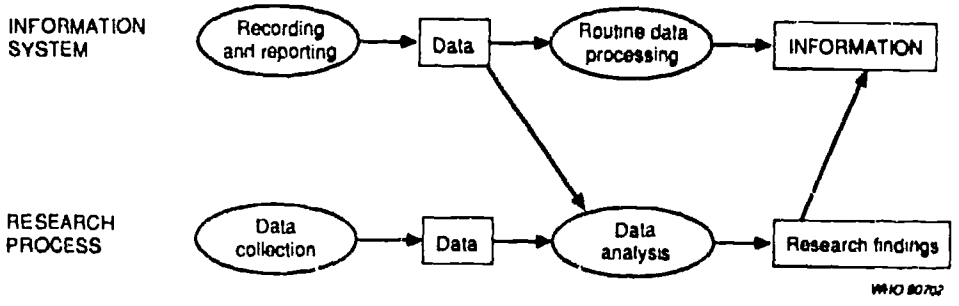


Fig. 2. Relation between the information system and research



levels of authority. For example, during policy formulation and planning, decisions will need to be taken about the optimum combinations of different health personnel required for the various levels of the health-care system, or the standards for staffing health-care facilities. In the process of education and training of staff, issues such as the relevance of the training programmes to the work of the participants will have to be decided. Similarly, in the HRH management process, decisions on deployment, supervision, motivation, provision of incentives, and removal of disincentives will have to be made.

This decision-making process depends on the availability of specific information. Even when it is available, however, the information may be inadequate or out of date. In such cases, the data needed may be obtained by conventional methods (such as requesting submission of routinely collected information) or by research. Depending on the type and level of decision needed, for example whether it is for planning, evaluation, or management of the HRH process, the research can take one of several forms, such as operational, descriptive, or analytical.

In some instances, where the information is available but is not being used, research may be done to find out how decision-makers can best use it. In such situations, research and information-gathering become necessary and attractive tools for decision-makers. The Study Group established a number of important distinctions between research and information-gathering, which are set out in Table 1.

Table 1. Distinctions between research and information-gathering

Aspect	Information-gathering	Research
Purpose	Assembly of existing information Monitoring Controlling Evaluation	Provision of new information Problem-related studies Evaluation
Frequency	Routine	To meet occasional needs
Methods	Recording and reporting	Standard research methods
Data collection techniques	Fixed/standardized	Specifically designed
Depth of analysis	Description only	Statistical validity, reliability and significance
Skills required	Data and data systems management and processing	Research methodology

3. DEVELOPMENT OF HUMAN RESOURCES FOR HEALTH IN SUPPORT OF HEALTH FOR ALL

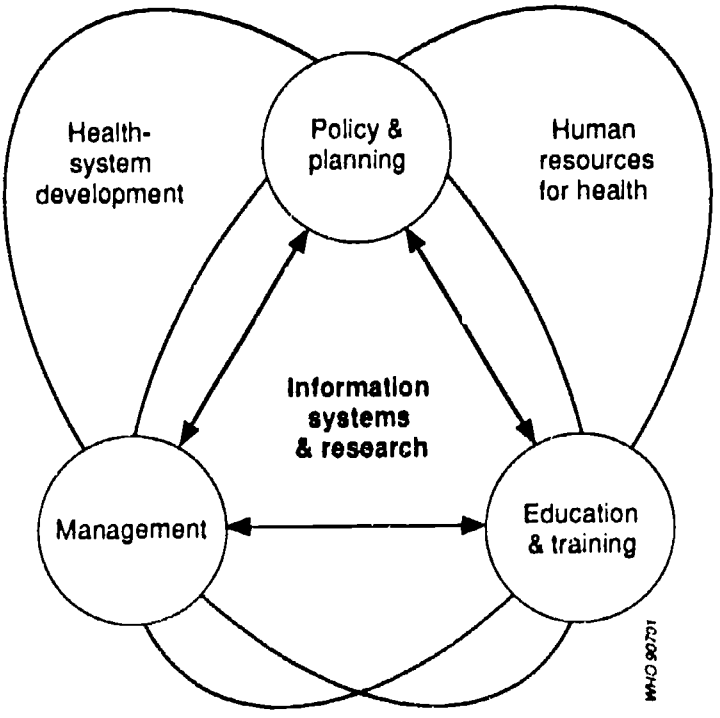
3.1 Coordinated health and human resources development (COHHRD)

The WHO Study Group on Implementation of Integrated Health Systems and Health Personnel Development (*1*), which met immediately before the present Study Group, felt that its title did not adequately reflect the underlying concept, and recommended that WHO and Member States adopt the term "coordinated health and human resources development" (COHHRD), which more closely reflects the intended meaning. In order to minimize confusion, the COHHRD expression was adopted by the present Study Group and is used throughout this report.

The term "coordinated health and human resources development" conveys the notion that the three broad functions of human resources development — namely policy and planning, education and training, and management — should be coordinated as closely as possible with the health system as a whole. Only by this means can it be guaranteed that staff are fully capable of the tasks expected of them.

Fig. 3 illustrates the relation between the three components of the HRH development process, the health system, and the role of information systems and research in decision-making.

Fig. 3. The role of information systems and research in supporting COHHRD



The following points should be borne in mind:

The health system should be oriented towards the main health needs of *all* the people, as far as available resources permit, and not just those of certain groups within the population. This approach has been adopted by many countries as part of the strategy for achieving "health for all by the year 2000 through primary health care".

A country's health system encompasses all activities that promote health, prevent and cure disease, reduce disability, and improve the quality of life; it thus deals with far more than the simple delivery of medical care.

Human resources are a major component of the health system; they must be regarded as a means of improving health, and not as existing in isolation.

The term "human resources for health" refers to all who contribute to the health system's objectives, whether or not they have formal health-related training or work in the organized health sector. Human resources development is concerned with policy and planning, and management, as well as education and training.

—The effectiveness of the health system will depend largely on the extent to which human resources development and health systems development are carried out concurrently and in the closest possible coordination.

3.2 HRH in support of health for all

If the HRH development process is to support health for all, there must be:

- national personnel policies in which quantitative and qualitative health personnel requirements are matched to health needs;
- political commitment to a reform of HRH development;
- the capacity for educational systems to respond to the rapidly changing need for some types of health personnel and a reorientation of training programmes to meet health-for-all goals; improved living and working conditions for front-line health workers; better career development, closer supervision, and opportunities for continuing education.

Much has been written about possible strategies for developing each of these aspects of HRH development, and much national and international effort has been invested in institutional development and training in this area. However, in most countries, problems in the HRH development process still remain a major concern. The practical application to national health systems of knowledge on HRH development has become a priority. The WHO Expert Committee on Health Manpower Requirements for the Achievement of Health For All by the Year 2000 Through Primary Health Care (*3*), which met in December 1983, reviewed in great detail the health personnel situation and made several recommendations, including some on strengthening information systems for HRH and research into HRH development. The Committee stated that appropriate information support is vital for the proper functioning of the HRH development process, and particularly for managerial effectiveness.

4. OBSTACLES TO HRH DEVELOPMENT

Since the Alma-Ata Conference in 1978, Member States and WHO have made great efforts to implement strategies for health for

all, in particular those concerned with health personnel. However, an analysis in 1987 showed that, despite some progress in the training and availability of health personnel, there were still many major obstacles to be overcome in all three areas of the national HRH development process and in making HRH development more relevant to national strategies for health for all.

Policy and planning. While a number of countries in all the WHO regions have developed plans, some of them based on HRH policies, there are still many countries with no HRH plans and few clear policies. Most of the existing plans suffer from being too quantitative, concentrating purely on the required numbers of various types of health personnel. Qualitative aspects, based on job descriptions for each category of health worker to serve as a basis for the quantitative projections, are usually lacking. Moreover, resource requirements and availability are commonly not taken fully into account, with the result that plans are often only partly implemented. Poor coordination between planners, the education system (especially universities), and health services (as the employers of health personnel) results in unrealistic plans for training which are then ignored by the training institutions.

Education and training. One of the major problems in the training of health personnel is the reorganization of training programmes, especially for the professional categories, to make them relevant to the needs of a health system based on primary health care. Teachers, programmes, and processes are sometimes strongly resistant to change, and there may be no incentive for teachers to change conventional and often irrelevant curricula and processes. Even when training staff are willing to change existing training programmes, a lack of analysis of functions or tasks can hamper their efforts to do so. Finally, in some countries there is a formidable gap between the quantity and quality of school-leavers and the requirements of the health training institutions.

Management. Although the human resource pool of practically all countries has been considerably diversified compared with the physician–nurse model of the past, the shortage of certain categories of health worker remains a problem in many developing countries. In addition, only a few countries have a pattern of health personnel distribution (by geographical area, job, specialty, and type of health care setting) that matches the community's needs. Paradoxically, while some countries are still short of professional health personnel, in many others, training of too many staff in certain categories and

their consequent underemployment and unemployment are becoming increasingly serious. The lack of HRH plans based on studies of the work actually done by health personnel has also hindered the effective utilization of health workers. Consequently, the development of health personnel, supervision, performance assessment, career development, and incentive schemes, as well as the planning of basic, postgraduate, and continuing education for the entire health workforce, lack a systematic basis.

These serious problems in the HRH development process call for urgent attention. If they are ignored, they will only accentuate the existing severe difficulties, such as:

- the discrepancy between the number of health staff produced, the number needed to meet the country's health needs, and the number the country can afford to employ;
- inappropriate geographical distribution of staff;
- low quality and irrelevance of training in relation to national health needs and the work expected of health workers;
- a mix of health personnel inappropriate to the health needs and socioeconomic resources of the country;
- inappropriate or inadequate health personnel management policies and procedures, resulting in misuse of staff's abilities, poor morale, low productivity and, often, loss of valuable and scarce human resources (*4*).

5. DECISION-MAKING

5.1 Levels of decision-making and information needs

The decision-making process begins with the recognition of the issues involved. It then continues with the specification of the problems, the setting of goals, consideration of possible solutions, the making of a decision, the implementation of the chosen solution, and, finally, assessment of the results. Information — either collected routinely or obtained through research — should guide each stage of the process. Timely, usable information makes decision-makers aware of the issues needing attention, and helps them to determine priorities and evaluate the results of the decision made.

Decision-making in the development of HRH occurs at each of the following levels:

—policy-making and planning level: politicians and higher-level managers in health services, academic institutions, and civil services;
—administration and programme management level: middle managers responsible for managing health programmes and training programmes;
—technical and operational level: operational-level managers responsible for managing front-line health institutions and their support staff.

At the *policy-making and planning level*, the types of decisions policy-makers are called upon to make affect areas such as the numbers of people trained in various categories of health personnel, the number of graduates employed, the mix of health personnel (e.g. the ratio of highly trained personnel to those trained to an intermediate level), and the curriculum and training environments. They might also need to review and restructure personnel management in the health sector, making decisions on recruitment, salary differentials, financial and social incentives, transfer and promotion policy, and compulsory periods of service in rural areas. Such decisions will require courage, innovation, imagination and determination. They are more likely to be effective if they are supported by adequate information.

Academics and trainers would be in a better position to tailor their programmes to the needs of the country if they had information on HRH plans, on the availability of posts and sources of employment and remuneration for graduates, and on their utilization and levels of competence and performance.

At the *administrative and managerial level*, besides making detailed programming and budgeting decisions, managers may have to determine the expected functions and levels of competence of various categories of staff in their administrative areas, create posts, recruit personnel, determine the distribution of health personnel both by geographical area and by specialty, and provide opportunities for continuing education. Employers who are responsible for managing health personnel therefore need information relating to the country as a whole, not only on policy decisions, planning and training but also, for example, on the distribution of staff, their mobility between the public and private sectors, the health personnel mix, and opportunities for continuing education.

At the *technical and operational level*, decisions are concerned with day-to-day activities, for example determining tasks that are to be performed by various categories of staff, dividing the time available among the various tasks, and setting targets for achievement. Such decisions would be made more rationally if operational-level managers had information on the actual performance of their staff, and the relative effectiveness of alternative ways of performing a task.

5.2 Use of information by decision-makers

Decision-makers are often not accustomed to formulating their own information needs. Furthermore, they rarely involve the community when attempting to identify its needs. The way in which information is gathered and used depends on the time available before the decision has to be made. For instance, in day-to-day administration where decisions often have to be made very quickly, the administrator of health service personnel may take into consideration information on a similar case or information immediately recalled or obtained from staff. The decision may be intuitive or it may be deferred until existing information has been reviewed or new information has been obtained by problem-oriented research.

Other situations, such as meetings of committees, working groups, and task forces, may call for instant decisions based on information immediately recalled by members. On the other hand, the meeting may decide to wait for further information, obtained from a literature search or from specially commissioned studies, before making a decision.

A third situation may arise during policy formulation, planning and programming, for example. In such cases, decisions can usually wait until information has been obtained by means of specific studies, such as situation analyses, surveys or evaluation studies, or through an extensive literature search.

In all the above situations, research is an essential means of acquiring information for decision-making. This is the basis of what is now called "decision-linked research" (see section 9.1). This approach to research establishes links between the research and decision-making processes. In the usual run of events, if the two processes are linked at all, it is only after the research has been completed. The decision-linked approach reverses this sequence:

researchers and decision-makers first discuss and identify the decision-makers' information needs, and the research is then designed to respond directly to those needs. This will ensure, as far as possible, that research results are actually used in decision-making.

5.3 Factors affecting decision-making

Decision-making in HRH development is influenced by a complex set of interrelated factors. These include the availability of the information needed, skills in making use of information in managerial decision-making and the authority to make and implement decisions.

5.3.1 *Factors related to information*

(*a*) *Lack of information.* Although some countr es are aware of the imbalance in their health personnel mix, many others have not yet recognized the problem or responded to it. Data on unemployment, underemployment and its impact on medical care, and the movement of medical, nursing and other health personnel are often not collected or analysed; little or no appropriate HRH research is conducted. The interdependence of the training and the subsequent utilization of health personnel may not be recognized, and the need to plan ahead is not adequately acknowledged.

Policy-makers, who determine salary differentials and financial and social incentives, and managers, who control transfers, promotions and appointments, are often not sufficiently aware of or committed to the need to correct imbalances in the distribution of health personnel in order to achieve health for all.

The Study Group felt that the problem affects doctors most severely. Leaders in the field of medical education are often unaware of the extent of oversupply, unemployment, discontentment and migration among doctors. In many countries, such data are often not compiled routinely or are unavailable in usable form to educators and other decision-makers. Medical educators may consider that their responsibility extends only to the training of medical personnel; subsequent problems in employment, utilization and distribution are seen as the responsibility of politicians and health administrators. They do not consider medical education to be part of a larger subsystem of training of human resources which, in

its turn, is a component of the health system as a whole. In addition, the factors—both domestic and international—that can affect the balance of distribution of health personnel have not been fully recognized.

(*b*) *Poor utilization of available information.* Within ministries of health, large social security organizations and other major employers of health personnel, there is usually a large volume of statistical data about health personnel. Much of this, however, is scattered through files, ledgers, registers and records, and is not used to monitor rates of staff employment, utilization, distribution and costs, nor is it related to the health needs and health demands of the community. Some of the data are routinely compiled as official statistical reports because they are required for annual reports or budget control. Often, however, little attempt is made to analyse the data in relation to the major issues in HRH in order to detect trends and recognize emerging problems.

Similarly, institutions within ministries of health responsible for the training of many categories of health personnel may neither analyse the available quantitative or qualitative data on their graduates properly, nor use the data to determine future training needs for both basic and continuing education.

Data on unemployment, underemployment, migration and cases of malpractice, which are usually available from organizations responsible for the registration or licensing of various types of practitioner (medical and nursing staff, pharmacists, etc.), are seldom analysed or utilized by those who train such personnel, or by those who employ and manage them. Furthermore, in many countries, registries are inaccurate or too outdated to provide reliable information.

The Study Group pointed out that many decision-makers are not fully aware of the usefulness of information obtained through research, because they have had little exposure to it. Most HRH research is conducted by academic institutions. Where decision-makers have not been involved in drawing up research questions, they may not see the results as relevant to their needs, and are less likely to feel committed to using them.

(*c*) *Poor communication.* Politicians and higher-level managers may seldom have time to read research papers or international and local research journals, and often do not know either the extent of the available information, or where to look for it. Moreover, many research papers may be written in a style and language which are not

readily understood by those unfamiliar with the subject matter; information and statistics are not presented in a form which can be easily assimilated and used for decision-making. Many decisions are, therefore, taken on the basis of sociopolitical pressures or "professional intuition". The same situation applies to administrators and managers who, in addition, frequently have to solve urgent problems on a daily basis. All too often, they are swamped with statistics which are collected routinely, but which have not been analysed and converted into information that can be used in decision-making.

Poor communication and use of information also affect front-line managers responsible for the training and management of health personnel. In larger, understaffed urban institutions, they are frequently overworked, and have a daily struggle to keep to the schedule of training activities, preparation of duty rosters, ward rounds and clinic visits. In rural, isolated situations, they may be bored by their repetitive jobs and receive little supervision, support or stimulation from their peers. In both situations, they often have to collect large amounts of data on a routine basis, but they tend to see this as a task done for higher levels of management, rather than as a process which might assist decision-making at their own level. Often, they lack the skills to convert statistics into meaningful information.

5.3.2 *Factors not related to information*

(*a*) *Perceptions and expectations of society*. Political and social pressures exert a powerful influence on decision-making. Advances in international communication mean that dramatic advances in medicine, most of them in the tertiary care of particular disorders, are widely reported almost as soon as they occur. This raises the expectations of the public which, more and more frequently, demands expensive high-technology care, with little understanding as to its appropriateness.

Politicians may be hampered in their decisions on priorities and choices by a lack of information on health needs and health personnel and distribution. They are thus particularly vulnerable to the influence of the mass media, which give prominence to spectacular advances in medical technology. They may consider it a matter of national pride to make such advances available to their citizens, without considering whether less well publicized and less

dramatic technology could bring health benefits for a much larger proportion of the population. Political pressures exerted by often influential power groups may adversely affect decision-making on the health personnel mix and the geographical distribution of resources.

In addition, the perceptions and expectations of society can hamper political decision-making. For example, the right of individuals to choose their own careers is acknowledged in the constitution of many countries. This can place constraints on the implementation of HRH plans.

(*b*) *Economic forces and financial realities.* The periods of economic growth during the 1960s and 1970s brought a rise in average income in many countries. The private health-care sector expanded in urban areas, taking scarce human resources from the public sector and providing high-cost care, with an emphasis on high-technology equipment and procedures. This change in the distribution of human resources was influenced by economic forces.

The economic slow-down of the 1980s clearly revealed the phenomena of oversupply and unemployment. Financial problems reduced each country's capacity to absorb extra staff, and this resulted in less international migration. Hence, unemployment among physicians and other highly trained health personnel became more common.

In market-economy countries, the allocation of funds for health personnel, particularly doctors, is a compromise between what the government determines it can afford, and the doctors' expectations of their personal income. Therefore, decision-makers dealing with health personnel in market-economy countries have to recognize and respond to national priorities on relative expenditure in the health and non-health sectors. Furthermore, decision-makers must also take into account the political and economic forces which affect the movement of health personnel into and out of the country. In view of these complex issues, it is not surprising that the decision-making is often of poor quality and merely aggravates the problems of HRH development.

6. STRENGTHENING DECISION-MAKING

The Study Group reviewed several issues relevant to the improvement of decision-making in HRH development.

The *political and social climate* should support the reorientation of HRH development to bring it into line with health-for-all goals. Sectoral power groups may have had a powerful influence on decision-making in some areas; without adequate political and social support, managerial decision-makers may be unable to withstand such pressures. The Study Group stressed that the level of social support for the reorientation of HRH is largely dependent on the degree of involvement of the community in HRH development.

The *organizational climate* should be conducive to rational decision-making. The organization of the health service, the degree of decentralization, accountability and responsibility accorded to managers at various levels, the expectations of the organization and other related organizational characteristics all affect the decision-making process. Managers who are capable of making good decisions may fail to do so because of organizational constraints. Since decisions affecting HRH are not taken in the health sector alone, an effective coordination mechanism should be established between the various organizations and organizational levels.

Appropriate decision-making skills should be fostered in the HRH development system. These include the ability to analyse problems, using a systems approach that recognizes HRH as a subsystem within the health system, and appreciates the relationship between the health system and other systems, such as the economic and education systems. Problem analysis should include the identification of the information needed to solve the problem. In particular, the manager should recognize what information is required at any one time to bring about change and monitor its progress. If such information is not already available, the manager should be capable of requesting it from the relevant sources. Finally, having acquired the appropriate information, the manager should consider the possible options and their implications, and make a rational choice.

Appropriate information support should be available for decision-making. This includes the provision of information relevant to the level of management where the decision is being taken. It also implies that the information should be available in a simple and easily understood form and should arrive quickly enough to influence the decision.

Some of this information will be available through routine monitoring processes, using existing information systems. It may be necessary to rationalize the monitoring system by improving the use

of performance indicators. There is also a need to improve the quality, timeliness and appropriateness of the information by introducing or improving the use of informatics.

Other information will need to be obtained through research. If information required for decision-making at any level of management cannot be obtained from the routine information system, the question can be referred to a research institution, where appropriate research can be designed to answer it.

7. INFORMATION SUPPORT AND THE NATIONAL HEALTH INFORMATION SYSTEM

Information support is vital for managerial effectiveness. Many countries have strengthened their health information systems during the past few decades, and some types of data on health personnel and health needs are available in most. However, a great deal remains to be done in order to convert such data into information of sufficient quality to support decision-making in the development of HRH.

The 1986 Acapulco Conference on Health Manpower Out of Balance identified "an urgent need to develop sufficient relevant information about health personnel to determine ... trends, assess the current situation and possible changes required ... To this end, countries need to monitor systematically the production, employment and atilization of health workers" (*4*).

7.1 Types of information needed to support decision-making

The Expert Committee on Health Manpower Requirements for the Achievement of Health for All by the Year 2000 Through Primary Health Care (*3*) recommended that information related to each component of the HRH development process should be included in the management information system for health personnel. It suggested including the following:

Health personnel planning
- health personnel requirements,
- availability,
- job profiles,
- dropout rates,
- assessment of community needs (derived from research),
- assessment of resources.

Health personnel production
—staffing needs of training institutions,
—production capacity,
—pools of potential trainees,
—dropout rate from training programmes,
—availability of continuing-education programmes,
—research data on effectiveness of training.

Health personnel management
—traditional personnel records, including information on appointments, transfers, leave, promotions and retirements,
—information to enhance job motivation, including trends in staff deployment, performance, utilization and expectations, extent and content of supervisory visits, and job satisfaction,
—monitoring for staff effectiveness, including data on staff productivity, quality of work, and community attitudes towards staff, including satisfaction with staff performance.

Subsequently in 1988, a Consultation on the Collection and Use of Health Manpower Information proposed a set of indicators for assessing the HRH development process (*5*). These are described in section 8.

7.2 The national health information system

Early in the 1980s, WHO had begun to promote national health information systems (NHIS). However, the term "health information" meant different things to different people, depending on their area of primary concern. Because of different perceptions, a document was prepared by WHO in 1980 (*6*) to help Member States to develop a general framework and guidelines for the establishment and maintenance of their own national health information systems. This document defined a NHIS as a family of "mechanisms and procedures within a country intended primarily to acquire, analyse and provide the information required: (*a*) by all levels of health planners and managers for the planning, programming, budgeting, monitoring, control, evaluation and coordination of national health programmes; and (*b*) by other members of the health professions—health care personnel (e.g. medical and public health personnel, sanitary engineers, dental workers, pharmacists and auxiliary personnel of all categories), health research workers, and educators and trainers of health

personnel—each in support of their respective roles in the national health programme. The system also provides specific health information to users outside the health sector, particularly national policy-makers, socioeconomic planners and the general public."

A NHIS is thus considered to include all health-related information required by both "health planners and managers" and "other members of the health professions". A third group is also identified—"users outside the health sector, particularly national policy-makers, socioeconomic planners and the general public".

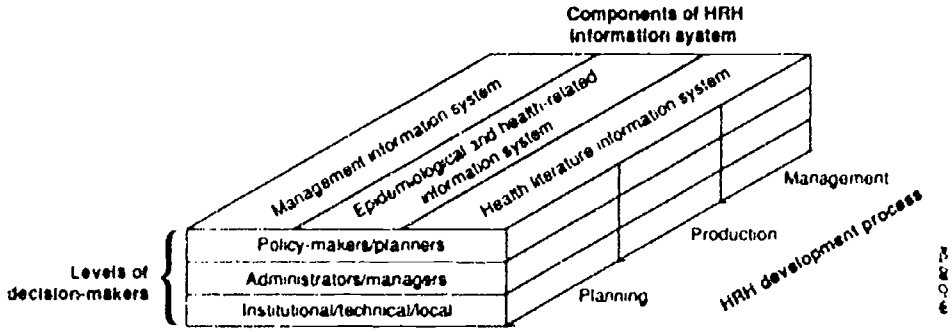
7.3 Framework for an HRH information system

The HRH information system should be included in, and developed as part of, the NHIS. Three dimensions of an HRH information system may be identified:

1. *Categories of information* HRH managerial and operational information, HRH epidemiological and health-related information, and literature on all aspects of the HRH development process.
2. *Components of the HRH development process* planning, production and management of HRH.
3. *Information for users* policy-makers and planners, managers, and those involved in decision-making of an institutional, technical or local nature.

All these aspects may be put together in a three-dimensional framework of an HRH information system, which brings out its multifaceted nature (Fig. 4).

Fig 4 A three-dimensional framework for an HRH information system



8. STRENGTHENING INFORMATION SYSTEMS

8.1 Standardizing definitions of data

Regardless of the level and intended use of the data, the Study Group strongly recommended that any national approach to using human resources data should include a standard definition of each of the items of data to be collected.

Without such definitions, and a mechanism to ensure that they are adhered to, there can be little hope of credible or valuable information being available to national or regional decision-makers when it is needed. This applies to both manual and computer-assisted information systems.

8.2 Integrated versus coordinated information systems

Most information on HRH development is generally collected and kept by several different departments or organizations. For instance, health personnel records are kept in the personnel division or a similar department, whereas data on aspects of health personnel training, including training needs, numbers of graduates trained, and details of institutions are normally kept by the training division of the ministry of health. Information on the training of some health professionals, such as doctors, nurses, pharmacists and dentists, may be kept by universities and may thus not be readily available. In many countries, professional associations can also provide such information from their records. However, the links between these sources of information are often either inadequate or non-existent.

For decision-makers and users, it would be useful if all the information on development of health personnel kept by various agencies could be available from one integrated system. However, in practice this is fraught with obstacles. The WHO Expert Committee on Health Manpower Requirements sounded a note of caution in this respect (*3*, p. 62) stating:

"Each country has to decide whether to introduce an integrated and centralized health manpower information system or to coordinate the health manpower information that is being kept by different subsystems. Efforts to launch an integrated health manpower information system, as part of a national health information system, have often failed precisely because information is jealously guarded by potential users. In order to break down the

barriers, it may be advisable to approach the problem cautiously, starting with coordination so that none of the users feel left out."

8.3 Feedback

The importance of feedback to all levels of decision-maker is well recognized in the NHIS. The WHO Expert Committee on Health Manpower Requirements therefore recommended the establishment of a mechanism by means of which data obtained by monitoring health personnel can be fed back into the planning, production and management subsystems, so that adjustments can be made to adapt to changing circumstances.

8.4 Development and use of indicators

The WHO Expert Committee on Health Manpower Requirements recommended that country-specific HRH indicators should be developed in order to monitor the progress of HRH development in pursuit of the goal of health for all. Such indicators may be quantitative or qualitative. When the indicators have been identified and implemented, they can be used to set national norms and targets, against which performance can be monitored. They can be used to monitor trends and to detect early signs of personnel imbalance. As information accumulates and research addresses itself to pertinent issues, the monitoring and coordinating system should become more responsive and better able to predict and prevent health personnel problems.

In 1988, the WHO Consultation on the Collection and Use of Health Manpower Information proposed a set of indicators to assess HRH development at country level (*5*, p. 11). These are as follows:

Orientation of health care

1. Percentage of health budget spent in primary care and in secondary tertiary care hospitals and in urban as opposed to rural areas. (The Study Group considered it important to modify this to distinguish between three populations, namely urban affluent, urban poor and rural.)
2. Proportion of professional health personnel working in primary care and in hospitals above the district level.
3. Trends in personnel trained for geriatric care.
4. Specialized physicians as compared to general practitioners.

Equity

1. Ratios of selected categories of health personnel to the population in different provinces/states/districts.
2. Trends in access of population to organized health care (e.g. percentage of population living within 5 km of a health facility).
3. Vacancies by geographical areas (provinces/districts).

Functions/performance

1. What types of personnel perform/assist in births/deliveries.
2. Deviation from established norms of service, if they exist, for selected health conditions.
3. Proportion of districts having integrated health management teams.
4. Growth of refresher/continuing-education courses to add new skills and improve performance.

Economics

1. Proportion of health budget allocated to salaries, drugs, equipment.
2. Trends in earnings (or fees for service) for selected categories of health personnel.
3. Trends in public/private sector expenditures.
4. Rate of return on education (health and other sectors), e.g. earnings as a ratio of cost of training.

Numerical imbalances

1. Trends in health personnel population ratios over a 5 10 year period.
2. Trends in numbers of graduates over a given period.
3. Trends in underemployment or unemployment.
4. Trends in ratios of number of graduates to number of recruitments by public sector.
5. Trends in proportions of health personnel in public private sectors, etc.

Imbalances in quality of graduates

1. Number of schools for the health professions that have revised their curricula towards primary health care.
2. Proportion of curricula oriented to primary health care.
3. Proportion of time a community nurse spends in the community.

Occupational imbalances

1. The ratio of nurses or other categories of health workers to doctors.

The Study Group, taking this list as a useful starting point, defined the minimum data sets on posts, personnel and qualifications that would be required to derive these indicators. They appear in the Annex (p. 51) as examples that can be further modified at country level.

8.5 Mechanisms for collecting information and use of informatics

Collecting, recording and analysing data on HRH is tedious, time-consuming and generally expensive. Moreover, the data are usually widely dispersed and therefore difficult to collect, and for various reasons these data are usually updated only at irregular intervals. Managers need to obtain information that is up to date and reliable. The WHO Expert Committee on Health Manpower Requirements felt that, in particular, there was scope for the development of new and inexpensive ways of collecting HRH information relevant to community needs.

Informatics may be defined as a combination of technology and methods which makes possible the collection, storage, processing, retrieval, distribution and management of information with the assistance of a computer. The rapid expansion in health services in many countries and the mass of data which needs to be collected, processed and analysed have made it difficult for ministries of health to work effectively with a manually operated information system. Such a system may be quite adequate for the local provision of information for a single unit or a small district, but in the more central levels of the service, an increasing number of organizations are introducing a computer-assisted system.

The aim of using informatics in the HRH information system is to improve access to reliable and appropriate information in useful quantities and to make its collection, storage and manipulation easier, faster and more cost-effective. The Study Group stressed, however, that introducing a computer into a poorly planned and managed health information system will not improve the standard of information. When preparing for computerization, the first step is to streamline the manual system of data-handling. It should also be borne in mind that the introduction of computers is not merely a mechanical process. Successful computerization calls for the rationalization of managerial procedures, profound organizational and behavioural changes and the acquisition of new skills.

8.6 Optimizing the contribution of information systems

Many countries maintain central/national records of the qualifications and subsequent registration or accreditation of professional health-care staff. This registration process, which requires frequent access to and periodic updating and checking of large volumes of data, lends itself readily to computerization.

At local level, specialized personnel departments maintain information about staff, covering, for example, vacant posts, staff assignments, job descriptions, individual personnel data, training needs, job termination patterns and staff availability. A personnel system, while respecting the need for confidentiality, should allow managers direct access to data on an individual worker. A computer-assisted system offers this possibility. It can also be linked directly to budgeting systems and to similar strategic planning or control tools.

For any organization, information on the management structure can provide a profile of the organization itself. All the posts have to link together in an ordered manner to provide lines of responsibility and accountability. Computer-assisted personnel systems are able to amend information on the structure rapidly and provide a simultaneous and up-to-date profile to all authorized users, thereby helping management to analyse and compare information from throughout the organization.

Computer systems can define the "establishment" of an organization (the preferred and/or funded number of posts) and keep track of the actual number employed compared with the establishment figure, converting part-time posts into their full-time equivalent. They will automatically quantify the establishment numbers in cash terms for the estimation of departmental budgets.

In many areas of a health service, departmental heads keep comprehensive manual records on their staff. Computerization of these manual systems allows information on different groups of staff to be linked together and provides complete, consistent and comparable sets of data with which to manage the health workforce.

Many personnel systems today are able to answer questions such as:

Is there anyone with surgical skills of level "y" who is not on duty, but who could be contacted to give extra support today?
Where is "x" working at present?

If the attendance, absence and sickness of staff are recorded, statistics relating to work patterns can be automatically generated. The personnel attendance system can be linked with the payroll in order to calculate workers' remuneration.

Using an information system of this type, a manager could obtain answers to questions such as:

—How much has overtime for grade "x" cost my department this month, and how does that figure compare with those for other grades or other periods?
—How many grade "x" staff are there in the district?
—How many staff could benefit from a particular study course and what is the demand for it?
—How many posts in which areas are filled by part-time staff?
—What is the sickness/absence pattern in the department and is it acceptably near the "norm"?

On a larger scale, it may be necessary to consider the likely consequences of certain events, such as an impending pay award, a proposed change in the retirement age or a proposed reduction in staff.

The HRH information system need not contain all the elements identified above. A system may develop by increments or by being linked to other systems. The functions required will depend on the limitations and expectations of the organization concerned. Nevertheless, all the functions identified above are almost certain to be carried out within the organization, but local custom and practice will have determined where, when, how and by whom. Once again, it is important to consider which items of data should be collected and how they should be defined. Ideally, the data items should conform to an agreed data model which describes them and their characteristics in relation to management and personnel functions. Reviews of existing computerized personnel systems will increasingly highlight other issues which need to be addressed.

To sum up, the Study Group stressed the need to examine the costs and usefulness of two main options: (1) collecting and maintaining up-to-date and readily accessible data on personnel, which may be very costly, and (2) operating a cheaper, but possibly less convenient, system with costs incurred for the collection of data on an *ad hoc* basis when required. While computer technology offers the tools for handling data in a cost-effective way, great care must

be taken not to collect or hold items or perform analysis without justification, merely because the technology makes it possible.

9. RESEARCH

9.1 Decision-linked research

Many questions connected with all three aspects of HRH development (policy formulation and planning, education and training, and management of health personnel) call for research. However, the primary role of research in HRH development should be to provide information which is unavailable through the existing information system. This is the basis of what has been called "decision-linked" research. Since decision-linked research is focused on questions relevant to the needs of decision-makers, there is a much greater chance that they will actually make use of the results.

Well designed and effective information systems should be able to provide decision-makers with considerable information on a regular basis, covering, for instance, the health status of the population, the availability and distribution of personnel, and indicators of utilization and productivity. However, other information may be required from time to time for management and decision-making in particular areas, e.g. on the extent to which graduates are performing the functions they have been trained for, or the organizational arrangements which achieve the best staff retention rate in rural areas. Research can provide information on these issues. Case-studies from Botswana, Indonesia, Malaysia and Norway (*7*) illustrate that, while routine monitoring provided information on the trend of events, it could not explain why problems occurred in particular services or areas: specifically designed research was needed to obtain such information.

The information needed for HRH development is diverse and complex. Where it is not readily available to decision-makers, research can provide it. When the information exists but is not being utilized, the role of research is to make it accessible. Research to provide relevant information must draw on disciplines such as epidemiology, demography, behavioural science, management science and economics. Health systems research (HSR) takes this multidisciplinary approach (*8*), and HRH research cannot, and

should not, be separated from it. Coordinated research in these two areas can be a powerful means of improving health care.

9.2 Contribution of research to decision-making

The Study Group reviewed several examples of the contribution of research to HRH decision-making, taken from the members' own experience. The potential contribution of research to health personnel development has been described by Taylor (*9*); further examples are cited in the Report of the WHO Study Group on Research for the Reorientation of National Health Systems (*8*).

Written evidence of the contribution of research to HRH development is limited. This is partly because such research is often directly commissioned by management, so that the findings are subsequently treated as management documents and do not find their way into print. To give two examples from Malaysia: a study on "Evaluation of training for family health services" led to widespread efforts to improve supervision of front-line health workers and the provision of continuing education for them; and a "Comparative study of community nurses and assistant nurses" is being used to decide whether the hospital-based assistant nurse should be replaced by the more versatile community nurse, who undergoes a similar period of training. Neither of these studies has been published, but both have been used in decision-making.

Such examples are found in many countries. In Botswana, for example, a study of the low utilization rate of a rural clinic showed that the negative attitude of the nursing staff and poor communication between staff and the community were making people seek care elsewhere (*7*).

Another example of the contribution that research has made to HRH development comes from the Netherlands (*7*). The Government, faced with an oversupply of dentists and consequent unemployment in this group, commissioned a study that clarified the options and their possible consequences. The information obtained made it easier to introduce changes leading to a reduced intake of dental students. Roemer (*7*), analysing HSR in the United States of America since 1930, discussed the relation between research and policy changes in ten cases. These included areas of HRH development such as increasing medical school enrolment in response to an expanding demand for medical care, training auxiliary medical personnel for primary medical care, and

developing the specialty of "family practice" in order to increase the availability of general primary health care. He concluded that "the relationship between research on health systems and policy changes or innovations need not be expected to be simple and direct ... many social forces are at play in society, to bring about system changes, and research findings have provided crucial support in defence of a certain course of action" (*7*, p. 122).

The use of findings from such research should lead to better informed decisions on HRH development. Decision-making will thus become less arbitrary and more influenced by objective considerations.

If the existing information systems are not yet able to support HRH development, HSR can provide much of the data needed. For example, at the Interregional Workshop on Economics of Health Manpower Development in Support of Primary Health Care, held in Manila in 1987 (*10*), three of the ten participating countries proposed to undertake studies on the availability and distribution of health personnel, while another proposed to study overproduction and overspecialization. Critical variables can be identified on the basis of these studies, and information on them may eventually be produced by routine information systems. Information on other variables can be obtained as necessary, by other conventional methods (for example by reviewing existing socioeconomic indicators) or research studies, and need not be produced routinely. In Botswana and Indonesia where routine reporting systems were not then in place, household surveys provided data on health status that have been used for a variety of planning purposes, including personnel planning.

9.3 Research priorities

HRH development should be coordinated with the development of health systems for health for all. Accordingly, research priorities should be determined by consideration both of the priorities for health personnel development if it is to support health-for-all goals, and of the information needed for decision-making in these priority areas.

The WHO Regional Office for Europe has set an example in a document detailing priority research for health for all for the region (*11*). In the area of HRH development, some of the priorities that have been identified include: research to develop standardized

indicators and definitions so that nationwide as well as regional comparisons can be made; research into the implications of reallocating resources in line with needs, including the transfer of resources from hospitals to primary health care (PHC); investigation of personnel requirements for PHC, structure and content of training for PHC teams and management, and the social acceptability of PHC; and studies of the effectiveness of lay medicine and self-help groups. In the area of appropriate care, a major priority is research into the health needs of the population and the performance of health workers and, on that basis, estimations of the number, qualifications and mix of health personnel needed.

Research priorities for HRH development can be determined in a similar way in any region or country. So that decision-making can gain as much as possible from the information generated by research, managers should be involved in priority identification, and researchers should be made aware of the conclusions reached.

To sum up, the Study Group recognized that research in support of HRH development can be used:

to draw attention to problems, thereby creating a climate suitable for informed decision-making;
to improve understanding of the problems, the options available and the implications of each option;
to contribute to rational decision-making and, in some circumstances, to evaluate decisions that have already been made.

10. STRENGTHENING RESEARCH

10.1 Why little research is done

Despite the generally acknowledged importance of research in HRH development, why is so very little of it being done? The Study Group identified two principal causes:

1. Lack of effective organization and institutional links between health personnel researchers and those responsible for planning, training and managing staff, particularly at the level of senior decision-makers.
2. Lack of individual and institutional capacity for health personnel research.

Furthermore, the Study Group pointed out that managers frequently fail to request research that would be relevant to their needs because they are not always aware how research can improve decision-making.

10.2 More effective utilization of results

The few results produced by research on HRH development have remained largely unused by decision-makers, as both research managers and administrators agree. Suggestions by the WHO Expert Committee on Health Manpower Requirements for the more effective use of research results included:

joint selection of research topics by the health service and research agencies (research-mapping);
involvement of health personnel in some aspects of research, for example in data-gathering;
dissemination of research results in an easily understandable form;
continuous contact between the research and health-care systems;
follow-up by research and health managers of the way in which the results are being used;
development of channels of communication between the research community and the health community as a whole (not only with the ministry of health).

One common factor linking all these suggestions is the need for dialogue between users and producers of research information at all stages, if the former are to make use of the results. Consequently, the Study Group emphasized that, in order to improve the utilization of HRH research results, the following key areas must be reinforced:

contact between decision-makers, the community, teachers and researchers in the field of HRH development;
the institutional framework for development of HRH research;
training of researchers;
training of managers in the interpretation and application of research results;
distribution of research results to all interested parties as soon as possible and in an easily understandable form.

Contact between decision-makers, researchers and other groups. The whole basis of "decision-linked" research is to bring together

decision-makers, the community, teachers and researchers right from the start, and to involve them at all stages of research and decision-making. While the decision-maker can identify precise issues, the community is in the best position to convey its own needs and to ensure that the research is consistent with them.

Institutional framework for research. The Study Group recognized that some form of technical infrastructure is essential for strengthening research in HRH development. Since this research, like HSR usually requires a multidisciplinary approach, a coordinating centre for the multidisciplinary team must be established by the ministry of health. This team should draw up the research programme, establishing a network of contacts, strengthening national, provincial and local institutions, developing such institutions where they do not exist, and making research results available to the decision-makers. Where necessary, the ministry of health should provide appropriate research grants.

Preparation of acceptable research plans. Plans for research in the health sector and in HRH development have generally been based on the past performance of a country and the resources likely to be available. Such plans should, however, also take into account: the health lobby and the participation of all those involved in decision-making and health care, including the ministries responsible for finance, planning, education, social security, environment, public health engineering, population planning, and social welfare; bureaux of statistics and science and technology; research organizations; professional bodies; community representatives at all levels; and independent experts.

Training of researchers. By its very nature, research in HRH development involves people and processes concerning people. Hence, the methods required are drawn from epidemiology and the social sciences rather than from laboratory sciences (as they are in biomedical research). In addition, HRH research deals with the activities and attitudes of health personnel, which may vary from place to place and from time to time. Few countries have enough adequately trained staff in the necessary research disciplines.

Experience in Botswana and Malaysia (7) suggests that two, or perhaps three, levels of researchers may be needed, depending on the complexity of the research. One level would deal with large-scale and complex research, often with national implications. Such research calls for sophisticated techniques and large-scale projects or for cooperation between many organizations, professions and

disciplines; it requires specialist skills and resources and is best carried out by universities, research institutes or research units. At the second level, research is carried out locally in response to special problems and local initiatives; the methods used will be relatively simple and require only modest resources. The third level comes between the two and is concerned with advice and guidance to local researchers. Personnel will need to be trained to carry out research at all these levels, and training will thus have to be extended to a large part of the personnel of the health system.

11. APPROACHES AND STRATEGIES TO STRENGTHEN INFORMATION SYSTEMS AND RESEARCH

The development of information systems and that of research have much in common. If information is to be used effectively to support decision-making in HRH development, the present system must be changed. This is true whether the information is to be obtained routinely through well developed and appropriately managed information systems, or through specially targeted research. Changes must take place:

among managers in the health system
among researchers in health and health-related fields and among information support staff
in the relevant organizational structures and processes in the country.

11.1 Change in managers

Managers in HRH development must recognize the ways in which information can facilitate decision-making and understand that managerial decisions can only be as good as the information on which they are based. They must recognize the potential of informatics and HSR in providing intelligible and useful information for this purpose.

Sometimes managers already have sufficient information but postpone the decision by asking for more. At other times, it is obvious that socioeconomic or political realities will dictate the decision regardless of the information provided. Managers must be able to recognize situations where information can realistically be expected to support decision-making. They must analyse problems

systematically in order to determine what information is necessary and appropriate, and they must be able to judge whether their information systems will be able to provide such information, or whether specific research will be needed.

Managers must be prepared to support the development of appropriate information systems and learn to talk to information workers and guide them so that the data are collected and analysed in a way which helps decision-making. They must be aware of the cost–benefit ratio of the information, since the cost of information beyond a certain level often becomes unjustifiable. They must, therefore, choose carefully the information they want.

Similarly, they must be able to talk to researchers and help them to clarify the research questions arising from managerial problems. Subsequently, they must support the research process that they have initiated.

11.2 Change in information support staff and researchers

Change must also occur in information support staff and the research community. The introduction of informatics into the health-care system involves large numbers of personnel. As stressed in a recent WHO publication (*12*), "Successful implementation of a computer-based information system is as much a social process as it is a technical one ... Health informatics specialists [need] to be familiar with the concepts, problems and methodology of medicine, the structure of the health care delivery system and the complex problems pertaining to system design and integration in that environment." Health personnel need to develop more appropriate attitudes towards the generation and use of data at their own level, and may have to be trained to use information technology.

Similarly, changes must occur in the research community. Researchers in health and health-related fields must accept that research should support health development, and they must be familiar with the relevant issues. They need the skills to analyse problems from a health-system perspective and to present their findings accordingly. It is important that researchers recognize the multidisciplinary nature of HSR, learn to work in a multidisciplinary team i.e. to understand the methods, terminology, strengths and limitations of related research disciplines and are able to communicate their findings clearly without using jargon.

Since research findings will be needed at every level of managerial decision-making, it is unlikely that the traditional research community will be able to fulfil the needs of all the levels. As mentioned above, experience in some countries has shown that, while full-time researchers may be employed for larger and more complex research projects, the health service personnel themselves will have to carry out the smaller projects related to decision-making at the operational level.

11.3 Organizational change

Many organizational changes are required in order to support the development of information systems and research. There is a need for a national health informatics policy (*12*, p. 8) and for appropriate strategies to guide the establishment of managerial mechanisms and responsibilities for information in the health care system. These responsibilities include:

- allocating and developing resources
- establishing principles for information sharing and exchange
- allocating a priority to new projects, and establishing a training programme
- deciding the degree of decentralization
- ensuring data security and rights of access
- determining methods of choosing appropriate support technology.

Similarly, there is a need for a health research policy and appropriate strategies, including the establishment of:

- a mechanism for identifying priority areas for research to further national health development
- criteria for selecting priority problems and priority research projects
- a funding mechanism to support national or local priorities in research
- well planned training and development programmes to teach managers at all levels and researchers in relevant disciplines the necessary skills and attitudes
- mechanisms for dialogue and communication between researchers and managers
- equitable career development for researchers in HSR
- mechanisms to promote high-quality and relevant research.

Clearly, national health systems, and in particular HRH subsystems (planning, production and management) will have to undergo fairly complex changes in order to integrate information and research into decision-making. As with any process of change, the first step is to create a favourable climate, to achieve recognition of the present and potential uses of HRH information and research as part of HSR, and to promote understanding of the use of HSR as a management tool. The target groups for such efforts are the key policy-makers and senior managers in the health service, academic research institutions and funding agencies. In particular, the Study Group emphasized that politicians, who control the allocation of funds, should appreciate the potential contribution of research to decision-making.

Among the strategies that have been found to be successful in securing the involvement of the above groups are their attendance at international conferences and membership of relevant international committees. Other successful strategies include national workshops that stimulate awareness of the potential of HSR (including development of HRH research) and bring managers and researchers together; the formation of national committees responsible for developing HSR and information systems; and the successful completion of one or two projects on issues of major interest to top policy-makers, with the emphasis on relevance and the subsequent use of the findings.

The process of building a consensus among users of information and its providers on the collection, production and use of information is long and tortuous. The experience of some countries suggests that it will not succeed without the continued commitment and leadership of key individuals. A framework for assessing the progress made in consensus-building would include questions such as:

Do policy-makers and managers ask for information on issues of concern before making decisions?
Do senior officials in the health-care system highlight the use and potential of HSR or information in official speeches, documents, etc?
Will managers provide support for training in HSR, information collection and the use of informatics?
Will managers commit staff and money in order to obtain information for decision-making?

—Do managers request funds to upgrade their health information system and introduce informatics into health care?

11.4 Developing the capacity for informed decision-making

Once a climate favourable to change has been created, the necessary human skills and organizational structures must be developed simultaneously. As stated above, research-generated information is more likely to be used in managerial decision-making if the manager has been involved in identifying the need for such information and, if possible, in the research process itself or, at least, has been kept up to date with the progress of the research. The experience of many countries supports this theory.

The development of human resources for informed decision-making should cover the development of managerial skills in decision-making for HRH, the capacity for conducting HSR, and the capacity for managing and using informatics. Although many countries have made some progress in each of these areas, the remaining constraints should be recognized, and strategies must be developed to initiate and sustain that development. Often, training has been sporadic; staff who have been trained may no longer be in positions related to health personnel development. Experience has also shown that individuals who have been trained may be unable to use their new skills when they return to their units because their managers will not support them. The aim, therefore, should be to create as quickly as possible a substantial core of trained personnel who will have the capacity for informed decision-making.

The Study Group reaffirmed that systematic and sustained training programmes are needed for both managers and researchers. A great deal of effort is already being invested in training middle managers in order to improve management at district level and the operational management of many health programmes. Much of this training has relevance for decision-making in HRH development, but efforts must be expanded to cover other areas, particularly the management of health personnel in the labour-intensive hospital service. Also, managers at higher levels, such as policy-makers and planners, may not be aware of recent advances in the use of informatics in the development of HRH. The shortcomings of existing training in a country or a region must be identified so that its specific training needs can be determined.

Training programmes for researchers in HSR must address a variety of target groups. Established researchers from relevant disciplines (e.g. epidemiology, behavioural sciences, management sciences, demography, health economics) may need guidance on the information needs of HRH development and the approaches used in multidisciplinary research. These researchers will be carrying out more complex types of research, providing most of the new information needed for major policy decisions and extending the boundaries of knowledge. Strategies to develop a core group of such researchers in every country as quickly as possible must be developed and tested.

Various categories of staff in the health service can be trained to conduct simpler research which can provide information for decision-making at the operational level and, in some instances, at the programme-development level as well. Experiences from a number of countries indicate that carefully designed short training courses of between two and four weeks' duration are able to give health personnel the basic skills to do such research. An essential feature of such courses is practical experience in designing and conducting a small research project under supervision, and staff will require guidance and support from more experienced researchers while they gain experience in conducting projects on their own. Several training modules have been developed and used for these training courses, and subsequent follow-up of the participants has shown the effectiveness of this approach.

11.5 Consolidating change

In order to ensure that the initial gains achieved after intensive efforts to train staff and mobilize support are not lost owing to the departure of managers or staff and changing areas of interest, it is necessary to develop strategies to consolidate those gains.

HSR and health information should be included in both basic and postgraduate courses for all health and health-related workers. Potential starting points (e.g. epidemiology, statistics, informatics, community diagnosis, community health surveys) can be identified in the existing curricula, and the material can be adapted to suit the student's expected level of competence.

Systematic efforts should be made to disseminate the results of regular data analysis and information on completed research projects, as well as information on the subsequent use of research

findings in managerial decision-making. Newsletters, summaries of research papers and abstracts are popular and useful ways of doing this.

A review of experiences in several countries has shown that the establishment of a unit within the health system to provide leadership, training and continued support is an essential ingredient for the development of HSR.

Another promising strategy is to establish a system of regular contacts between researchers and managers, and between managers in different institutions and various disciplines. This can make it easier for managers and researchers to exchange knowledge and views and provides a means of identifying the information needs of decision-makers, adapting research to satisfy those needs, and making managers aware of information that is available in the research community but has not previously been accessible to decision-makers.

Initiating and sustaining this organizational change is a difficult process. Progress will be variable and, at times, frustrating. Experience suggests that, in the early stages of change, highly committed leadership, an innovative spirit and a few high-profile examples of the successful use of research and information in decision-making are ingredients for success. Subsequently, a "critical mass" of staff must be created, who will be able to operate effectively through mutual support and teamwork. Finally, it will be necessary to recognize and use opportunities, make use of existing potential and persevere with patience.

12. CONCLUSIONS

The Study Group reaffirmed that HRH are among the most important resources for the attainment of health for all by the year 2000, and will be most valuable if developed in coordination with the health system. To stress the importance of this coordination, the Study Group endorsed and adopted the COHHRD concept discussed by the WHO Study Group on Implementation of Integrated Health Systems and Health Personnel Development (*1*). The role of information systems and research in decision-making for the development of HRH was reviewed and discussed within this framework.

The Study Group identified a number of problems in the areas of policy and planning, education and training, and management of HRH. It also noted the underlying causes of these problems, which include:

- inadequate data definition
- lack of relevant information
- poor coordination of available information
- inadequate methods of analysing and presenting information
- insufficient or unsuitable research
- inadequate matching of information and research to decision-making needs
- in some cases, poor communication between different levels of government, leading to lack of coordination of HRH information systems and divided authority and responsibility for decision-making.

The Study Group identified the following positive factors that promote sound decision-making:

awareness of the problems
easy availability of well-presented information
timely presentation of information
relevance of information to the different functional levels of decision-making.

The Study Group stressed that HRH development is a continuous process, which should be seen as part of the wider field of health and socioeconomic development. It wished to emphasize this continuity because frequent reviews of existing policies are necessary in a rapidly changing environment. HRH development requires sound decisions to be taken, but the decisions will only be sound if they are based on appropriate and timely information. Information can be obtained from many sources: routine collection of data, specific surveys or research.

The importance of information and research findings relating to HRH is fundamental. At the same time, information-gathering and research consume resources and staff time. With this in mind, the Study Group examined the minimum set of health personnel information that would enable decision-makers to respond to a variety of problems. This set is merely an illustration, subject to modification according to the needs of specific situations (see Annex, p. 51).

Finally, the Study Group emphasized that strengthening decision-making in the development of HRH, by linking information and research to decision-making and promoting relevant information-gathering and research, requires a coordinated approach. All those concerned will need to understand what is being attempted and why, so that individuals at all levels can contribute to change. In addition, information-gathering and research institutions will need to be strengthened. The Study Group stressed that appropriate consideration should be given to sustainability and practicability before starting any such undertaking.

13. RECOMMENDATIONS

The Study Group suggests that Member States and WHO should take the following action in order to promote appropriate and timely decision-making in the development of HRH. Each of the seven major recommendations is followed by brief supplementary comments and/or examples for action.

13.1 Recommendations to Member States and WHO

1. Member States and WHO should strengthen information and research activities in a coordinated manner to support the development of human resources for health.

There was a consensus that sound decision-making in the area of human resources for health can be promoted through relevant information and research. The Study Group reaffirmed that the development of HRH is a key element in achieving the goal of health for all by the year 2000. Hence, the activities of the Member States and the World Health Organization in this area should be strengthened, and special attention given to the coordinated development of health systems, human resources, information-gathering and research. Furthermore, the Study Group recommended that this topic should be discussed further in various forums, such as the World Health Assembly, the WHO Executive Board and the regional committees, as well as in national and international meetings.

13.2 Recommendations to Member States

2. *Member States should strengthen HRH information systems,*

for example by:

—reviewing existing HRH information as a basis for strengthening HRH development;
—strengthening collaboration and coordination between various departments, agencies and professional organizations;
—developing a national plan of action for strengthening HRH information systems, while taking into account the ability to ensure the long-term availability of the necessary financial resources for collecting and analysing information;
identifying a minimum set of information to be used at different levels of decision-making for HRH development.

3. *Member States should strengthen HRH research,*

for example by:

supporting relevant HRH research at all levels of the health service;
promoting dialogue between researchers and decision-makers at all levels and the community at large, in order to ensure that HRH research is relevant and receives a high priority;
recognizing the importance of, and supporting institutions and individuals involved in, HRH research;
providing training in research suitable for the categories of health personnel concerned and adapted to their level of education.

4. *Member States should strengthen their use of information and research results,*

for example by:

ensuring that those working in information and research are involved in HRH development;
making politicians, managers and community leaders aware of the value of information and research in decision-making, if necessary by training them in the interpretation and application of information and research results;
establishing proper mechanisms for the dissemination of information and research results.

13.3 Recommendations to WHO

5. *WHO should expand its advocacy role in high-priority activities in HRH development,*

for example by:

- promoting and supporting the exchange of information between countries and establishing an HRH data base for international comparisons and research;
- developing and promoting the use of minimum data sets for HRH and the standardization of definitions;
- formulating guiding principles for the development of HRH information systems, including techniques and tools.

6. *WHO should strengthen technical cooperation in high-priority activities in HRH development.*

Information systems can be strengthened through:

the development of information systems in support of HRH as an integral part of the national health information system;
the identification of a minimum set of HRH information and development of guidelines to assist Member States in adapting it to meet their specific needs;
- the development of national HRH data bases and promotion of the exchange of information to support policy development in HRH;
the promotion of standard definitions and a standard format for information.

Research can be strengthened through support for:

research that addresses HRH issues;
institutions undertaking such research;
the development of research capacity in HRH and the exchange of research results and experience.

The use of information and research results can be strengthened through:

advocacy of the value of information and research for policy-makers and decision-makers and the community at large, in order to increase both the relevance and the systematic use of information and research;

—facilitation of the development of a "critical mass" of human resource managers and health system managers with the capacity for informed decision-making, by building up networks and convening national and international training courses and meetings.

7. *WHO should strengthen its collaboration with international and bilateral agencies.*

Decisions in the area of HRH development should be made in a broader socioeconomic context. Hence, the Study Group recommends that:

—more use is made of information collected by other national, bilateral and international agencies;
—joint information-gathering activities are encouraged;
—funding agencies are encouraged to support such endeavours.

ACKNOWLEDGEMENTS

The Study Group acknowledged with thanks the contributions made by Dr I. Pathmanathan, Health Research and Health Education Division, Public Health Institute, Kuala Lumpur, Malaysia, and Dr Mya Tu, Ex-Director, Health Manpower Development, WHO Regional Office for South-East Asia, New Delhi, India, in preparing the background document, as well as the contributions made to the discussions by the following WHO staff members: Dr J.-R. Ferreira, Programme Coordinator, Human Resources Development, WHO Regional Office for the Americas/Pan American Sanitary Bureau, Washington, DC, USA; and Dr O.I.H. Omer, Director, Health Manpower Development, WHO Regional Office for the Eastern Mediterranean, Alexandria, Egypt.

REFERENCES

1. WHO Technical Report Series, No. 801, 1990 (*Coordinated health and human resources development*: report of a WHO Study Group).
2. NAKAJIMA, H. Opening address at the interregional Seminar on Financing Human Resources for Health, Bangkok, 6–10 March 1989.
3. WHO Technical Report Series, No. 717, 1985 (*Health manpower requirements for the achievement of health for all by the year 2000 through primary health care*: report of a WHO Expert Committee).
4. BANKOWSKI, Z. & FÜLÖP, T., ed. *Health manpower out of balance: conflicts and prospects. Highlights of the Acapulco Conference*. Geneva, Council for International Organizations of Medical Sciences, 1987.
5. *Report on a consultation on the collection and use of health manpower information*. Geneva, World Health Organization, 1988 (unpublished document HMD HST

88.1; available on request from the Division of Development of Human Resources for Health, World Health Organization, Geneva, Switzerland).
6. *National health information systems - guiding principles.* Geneva, World Health Organization, 1980 (unpublished document NHIS/80.1 Rev. 1; available on request from the Division of Epidemiological Surveillance and Health Situation and Trend Assessment, World Health Organization, Geneva, Switzerland).
7. *Health systems research in action.* Geneva, World Health Organization, 1988 (unpublished document WHO/SHS/HSR/88.1; available on request from the Division of Strengthening of Health Services, World Health Organization, Geneva, Switzerland).
8. WHO Technical Report Series, No. 694, 1983 (*Research for the reorientation of national health systems*: report of a WHO Study Group).
9. TAYLOR, C.E. *The uses of health systems research.* Geneva, World Health Organization, 1984 (Public Health Papers, No. 78).
10. *Report on the Interregional Workshop on Economics of Health Manpower Development in Support of Primary Health Care, Manila, Philippines, 22-26 June 1987.* Geneva, World Health Organization, 1987 (unpublished document WHO/EDUC/87.191; available on request from the Division of Development of Human Resources for Health, World Health Organization, Geneva, Switzerland).
11. *Priority research for health for all.* Copenhagen, World Health Organization Regional Office for Europe, 1988 (European "Health for All" Series, No. 3).
12. *Informatics and telematics in health. Present and potential uses.* Geneva, World Health Organization, 1988, pp. 8 & 62-63.

Annex

ILLUSTRATIVE EXAMPLE OF ESSENTIAL HRH DATA

Below are two examples of forms on which could be recorded the essential data on posts, personnel and qualifications that would be required to derive the indicators for the assessment of HRH development at country level that are listed on pages 27–28 of the main report.

These examples are illustrative, and when selecting items in a specific case, appropriate consideration should be given to the cost implications of data collection, etc. For health personnel data, an example is also included showing the data collected on employees for the HRH information system in Indonesia.

Example of form for recording essential data on health posts

Sources of data	*Items*
Public or government sector	Medical specialty or health programme
Health	.....
.....	Pay grade or scale
Education	.....
.....	Work location-position
Military	.....
.....	Budgeted hours
Other	.....
.....	Hours worked (against that post)
Private sector	.....
.....	Hours paid (against that post)
.....	.....
.....	

Example of form for recording essential data on individual health personnel

Sources of data	*Items*
Public or government sector	**Identification data**
Health	Name .....
.....	Personal identification/ payroll number .....
Education	Date of birth .....
.....	Sex .....
	Qualifications* .....
Military	Place of qualification* .....
.....	**Employment data**
Other	Employment status .....
.....	Type of employment .....
	Position .....
	Salary category .....
Private sector	Location of employment .....
.....	***Optional additional data**
.....	Principal qualification
.....	Type .....
	Date of qualification .....
	Place of qualification .....
	Registration renewal date .....
	Further qualifications
	Type .....
	Date of qualification .....
	Place of qualification .....
	Registration renewal date .....

Data collected on employees for the HRH information system in Indonesia

	Number of digits required for computer data base
Permanent data (no change over time)	
Identification number	9
Name	30
Date of birth	6
Sex	1
Place of birth province	2
city	12
Religion	1
Main institution	2
Date of appointment	6
Impermanent data (may change over time)	
Marital status	1
Number of children	2
Number of wives/husbands	1
Education	4
The last vocational training	1
Institution	2
Working unit	9
Employment status	1
Type of employment	1
Position	2
Salary category	2
Starting date with current salary category	6
Total years of employment (years and months)	4
Employee's card	1
Health insurance	1
Life insurance	1
Date of filling out this form (month and year)	4

WORLD HEALTH ORGANIZATION
TECHNICAL REPORT SERIES

Recent reports:

No		Sw. fr.*
744	(1987) **Hospitals and health for all** Report of a WHO Expert Committee on the Role of Hospitals at the First Referral Level (82 pages)	12.
745	(1987) **WHO Expert Committee on Biological Standardization** Thirty-sixth report (149 pages)	20.
746	(1987) **Community-based education for health personnel** Report of a WHO Study Group (89 pages)	12.
747	(1987) **Acceptability of cell substrates for production of biologicals** Report of a WHO Study Group (29 pages)	5.
748	(1987) **WHO Expert Committee on Specifications for Pharmaceutical Preparations** Thirtieth report (50 pages)	9.
749	(1987) **Prevention and control of intestinal parasitic infections** Report of a WHO Expert Committee (86 pages)	12.
750	(1987) **Alternative systems of oral care delivery** Report of a WHO Expert Committee (58 pages)	9.
751	(1987) **Evaluation of certain food additives and contaminants** Thirtieth report of the Joint FAO/WHO Expert Committee on Food Additives (57 pages)	9.
752	(1987) **WHO Expert Committee on Onchocerciasis** Third report (167 pages)	24.
753	(1987) **Mechanism of action, safety and efficacy of intrauterine devices** Report of a WHO Scientific Group (91 pages)	12.
754	(1987) **Progress in the development and use of antiviral drugs and interferon** Report of a WHO Scientific Group (25 pages)	5.
755	(1987) **Vector control in primary health care** Report of a WHO Scientific Group (61 pages)	9.
756	(1987) **Children at work: special health risks** Report of a WHO Study Group (49 pages)	9.
757	(1987) **Rational use of diagnostic imaging in paediatrics** Report of a WHO Study Group (102 pages)	14.
758	(1987) **The hypertensive disorders of pregnancy** Report of a WHO Study Group (114 pages)	16.
759	(1987) **Evaluation of certain food additives and contaminants** Thirty-first report of the Joint FAO/WHO Expert Committee on Food Additives (53 pages)	9
760	(1987) **WHO Expert Committee on Biological Standardization** Thirty-seventh report (203 pages)	28.

* Prices in developing countries are 70% of those listed here

761 (1988) **WHO Expert Committee on Drug Dependence**
Twenty-fourth report (34 pages) ..... 6.

762 (1988) **Training and education in occupational health**
Report of a WHO Study Group (47 pages) ..... 6.

763 (1988) **Evaluation of certain veterinary drug residues in food**
Thirty-second report of the Joint FAO/WHO Expert Committee on Food Additives (40 pages) ..... 6.

764 (1988) **Rheumatic fever and rheumatic heart disease**
Report of a WHO Study Group (58 pages) ..... 8.

765 (1988) **Health promotion for working populations**
Report of a WHO Expert Committee (49 pages) ..... 8.

766 (1988) **Strengthening ministries of health for primary health care**
Report of a WHO Expert Committee (110 pages) ..... 12.

767 (1988) **Urban vector and pest control**
Eleventh report of the WHO Expert Committee on Vector Biology and Control (77 pages) ..... 9.

768 (1988) **WHO Expert Committee on Leprosy**
Sixth report (51 pages). ..... 8.

769 (1988) **Learning together to work together for health**
Report of a WHO Study Group (72 pages) ..... 9.

770 (1988) **The use of essential drugs**
Third report of the WHO Expert Committee (63 pages) ..... 8.

771 (1988) **WHO Expert Committee on Biological Standardization**
Thirty-eighth report (221 pages) ..... 26.

772 (1988) **Appropriate diagnostic technology in the management of cardiovascular diseases**
Report of a WHO Expert Committee (41 pages) ..... 6.

773 (1988) **Smokeless tobacco control**
Report of a WHO Study Group (81 pages) ..... 11.

774 (1988) **Salmonellosis control: the role of animal and product hygiene**
Report of a WHO Expert Committee (83 pages) ..... 11.

775 (1989) **WHO Expert Committee on Drug Dependence**
Twenty-fifth report (48 pages) ..... 6.

776 (1989) **Evaluation of certain food additives and contaminants**
Thirty-third report of the Joint FAO/WHO Expert Committee on Food Additives (64 pages) ..... 8.

777 (1989) **Epidemiology of work-related diseases and accidents**
Tenth report of the Joint ILO/WHO Committee on Occupational Health (71 pages) ..... 9.

778 (1989) **Health guidelines for the use of wastewater in agriculture and aquaculture**
Report of a WHO Scientific Group (74 pages) ..... 9.

779 (1989) **Health of the elderly**
Report of a WHO Expert Committee (98 pages) 12

780 (1989) **Strengthening the performance of community health workers in primary health care**
Report of a WHO Study Group (46 pages) 6

781 (1989) **New approaches to improve road safety**
Report of a WHO Study Group (62 pages) 8

782 (1989) **Monitoring and evaluation of oral health**
Report of a WHO Expert Committee (69 pages) ..... 9.

783 (1989) **Management of human resources for health**
Report of a WHO Expert Committee (61 pages) ..... 8.

784 (1989) **The use of synthetic antigens for diagnosis of infectious diseases**
Report of a WHO Scientific Group (73 pages) ..... 9.

785 (1989) **Health surveillance and management procedures for food-handling personnel**
Report of a WHO Consultation (47 pages) ..... 6.

786 (1989) **WHO Expert Committee on Biological Standardization**
Thirty-ninth report (184 pages) ..... 22.

787 (1989) **WHO Expert Committee on Drug Dependence**
Twenty-sixth report (32 pages) ..... 4.

788 (1989) **Evaluation of certain veterinary drug residues in food**
Thirty-fourth report of the Joint FAO/WHO Expert Committee on Food Additives (66 pages) ..... 9.

789 (1990) **Evaluation of certain food additives and contaminants**
Thirty-fifth report of the Joint FAO/WHO Expert Committee on Food Additives (48 pages) ..... 6.

790 (1990) **WHO Expert Committee on Specifications for Pharmaceutical Preparations**
Thirty-first report (79 pages) ..... 9.

791 (1990) **Pesticide application equipment for vector control**
Twelfth report of the WHO Expert Committee on Vector Biology and Control (58 pages) ..... 8.

792 (1990) **Prevention in childhood and youth of adult cardiovascular diseases: time for action**
Report of a WHO Expert Committee (105 pages) ..... 12.

793 (1990) **Control of the leishmaniases**
Report of a WHO Expert Committee (158 pages) ..... 18.

794 (1990) **Educational imperatives for oral health personnel: change or decay?**
Report of a WHO Expert Committee (43 pages) ..... 6.

795 (1990) **Effective choices for diagnostic imaging in clinical practice**
Report of a WHO Scientific Group (131 pages) ..... 16.

796 (1990) **The use of essential drugs**
Fourth report of the WHO Expert Committee (57 pages) ..... 8.

797 (1990) **Diet, nutrition, and the prevention of chronic diseases**
Report of a WHO Study Group (203 pages) ..... 26.

798 (1990) **Chemistry and specifications of pesticides**
Thirteenth report of the WHO Expert Committee on Vector Biology and Control (77 pages) ..... 9.

799 (1990) **Evaluation of certain veterinary drug residues in food**
Thirty-sixth report of the Joint FAO WHO Expert Committee on Food Additives (68 pages) ..... 9.

800 (1990) **WHO Expert Committee on Biological Standardization**
Fortieth report (221 pages) ..... 26.

801 (1990) **Coordinated health and human resources development**
Report of a WHO Study Group (53 pages) ..... 8.

SELECTED PUBLICATIONS OF RELATED INTEREST

	Price* (Sw. fr.)	
Management of human resources for health Report of a WHO Expert Committee WHO Technical Report Series, No. 783, 1989 (61 pages)	8.	(5.60)
Fülöp, T. & Roemer, M.I. **Reviewing health manpower development: a method of improving national health systems** WHO Public Health Papers, No. 83, 1987 (xi + 138 pages)	13.	(9.10)
Health manpower requirements for the achievement of health for all by the year 2000 through primary health care Report of a WHO Study Group WHO Technical Report Series, No. 717, 1985 (92 pages)	8.	(5.60)
Research for the reorientation of national health systems Report of a WHO Study Group WHO Technical Report Series, No. 694, 1983 (71 pages)	7.	(4.90)
Taylor, C.E. **The uses of health systems research** WHO Public Health Papers, No. 78, 1984 (49 pages)	9.	(6.30)
Bankowski, Z. & Mejia, A. **Health manpower out of balance: conflicts and prospects. Conference papers, conclusions and recommendations** CIOMS Round Table Proceedings, No. 20, 1987 (220 pages)	20.	(14.)
Hornby, P. et al. **Guidelines for health manpower planning: a course book** 1980 (368 pages)	26.	(18.20)
Health for all — a challenge to research in health manpower development: highlights of the Ibadan Conference CIOMS Round Table Proceedings, No. 16, 1983 (48 pages)	15.	(10.50)
Informatics and telematics in health: present and potential uses 1988 (108 pages)	16	(11.20)
Coordinated health and human resources development Report of a WHO Study Group WHO Technical Report Series, No. 801, 1990 (53 pages)	8	(5.60)

Further information on these and other WHO and CIOMS publications can be obtained from Distribution and Sales, World Health Organization, 1211 Geneva 27, Switzerland.

* Prices in parentheses apply in developing countries

In all aspects of the development of human resources for health—policy formulation and planning, education and training, and management—efficient decision-making is required if health personnel and health systems are to be relevant to the needs of communities and the goal of health for all by the year 2000. This report presents the conclusions and recommendations of a WHO Study Group that met to discuss current problems in decision-making for human resources development and to decide how information systems and research can best contribute to resolving them. Taking into account the various factors that influence decision-making, including the political, social and economic climate as well as the availability of specific skills and information, the report analyses the reasons for current deficiencies. The types of information needed to support decision-making, methods for collecting it, and the role of national health information systems are discussed in this context, and research priorities and methods for the more effective utilization of research results are identified. Having drawn attention to ways of improving decision-making for the development of human resources for health, the report concludes by proposing strategies for strengthening the capacity of countries to develop and implement relevant information systems and research.

Price Sw fr 8
Price in developing countries Sw fr 5.60

ISBN 92 4 120802 3