WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTE

DISTR. : LIMITED
DISTR. : LIMITEE

IDUO Coll/ACHR/130/95.13

ACHR32/94.22 Report

INDEXED

ORIGINAL: ENGLISH

ADVISORY COMMITTEE ON HEALTH RESEARCH

REPORT TO THE DIRECTOR-GENERAL

on its thirty-second session
held at WHO headquarters, Geneva
10-14 October 1994

CONTENTS AND AGENDA

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ABSTRACT OF CONCLUSIONS AND RECOMMENDATIONS

General orientation

The Committee acknowledged that research activities within WHO cover a broad professional spectrum and that, in order to promote a correct orientation, it is necessary to be sensitive to current and impending developments in health research, science and technology.

It therefore commended the report of the joint WHO-CIOMS colloquium of the Impact of Advances in Science and Technology on the future of Global Health (see Annex 1). In order to retain its leadership in health matters, WHO needs to anticipate global issues of critical significance to future health and investigate them with the appropriate scientific armamentarium. The committee recommended that special attention should be given to new or re-emerging infectious diseases; to applications of DNA-based technologies in diagnosis and treatment, as well as vaccine and food production; to ecosystem monitoring; to research on indicators and other new developments in information technology; and the development of decision-support tools for health policy formulation (in this respect a special panel should be invited to undertake a critical evaluation of disability-adjusted-life-year methodology and its potential operational usefulness). The Committee emphasized the importance of carefully prepared, country-based studies for health policy research.

The Committee was aware of several national and regional initiatives to promote a decade of brain research, and endorsed their value. The Committee felt that WHO should play a leading role in the global coordination of such initiatives.

Global priorities

The ACHR monograph Research for health: principles, perspectives and strategies, prepared since the Committee's previous session, is a strategic document containing critical guidelines. The Committee recommended that it should be translated, widely disseminated and followed up with more detailed specification of priorities.

In reviewing another initiative, the establishment of the WHO Ad Hoc Committee on Health Research Relating to Future Intervention Options, the ACHR expressed concern that it had not been consulted, and stressed the importance of such initiatives being brought to its attention so that it could provide timely advice to the Director-General, and therefore to the governing bodies, in accordance with its terms of reference. It stressed that such advice should always be based on scientific merit and an all-round view of health research; it should rely on sound and accepted methodological principles, and it should seek to preserve the institutional integrity of WHO. Furthermore, ACHR should be involved from an early stage in research initiatives arising from outside the Organization, to ensure that they reflect the overall research policies of WHO.

The Committee recommended that it should be requested to peer review the WHO Ad Hoc Committee's report on intervention options prior to its publication.

Programme Reviews

Eight research programmes supported by ACHR have been visited since the last session, and others will be the object of subsequent review.

Cardiovascular diseases

The WHO Monica project, which monitors trends in and determinants of cardiovascular diseases, is reaching the final stages of its data collection period. Over the last ten years a total of 15 million people between the ages of 25 and 64 have been monitored in 39 collaborating centres in 26 countries. More than 500 publications have been issued by individual centres but more resources are required to enable the preparation of collaborative papers. Such efforts are needed to determine whether trends in cardiovascular mortality are due to changes of incidence in acute myocardial infarction and stroke or in survival after these diseases, i.e., the contribution of preventive and curative cardiology. The results will help decision-makers in the planning and management of services.

Global and integrated environmental health

This recent and promising programme, in an early phase of expansion, will bring a much-needed research component into the crucial relationship between environmental health hazards and public health. Research in environmental epidemiology should be strengthened, in collaboration with related disciplines in WHO and other international organizations. Other areas to be pursued include research that will assist in policy development, environmental health risk management, strengthening of environmental health indicators, improved information systems and means of incorporating health impact assessment into new environmental control technologies. The Committee recommended that equal priority should be given to research aimed at preventing environmental health problems and research aimed at their resolution or mitigation. Further, strong support should be given to the planned meeting on International perspectives in environment, development and health: Determining future interventions and research priorities.

Food and Nutrition

Current programmes and research are directly related to the International Conference on Nutrition sponsored jointly by WHO and FAO in collaboration with other agencies in December 1992. The conference drew up a Plan of Action for Nutrition which was adopted by WHO. The Food and Nutrition Programme is therefore faced with an enormous task of supervising implementation of the Plan on a global basis, as well as monitoring and evaluating research into nutrition. A major component of such research is the use of biotechnology in the development of food an in keeping it safe, with special emphasis on the as yet uncertain health impact of such technology. The Committee was impressed by the commitment of the Programme to carrying out its activities in coordination with other WHO programmes, as well as with FAO and many other international agencies. It was concerned, however, that lack of resources were a severe impediment to the achievement of its goals.

Special Programme of Research, Development and Research Training in Human Reproduction

The overall objective of this programme in the area of family planning is to increase the choice of methods available to couples and individuals. ACHR endorsed the two critical research thrusts: epidemiological research to document safety issues, and sociobehavioural research to ensure that methods are culturally acceptable and to explore reasons for their non-use. Other priorities are the improving of existing or development of new fertility regulation methods and strengthening of research capabilities in developing countries. The programme has pioneered, within WHO, the

concept of research integrated within the Organization's structure, through extrabudgetary funding. The links established with ACHR have proved valuable, and the Committee is eager to explore means of strengthening them.

Intensified cooperation with countries

The programme is a demonstration of one way to promote and practise health systems research on topics such as micro-macro simulation models in countries, and poverty as a criterion for health expenditure allocation. It provides an original approach to health systems planning at country level, with emphasis on continuing evaluation. It is recommended that the results of evaluation of programmes in the 26 countries which are using new and better indicators should be widely disseminated; that coordination should be intensified between the programmes, the Regions and WHO representatives; that the programme's interdisciplinary group should be strengthened; and that priority should be given to social elements in defining health policies.

Nursing

The programme promotes and supports health services research that will ensure the optimal contribution of nursing and midwifery to health care delivery with emphasis on primary health care. It is recommended that the programme should continue on issues addressed in the Nursing Personnel Resources Survey; develop nursing research concepts grounded in the realities and cultures of developing countries; and assign WHO fellowships to prepare nurses in health services research and to strengthen the research competence of headquarters and regional nursing units.

Oral health

Research activities are concerned with prevention, epidemiology, health services research and education. The main objective of the programme is centred around fluoride with emphasis on research in the epidemiology of fluoride deficiency and fluorosis. The Committee endorsed the research directions based on a primary health care approach.

Special Programme for Research and Training in Tropical Diseases

The programme is one of WHO's main large-scale research contributions for developing countries at operational level. The new Programme structure is efficient, the main topics (leprosy and five parasitic diseases) being critical to the regions affected by tropical diseases. The Committee acknowledged training efforts (capacity building), the programmes in applied fields research and product research and development, and the work of the steering committees. It was affirmed that the Programme would welcome ACHR representation at the meeting of its External Review Group in 1996.

General conclusions

The Committee was generally impressed by the research programmes reviewed in terms of scientific and technical appropriateness, but noted with concern that funding from extrabudgetary sources was declining. The opportunity given to members to become more closely acquainted with the management of specific research activities as well as their outcomes and impact on WHO's programmes was greatly appreciated. The Committee welcomed these renewed contacts and hoped that they will be maintained and strengthened by all appropriate means.

Bioethics

The Committee commended CIOMS activities in the field of bioethics, including the programme on *Health policy, ethics, and human values - an international dialogue*. It supported the CIOMS initiative to promote a global agenda for bioethics and endorsed the Declaration of Ixtapa. It recommended that WHO should provide technical and financial backing to assist CIOMS in carrying out its programme.

The Committee recognized that CIOMS should look at wider issues, for example, in relation to health systems development, psychosocial aspects and transcultural ethics and concluded that as WHO's guidance is being increasingly sought, an ACHR subgroup should be charged with helping to harmonize activities between WHO, CIOMS and other bodies including the International Council of Scientific Unions and academies of science.

Harmonization

The Committee emphasized that research policy and strategy coordination must involve harmonization at different levels of activity, i.e. within headquarters, with the regional ACHRs and their secretariats, with WHO Collaborating Centres, with non-governmental organizations and with other bodies of the United Nations family. To discharge these functions, appropriate infrastructures are required in professional, technical, clerical and material terms.

Considering their terms of reference and its acknowledged role *vis-a-vis* the governing bodies, the Committee recommended that the ACHR system (a) be informed and consulted in time on the elaboration of new activities which have implications for overall research policies and strategies; (b) be given appropriate visibility in the WHO programme classification structure, linking it clearly to the executive management function; and (c) be provided with sufficient resources both at global and regional levels in order to fulfil its scientific and technological mandate in all matters concerning WHO research policies and strategies and their implementation in close cooperation with the scientific community, worldwide.

OPENING OF THE SESSION (Agenda item 1)

The Chairman, Professor T.M. Fliedner, opened the 32nd session of the Global Advisory Committee on Health Research and welcomed members to Geneva.

ELECTION OF OFFICERS (Agenda item 2)

Professors Z. Hasan and M. Manciaux were elected vice-chairmen, and Professor O.O. Akinkugbe, rapporteur.

ADOPTION OF THE AGENDA AND PROGRAMME OF WORK (Agenda item 3)

The draft agenda (ACHR32/94.1 Rev.1) and the Programme of Work (ACHR32/94.2 Rev.1) were adopted.

INTRODUCTORY STATEMENT BY THE DIRECTOR-GENERAL (Agenda item 4)

The Director-General reaffirmed his decision that ACHR would now revert to meeting annually and recalled its terms of reference:

(i) to advise the Director-General on the general orientations of WHO's research;

(ii) to advise on the formulation of global priorities for health research in the light of the policies set by the Health Assembly and the Executive Board and on the basis of the regional priorities evolved in response to the health problems of the countries;

(iii) to review research activities, monitor their execution and evaluate their results, from the standpoint of scientific and technical policy;

(iv) to formulate ethical criteria applicable to these research activities; and

(v) to take a prominent part in the harmonization of WHO's research efforts as between the country, regional and interregional levels, and in their effective global synthesis.

In discharging these functions, ACHR takes fully into account regional priorities through the participation of the regional ACHR Chairmen in its proceedings. Reference was also made to the increasing role of bilateral and multilateral donors in the field of health. It was emphasized, however, that WHO should harmonize its approach with related UN efforts, such as the Commission on Science and Technology. The Director-General concluded that in an era of dwindling resources, there was an even greater need to prioritize issues and optimize the allocation of resources.

INTRODUCTORY STATEMENT BY THE CHAIRMAN (Agenda item 5)

The Chairman thanked the Director-General and stressed the need to harmonize ongoing and future research efforts at national, regional and global levels so as to strengthen capacity and avoid wasteful duplication. In this context, by its very generic structure, which includes regional components, and in view of its broad mandate, the ACHR system plays a unique role. He emphasized the interplay of such factors as population dynamics, migration, nutrition, industrialization, use of energy, global communication and the evolution of the man-made environment. It was clear that "minimal pathway approaches" and "convergence techniques" had to be developed to confront these seemingly disparate issues.

The Chairman likened the Committee's role to that of "Science Broker" for global health research efforts. All relevant disciplines should be mobilized to address issues of health research for development. Member States and the Regions should assist in this task. He drew attention to the following activities to be discussed and initiated during the present session and continued in future years:

- analysis of the scientific content of WHO programmes from the viewpoint of a strategy addressing the newly-recognized dynamics and complexities;

- formation of a "think-tank" on global health issues emphasizing dynamic development in areas of major importance as a determinant of global health;

- consideration of the available scientific resources in the world-wide scientific community to address the new global-oriented research agenda and the appropriate ways and means to do this work in the short time available;

- analysis of the potential of new approaches, technologies and methodologies adapted to the complex and dynamic global situation, including remote sensing, communication technologies, and other types of engineering sciences.

With this in mind, the Chairman drew special attention to the report of the joint WHO-CIOMS Colloquium on the Impact of Advances in Science and Technology on the Future of Global Health, which had carried out an in-depth review of the topic (Annex 1).

He continued his address by making a plea for WHO to accord research strategy the high profile and resource support necessary to enable the ACHR to address the health problems of the "global village".

The Chairman concluded by introducing Mr V. Petrovsky, Director-General of the European Headquarters of the United Nations. Mr Petrovsky conveyed the greetings of the UN Secretary General, Dr Boutros Boutros-Ghali, to both WHO and the ACHR. Although he regretted the "gross deficit" in the availability and utilization of information needed to carry out research in the developing world, Mr Petrovsky nevertheless sounded a note

of cautious optimism. The worldwide reduction in military spending could be channelled into social development. He was also encouraged by examples

of inter-agency cooperation for health within the UN system, citing prevention and control activities against AIDS, malaria and diarrhoeal diseases. He hoped that such cooperation could be extended, in accordance with the recommendations of the 1993 World Development Report - Investing in Health, and considered that ACHR could play a vital role in initiating discussions with the World Bank, UNESCO, FAO, UNDP, UNICEF and other institutions of the UN system.

IMPACT OF ADVANCES IN SCIENCE AND TECHNOLOGY ON THE FUTURE OF GLOBAL HEALTH (Agenda item 6)

(a) Professor Jablensky presented a review of the WHO -CIOMS colloquium **"The Impact of advances in Science and Technology on the Future Global Health" held in Charlottesville"**, 20 - 24 June 1994 (Annex 1).

The objectives of the colloquium were: to review the new developments in science that could have significant impact on health and the attainment of national and global health goals and programmes; and to identify trends. potentials for applications of the advances in research and thus contribute to the up dating of the WHO research strategy. It was emphasized that the group could not provide a comprehensive overview but had to be selective. Also the report was of a preliminary nature at this time.

The meeting first considered an overview of general trends and projections in global development concerning health and the impact of science on such development. It reviewed some of the developments in science and technology that are likely to have profound implications for health in the coming decades. The meeting addressed the biological and physical sciences, behavioural sciences, ecology including the environment, and bioethics.

Some positive and negative trends in public health and human developments were identified. Positive aspects include increasing life expectancy and diminished infant mortality; developments in primary health care; democratic transition trends; reduced threat of global nuclear war; increasing collaboration between scientists and decision-makers; and increasing involvement of non-governmental organizations (NGOs) in health. Overriding negative trends include: decreasing public expenditure on health coupled with rising costs; persisting inequities within and between countries; exploitation of non-renewable resources; non-resolution of local conflicts coupled with militarisation of the third world; export of polluting technologies to the third world; the intractable poverty gap; the long term trend of overpopulation coupled with maldistribution of productive resources; inadequate efforts by scientists to provide research solutions to the basic problems of safe water supply and waste disposal. The opinion of the group was that the role of science and the scientific community in these developments was marginal or modest. Very few of the scientific achievements have benefitted the developing countries.

Epidemiological and demographic transition in a number of third world countries is occurring in a scientific vacuum with no support from adequate research or guidance from the scientific community. There is a lack of a global research agenda which should be linked to the tools for development as described in some important documents developed by the United Nations and other agencies. The colloquium thus aimed to make a modest contribution to the formulation of a research agenda taking account of the overview and propose realistic strategies.

The colloquium then considered six specific themes.

Basic Science

The discussion concentrated on molecular biology. The current important applications are in:

a. pure research or investigation,
b. diagnostics,
c. therapeutics, and
d. manufacturing.

Problems identified were associated with cost-profitability, ethics, patent rights and other governmental restrictions. It was agreed that efforts should continue in application to infections, heart disease, cancer, ageing, mental disorders, family planning and food production.

A general conclusion was that WHO and CIOMS should continue to explore the development of an international code of ethics in biotechnology.

Application of Research and Technology

The discussion revolved around three areas:

a. information and communication technology,
b. biosensor technology, and
c. development of new materials.

Systems modelling and application of the systems approach for the planning and management of health programmes will become or are available. Current methodology will be supplemented or replaced by multi-dimensional health indicators, knowledge based indicators and decision support tools.

A number of problems were addressed, the most important being the need for strategic planning for the user of technologies in health. The principle here should be that social benefits should outweigh the private benefits. Other questions to be addressed include:

(i) Where are the technologies generated?
(ii) Who pays for development?
(iii) Who makes the decisions on types of technologies needed? and
(iv) Who are the beneficiaries?

Changing Concepts of Disease

It was stressed that disease is not only a principal and biological concept but is also a social construct. The current concept is polyethic defined by the following characteristics: clinical abnormalities, pathological abnormalities, biological agents, biological disadvantage and therapeutic concern. Decision making theory is now increasingly applied in clinical medicine leading to the development of clinical epidemiology. This requires a need for regional population-specific data bases.

Problems to be addressed are:

a. dimensional versus categorical definition of diseases;
b. predictive testing;
c. the tendency to blur the boundaries between disease and non disease;
d. the rise of medicalization of social problems; and
e. how to model morbidity and mortality in specific populations.

Public Health and the Economic Environment

The eight tendencies related to income and health identified in Annex 1 evoked the following issues:

a. The impact of stabilization and structural adjustment policies on health and equity;
b. the need for improved criteria for allocating and channelling financial assistance;
c. the implications of automation on employment, the dependency burden and their impact on who pays for improved health; and
d. the need for designing better indicators of the quality of health.

The DALY concept was discussed in some detail. The majority of participants regarded it as a positive development but also recognized that in its present form it has severe limitations. The group recommended that the ACHR should advise that the Director-General of WHO should convene a special study group to undertake a critical evaluation of the DALY methodology and its potential operational usefulness.

Public Health and the Constructed Environment

The important priority here was seen as the development of an inventory of environmental risks contributing to a global environmental epidemiology of risks. This would include:

a. long term health status monitoring of populations with a focus on particularly sensitive groups;
b. studies on the dynamics of ecological systems;
c. development of new risk assessment models, and
d. integrated chemical and biological risks.

Also considered was the use of remote sensing to aid in monitoring of environmental parameters, the development of biomarkers regarding the effects of chronic low level exposure to chemical and physical agents, and new methodologies for assessing the effects of multi-factorial exposures.

All of these could lead to a second hygiene revolution applying the advances in environmental engineering to the construction of a new type of user friendly environment.

Public Health and Social Behaviour

A number of models of primary health care were examined and the need for a human development index was emphasized.

This should lead to better methodologies for community empowerment where the ultimate aim should be a people-centered world order.

Five types of concern were expressed:

a. new concepts of health security;
b. new models of sustainable development;
c. new partnerships between state and market;
d. new patterns of partnership of national and global governance; and
e. new forms of international cooperation.

The group also considered the partnership between health policy and research. In place of traditional patterns of policy formulation a pattern where the policy-maker and the researcher work in partnership in formulating the policy question, the research approach and their working together to ensure policy formulation.

In conclusion it was the opinion of the colloquium that there is a great and largest need to mobilize the scientific communities of the world to devote more attention than hitherto to the application and development of scientific advances for health and human developments and that WHO and CIOMS should create a forum for the scientific community to discuss the needs and implementation of necessary research for global health and human development including a science summit for health research.

The GACHR warmly welcomed the report which it considered as a most useful and timely one. It recalled that in order to retain leadership WHO constantly needed to anticipate global issues of critical significance to future health and investigate them with appropriate scientific armamentarium.

It emphasized the importance of DNA technologies and their utilization in both developed and developing countries: "cross-fertilization" or "cross-linkage" of applications in health and agriculture would be productive.

It is important however, to avoid excessive commercialization. It is equally important to avoid medicalization of social problems.

Family disintegration should be recognized as a negative trend. Valid data are needed on the current relative prevalence of diseases of poverty and those of affluence in both developed and developing countries. There is a general problem of inadequacy of information on health status in most countries. Indicators of poverty which are better than extant ones are also needed. Some concern was expressed about the validity of DALY and its usefulness (even though it was considered a desirable measure of mortality and morbidity) compared with existing multicomponent indicators such as the human development index.

While it is recognized that international cooperation in the use of science and technology for development is essential, it is undesirable that priorities in developing countries should be predominantly donor-driven.

Political stability should be considered as a *sine qua non* for successful development.

Attention was drawn to the need for collaboration in the areas of science and technology for development with other UN Agencies, particulary UNESCO, especially in preparing or convening of science fora and global scientific communications.

It was also considered worthwhile to replicate the colloquium with similar objectives at national levels, with the aim of developing practical country models and applications.

The GACHR made the following recommendations:

i. The report of the colloquium should be widely disseminated to policy-makers in countries, the scientific community and UN Agencies.

ii. Special attention should be given to application of advances in science and technology to emerging infections; to new developments in information technology with relevance to policy planning, and to focus on country-based case studies.

iii. There is a strong need for health care policy-makers and providers to have access to information in science and technology for developments and for the scientific community to be appropriately involved in the solution of problems of critical significance in global health. The committee supports the convening of a "Science and Technology summit for Health" to create the appropriate awareness and forum.

iv. Developing countries should be encouraged to participate actively (rather than be silent on-lookers) in the use of the new developments and advances in science and technology. The special problems of developing countries in respect of health and capacity building require focused attention.

v. WHO, in collaboration with other UN Agencies such as UNESCO, should mount an appropriate campaign to emphasize that patent rights should not interfere with scientific investigation, nor constitute an obstacle in extending the fruits of basic research to needy communities.

vi. Efforts should continue to explore and expand the application of advances in science and technology.

vii. A major need to be met in future research will be the development of population and region specific epidemiological data bases to support the application of new diagnostic technologies.

viii. The Director-General is advised to set up a panel to undertake critical evaluation of the DALY methodology and its potential usefulness.

ix. Ethical aspects of somatic gene therapy have raised no new issues but germ line therapy should be discouraged. WHO and CIOMS should continue to cooperate with other international organizations to explore obtaining international agreement on a code of ethics in molecular biology especially in the human genome project.

x. CIOMS has a special mission to fulfil in continuing its advocacy role for international order and a code of ethics in health research.

(b) A presentation by Dr I. Nutall on **Geographic Information Systems** was made to the Committee using remote sensing and related data. This illustrated the potential use of technology to assist in solving health problems. The emphasis was on the training component and the transfer of technology for strengthening regional and national capacity to collect and use multisectoral information in decision-making processes. The Committee commended WHO efforts in this direction and noted the enormous practical issues in monitoring and control of tropical diseases, such as vector control in malaria or onchocerciasis and evaluation of control methods in schistosomiasis.

(c) A brief outline of WHO's activities in **biotechnology-related domains** was given by Mr V. Oviatt.

The ACHR in developing the WHO health research strategy had included the necessity of reviewing the changes in the health scene resulting from advances in scientific research. In particular it had noted the major developments in biotechnology in the last few years. Recognizing this, a survey was conducted in February 1994 of WHO Headquarters programmes with respect to their application of the technology.

Information was gathered under the following applications: epidemiology, diagnosis, treatment, research and biosafety.

Epidemiology: the main interest is in molecular epidemiology and genetics and the Human Genome Project. Major programme involvement is in the epidemiology of genetic and other non-communicable diseases. Other studies include biological psychiatry, male fertility and the relationships of HIV strains.

Diagnosis: several programmes are now applying genetic technology (genetic and biological markers, molecular genetics, etc.) to diagnostic techniques. Some applications are for early diagnosis for prediction of genetic diseases or to detect common disorders with genetic predisposition, fertility regulation, genetic screening, HIV strain subtyping and genome mapping of leishmania.

PCR, specific monoclonals, defined and purified antigens and nucleic acid probes are standard techniques in laboratories supported by most programmes. The new technologies have more recently made available reliable diagnostic kits, dipsticks and other pocket test kits for field use. The programmes surveyed noted that diagnostic techniques greatly exceed treatment ability.

Treatment: the major thrust in disease treatment has been in the development of vaccines which are the result of progress in genetic engineering, immunology and molecular biology. Currently live vaccines are being developed by the use of genetically modified microorganisms. Current target vaccines include those for diseases which are major causes of mortality of children in developing countries. Others produced by these techniques are an anti-fertility vaccine, and a rabies vaccine. Several candidate HIV vaccines are under development and are being or will be field tested.

The treatment and prevention of genetic diseases and common disorders with genetic disposition are receiving increased attention. Developments in basic genetic concepts, rDNA technology and mammalian gene transfer techniques are making possible the early treatment of many non-communicable diseases.

Research: research utilizing biotechnology is supported or stimulated by several programmes. They include and/or are interwoven with previously cited developments under epidemiology, diagnosis and treatment. Current examples in genetic technology are in genetic disorders related to environmental factors and gene therapy. Vaccine research includes those for cancer, tuberculosis, measles, hepatitis C and malaria. Research in the biological control of vectors is continuing. The development of transgenic mice as a replacement for non-human primates and other animal models is supported.

Biosafety: the safety of environment, workers, public and products have received major consideration since the beginning of WHO's involvement with biotechnology. These include the safety of biologicals, vaccines and foods produced by biotechnology, laboratory biosafety and the release of genetically manipulated microorganisms into the environment. Standards, manuals and guidelines regarding those are available from the Organization.

Summary: this synopsis of the report to ACHR indicates the awareness and utilization of biotechnology by the WHO secretariat and programmes. It also indicates the future application of the biotechnologies in the diagnosis and treatment of communicable, non-communicable, mental and hereditary diseases. Ethical issues were not included as these are being separately addressed by WHO and CIOMS.

(d) Professor Hasan made a brief presentation to the committee on **neurosciences**. On-going and future advances in neurosciences have great potential for prevention control and treatment of nervous system and mental disorders and promotion of mental health. Several countries have launched the 1990's as the "Decade of the Brain".

The GACHR endorses this development. A focused review of recent advances and their application in neurosciences should be part of the activities in connection with assessment of new and emerging areas of science and technology.

The GACHR recommends that the WHO through its Division of Mental Health should promote and coordinate the "Decade of the Brain" activities at country, regional and global levels.

GLOBAL HEALTH RESEARCH POLICIES (Agenda item 7a)

(i) **Research for Health:** the ACHR Report on *Research for Health: Principles, Perspectives and Strategies*[1] was presented to the Committee by the Secretary, Dr B. Mansourian who explained the rationale for the document. He stated that the outcome of the WHA Technical Discussion in 1990 on the "Role of Health Research in the Strategy for Health for All in the Year 2000" focusing on Health Systems Research, Research Capability Strengthening, Nutrition Research, and Biological and Physical Sciences and Technology was resolution WHA 43.19. The resolution inter alia requests the Director-General to "use appropriate mechanisms in close collaboration with the global and regional ACHR... to develop further a clearly enunciated health research strategy for WHO in order to translate research goals, priorities and programmes into coherent and coordinated action in support of health for all". The document represents a first step in this process.

In preparing the document, the ACHR drew on the work of its own Task Forces and Subcommittees namely, the Task Force on Science and Technology, the Task Force on Health Development Research, the Task Force on Evolving Problems of Critical Significance to Health, the Subcommittee on Health and the Economy and the Subcommittee on Research Capability Strengthening. The ACHR considered that although the Health Research Strategy proposed in 1988 is a valid cornerstone of WHO's research strategy, new dimensions should be added to give proper emphasis to infrastructural, economic, environmental and behavioural aspects. The revised strategy focused on the relevance of

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[1] Document WHO/RPD/ACHR(HRS)/93, available from the Office of Research Policy and Strategy Coordination, WHO, Geneva.

economic environment to health, global problems and global solutions, health research and human development, science and technology policies, the emergence of new ethical issues and research capability strengthening in developing countries. A resume of the report has been published in *World Health Bulletin*, 1994, 72(4): 533- 538 (see Annex 2).

(ii) A presentation was made by Mr Aitken to the Committee on sources of funding of research in the WHO. WHO's contribution to research funding from the regular budget has not changed much over the past two decades, being about 2 to 3% of the total research funding within the Organization (see Annex 3).

In the discussion, the appropriateness of the updated research for health policy was endorsed and it was emphasized that the report should be widely disseminated. The catalytic role of WHO and in turn the ACHR system in attracting extrabudgetary funding, especially for special programmes, should be appreciated. ACHR should play a prominent advisory role in overall allocation of research funds. The updated research strategy policy had been discussed with the regional offices which had made useful contributions and criticisms. The next step in the strategy update would be to define research priorities, since there are limited resources for research. It would also be useful to consider the methodologies that could be used by various countries in various stages of development and various health care systems to select research priorities.

The committee recommended as follows:

The ACHR monograph entitled *Research for Health: Principles, Perspectives and Strategies* is a strategic document containing critical guidelines. It should be translated, widely disseminated and followed up with a series of other publications specifying priorities in more details. The Chairman of the global ACHR might wish to establish working groups for this task.

RESEARCH INITIATIVES FOR GLOBAL HEALTH DEVELOPMENT (Agenda item 7b)

As previously stated, the Committee was briefed by the Chairman about the genesis of the WHO Ad Hoc Committee on Health Research Relating to Future Intervention Options which had been formed to investigate global R&D priorities, without prior consultation with the ACHR. The first meeting of the WHO Ad Hoc committee was held in Geneva in March 1994. Professor B.O. Osuntokun, a former Chairman of the global ACHR had represented the Chairman at the meeting and made a presentation on his behalf. Professor Osuntokun outlined the historical role of the ACHR system in advising on research policies of the Organization, summarised the updated health research strategy as proposed by ACHR and emphasized the immediate future programme of the ACHR.

The initiative of the WHO Ad Hoc Committee has been driven largely by the 1993 *World Development Report: Investing in Health;* the June 1993 meeting of the Joint Coordinating Board of the UNDP/World Bank/WHO Special

Programme for Research and Training in Tropical Diseases; the September 1993 meeting at Bellagio, convened by three foundations providing some catalytic support for health research in developing countries; and the October 1993 conference on a Future Partnership for the Acceleration of Health Development held in Ottawa (Canada). The mandate of this initiative is to focus on ways to "strengthen the relevance, quality and contribution of health research for health reform" particularly in developing countries and based inter alia on cost effectiveness analysis, and assessment of disease burden. It is obvious that the scale of research efforts involved would involve a multi-million dollar investment. It should be recalled that the total annual research budget of WHO is of the order of 100 million dollars.

The ACHR system, as the topmost advisory body on research priorities to the Director-General of WHO and ipso facto through the Director-General to the WHO's governing bodies, would have preferred to have been consulted ab initio on this new initiative, since in recent times it has precisely concentrated on the development of conceptual approaches of a strategic nature.

The Chairman informed the Committee that Professor Osuntokun on his behalf, at the March 1994 meeting, had made it clear to the WHO Ad Hoc Committee that a full progress report of the initiative by the WHO Ad Hoc group should be presented to the GACHR at the 32nd session. The GACHR would then deliberate on it and advise the Director-General and through him the governing bodies of the Organization. The ACHR system believes that WHO should intensify its efforts to collaborate with and mobilize the entire scientific community worldwide, the nongovernmental organizations, foundations, other relevant UN Agencies, in executive interventions and other types of research to achieve health for all and to assist the urgently needed promotion and development of health care reforms especially in developing countries.

The GACHR next listened to a presentation by Professor Jamison, Chairman of the Ad Hoc Committee. He outlined the background to the establishment of the Ad Hoc group. One of the finding of the *World Development Report* (1993) which surprised many people was the extent to which disease burden of high and low income countries overlap, a trend which will continue. With soaring costs of health care low cost highly effective interventions are welcome in all countries but especially in developing countries. Priorities in research might relate to high burden of disease and effectiveness of available intervention measures. The study being proposed will be global in scope although it will give special attention to both the emerging diseases and the recurring social threats which in major ways are likely to influence the health of low income populations in the next century. The study will adopt the broad view that the extant problems of the health sector will not be solved only by future economic growth and that appropriate research is needed in social sciences, population sciences as well as biomedical and natural sciences. The Ad Hoc Committee had been split into three working groups:

(a) Intervention Research and Development opportunities;
(b) Households and Health systems Research and Development opportunities; and
(c) Institutional Development Options.

None of the 3 working groups had met since the March 1994 meeting but some members of the three working groups were working on defined assignments. It was hoped that the results of the study will not only prevent donors' fatigue in support of, but enhance funding of Research and Development.

The study might also point to new ways of research capacity building similar to that currently existing in agriculture (CGIAR), UNESCO (International Institute for Education).

In the discussion, it was considered that the views expressed by the chairman on the process in initiating the Ad Hoc Group were positive, that ACHR should have been involved ab initio and that the Ad Hoc group should have submitted to this session of the committee a full progress report. The scope of the initiative was large the methodology to be used was not infallible and it was doubtful whether in the time frame of completing the study by June 1995, the objective could be achieved . It was agreed that an Ad Hoc committee of the ACHR, in accord with the defined advisory role of the ACHR system and respect for the institutional integrity of the WHO and the rules of the governing bodies, should peer review the final report of the WHO Ad Hoc group and advise the Director-General and through Director-General the governing bodies of the WHO. After a prolonged discussion, the Committee formally adopted the following statement:

> "The GACHR supports research initiatives which promote WHO's programme objectives. The GACHR equally recognized that it plays an advisory role to the Director-General and through the Director-General to the governing bodies. Such advice must be based on scientific merit and preserve the institutional integrity of WHO.
>
> The GACHR, however, expressed its concern over the process by which the Ad Hoc Committee on Health Research was formed. It is in WHO's interest that all initiatives regarding research be coordinated in order to achieve maximum impact and authority and avoid overlapping. WHO has mandated the ACHR to perform this coordinating function. By launching the Ad Hoc Committee without prior consultation with GACHR, the objective of WHO to have coordinated activities in health research has been compromised.
>
> However, given the fact that the Ad Hoc Committee has commenced its work and is under pressure to complete its report by June, 1995, the GACHR would not wish to cause delays and, as it supports such activities in principle, offers and recommends to peer review the report before its publication and endorsement by WHO. It is recommended that the GACHR appoint a group of experts to undertake this task".

It is further recommended that discussions be held by the Chairman with the Director-General in order to promulgate managerial arrangements that ensure that the ability of the GACHR to fulfil its mandate is not jeopardized in the future.

The GACHR also entrusted the chairman to discuss the issues raised by the formation of the WHO Ad Hoc Group with the Director-General with the aim of resolving them in the best interest of the organization.

HEALTH POLICY RESEARCH (HPR) IN WHO (Agenda item 8)

Presentations on Health Policy Research were made to the Committee by Professor Sayers who introduced a paper by Professor Attinger on "The role of dynamic modelling" (see Annex 4); by Professor Hasan on behalf of Dr Augus Suwandono from WPRO on Health Policy Research (Annex 5) followed by a brief commentary of his own; and by Professor Herrin, Chairman of WPR/ACHR (see Annex 6).

Defined in simple terms, health policy research is the process of scientific investigation in setting policies, leading to the formulation of strategies, priorities and plans for health development. Health development is considered as a positive change in health status, where health benefits are maximized and health hazards are minimized.

To plan health development effectively, the consequences and costs in terms of what happens in other sectors must be taken into account, preferably in advance, and preferably in circumstances that would permit a trial to be made of any particular strategy, adopted to aim at a chosen health development target.

The development of objective and quantitative methodologies for the assessment of the determinants of health development is both a critical and crucial issue for policy makers at all levels in the health care field for the following reasons:

(1) Limited resources (both material and nonmaterial) require a rational framework for the establishment of priority scales for resource allocations.

(2) It is now generally recognized that changes in health levels represent multifactorial processes that are determined primarily by the interplay of forces between the make-up of a host (an individual or a society) and his environment.

A "systems" approach has been widely used in health policy planning, usually based on the following major steps:

(1) Identifying and defining the problem.
(2) Identifying and priority ranking of objectives within the framework of a valid value system.
(3) Identifying resources, as well as the groups competing for these resources.
(4) Considering alternative solutions.
(5) Choosing the optimal system for implementation of the chosen solution.
(6) Synthesis of the system.
(7) Updating concepts, equipment, characteristics, and data.
(8) Testing the system.
(9) Refining the design based on a correlation of test data and requirements.

The Committee noted that despite a considerable pool of scientific expertise, policy makers were still not decision-making in an objective way. The Committee believed that health policy research, the aim of which

was to maximise health benefits and to minimize health hazards at the lowest possible cost, deserved a very high priority. HPR should be combined with Health Systems Research. Health policy research needed more case studies to generate new hypotheses. Research is needed to convince decision makers on the usefulness of HPR.

The Committee recommended that an ACHR working group be formed to develop a substantial unified ACHR document and to examine the desirability of a special programme on HPR.

REVIEW OF RESEARCH PLANS AND ACTIVITIES AT THE GLOBAL LEVEL (Agenda item 9)

In accordance with item (iii) of its terms of reference, "to review research activities, monitor their execution and evaluate their results from the standpoint of scientific and technological policy", ACHR has undertaken a review of eight of the research programmes it is currently supporting. Other programmes will undergo similar evaluation in due course. The reviews were carried out by working groups using the following framework:

Programme monitoring:

What are the objectives of the programme?
What are the research components?
How is the programme financed?
- core budget
- donor budget

Programme execution:

How is the programme executed, especially its research components?
Who is participating in the execution of programme research?
- cooperative linkages
- global/regional/local

What are potentials/limitations (opportunities/constraints)

Programme evaluation in the light of scientific and technical policy:

Which methods are employed?
What is the significance of research components for WHO's research policy?
What are the medium-term perspectives?

The GACHR was generally impressed by the research programmes reviewed in the context of scientific and technical appropriateness. It noted with concern that funding from extra-budgetary sources is in general decline. It recognised the need for the research programmes to take account of the impact on their activities of such factors as population dynamics or drug resistance, to name but two examples. Furthermore, it reaffirmed the principle that the ACHR system be fully involved in the evolution of new research initiatives emanating from outside the Organization.

General recommendations:

ACHR noted that most research programmes had their own review and management mechanisms. However, in view of the terms of reference given to the ACHR and its role *vis-a-vis* the governing bodies of WHO, the Committee made the following recommendations:

a) ACHR should be informed and consulted on the elaboration of programmes and projects having overall implications for research policies and strategies, including planning and prioritization;

b) ACHR should be accorded a higher profile in the classification of WHO's programme of work, as well as in the organizational structure, linking it clearly to executive management;

c) adequate resources should be provided for the work of the ACHR system at global and regional levels, in order that it may adequately reflect WHO's research policy and strategy and facilitate their implementation in collaboration with the scientific community in official relations with the Organization;

d) GACHR should be represented in the external review bodies of the programmes it supports. This view was endorsed by the programmes concerned in the evaluation process.

Overview of the programmes reviewed, and the Committee's recommendations

Cardiovascular diseases

The WHO Monica project, which monitors trends in and determinants of cardiovascular diseases, is reaching the final stages of its data collection period. Over the last ten years a total of 15 million people between the ages of 25 and 64 have been monitored in 39 collaborating centres in 26 countries. The findings of more than 500 studies have been entered in the database, although they have not yet been fully analysed, due mainly to lack of resources. This collective analysis is necessary to determine whether trends in cardiovascular mortality are due to changes of incidence in acute myocardial infarction and stroke or in survival after these diseases, i.e., the contribution of preventive and curative cardiology. The results will help decision-makers in the planning and management of services.

Global and integrated environmental health

This recent and promising programme, in an early phase of expansion, will bring a much-needed research component into the crucial relationship between environmental health hazards and public health. Research in environmental epidemiology should be strengthened, in collaboration with related disciplines in WHO and other international organizations. Other areas to be pursued include research that will assist in policy development, environmental health risk management, strengthening of environmental health indicators, improved information systems and means of incorporating health impact assessment into new environmental control technologies. The Committee recommended that equal priority should be given to research aimed at preventing environmental health problems and

research aimed at their resolution or mitigation. Further, strong support should be given to the planned meeting on International perspectives in environment, development and health: Determining future interventions and research priorities.

Food and Nutrition

Current programmes and research are directly related to the International Conference on Nutrition sponsored jointly by WHO and FAO in collaboration with other agencies in December 1992. The conference drew up a Plan of Action for Nutrition which was adopted by WHO. The Food and Nutrition Programme is therefore faced with an enormous task of supervising implementation of the Plan on a global basis, as well as monitoring and evaluating research into nutrition. A major component of such research is the use of biotechnology in the development of food an in keeping it safe, with special emphasis on the as yet uncertain health impact of such technology. The Committee was impressed by the commitment of the Programme to carrying out its activities in coordination with other WHO programmes, as well as with FAO and many other international agencies. It was concerned, however, that lack of resources were a severe impediment to the achievement of its goals.

Special Programme of Research, Development and Research Training in Human Reproduction

The overall objective of this programme in the area of family planning is to increase the choice of methods available to couples and individuals. ACHR endorsed the two critical research thrusts: epidemiological research to document safety issues, and sociobehavioural research to ensure that methods are culturally acceptable and to explore reasons for their non-use. Other priorities are the improving of existing or development of new fertility regulation methods and strengthening of research capabilities in developing countries. The programme has pioneered, within WHO, the concept of research integrated within the Organization's structure, through extrabudgetary funding. The links established with ACHR have proved valuable, and the Committee expressed eagerness to explore means of strengthening them.

Intensified cooperation with countries

The programme is a demonstration of one way to promote and practise health systems research on topics such as micro-macro simulation models in countries, and poverty as a criterion for health expenditure allocation. It provides an original approach to health systems planning at country level, with emphasis on continuing evaluation. The Committee recommended that the results of evaluation of programmes in the 26 countries which are using new and better indicators should be widely disseminated; that coordination should be intensified between the programmes, the Regions and WHO representatives; that the programme's interdisciplinary group should be strengthened; and that priority should be given to social elements in defining health policies.

Nursing

The programme promotes and supports health services research that will ensure the optimal contribution of nursing and midwifery to health care delivery with emphasis on primary health care. It was recommended that the programme should continue on issues addressed in the Nursing Personnel Resources Survey (i.e. shortage of nurses; standards of education; and quality of care); develop nursing research concepts grounded in the realities and cultures of developing countries; and assign WHO fellowships to prepare nurses in health services research and to strengthen the research competence of headquarters and regional nursing units. Furthermore, the Committee was of the opinion that more support should be given to the "twinning" mechanism whereby institutions in developed countries were linked with their counterparts in the developing world. This has proved to be a cost-effective approach to capacity-strengthening.

Oral health

Research activities are concerned with prevention, epidemiology, health services research and education. The main objective of the programme is centred around fluoride with emphasis on research in the epidemiology of fluoride deficiency and fluorosis. The Committee endorsed the research directions and praised the community approach to oral health education.

Special Programme for Research and Training in Tropical Diseases

The programme is one of WHO's main large-scale research contributions for developing countries at operational level. The new Programme structure is efficient, the main topics (leprosy and five parasitic diseases) being critical to the regions affected by tropical diseases. The Committee acknowledged training efforts (capacity building), the programmes in applied fields research and product research and development, and the work of the steering committees. It was affirmed that the Programme would welcome ACHR representation at the meeting of its External Review Group in 1996.

REVIEW OF RESEARCH PLANS AND ACTIVITIES AT REGIONAL LEVEL (Agenda item 10)

Further to an earlier meeting between the chairman of the GACHR and chairman of the Regional ACHRs, the chairman of the RACHRs made brief presentations of research activities in their respective regions. Formal reports of research activities of the RACHRs were also circulated.

AFRICAN ADVISORY COMMITTEE ON HEALTH RESEARCH

Research continued to be integrated into the health development mechanisms of the region.

The priority research areas were management of health systems, appropriate technology disease prevention and control, maternal and child

health, family planning, nutrition, community water supply and sanitation, financing and overcoming social constraints of HIV infection, health services research and research capacity strengthening.

The AACHR as part of the AACHD met in June 1993 and planned to meet again in November/December 1994. At its last meeting it reviewed the theme of the Technical Discussion of the Regional Committee, held in September 1992, on Essential health Research and the experiences of the African region in monitoring community health. The AACHR recommended that:

(i) WHO should collaborate with countries in identifying centres to be designated WHO Collaborative Centres for Essential Health Research (EHR).

(ii) Countries should earmark at least 5% of the health budget for research, the bulk of it being EHR.

(iii) Countries should examine and adopt EHR framework.

The theme chosen for the Jacques Parisot Foundation Fellowship Award was "The Financing of Community Health Activities".

In the region, 1% country budgets was allocated for research in addition to a sum of US$ 100,000 from the Regional Office.

REGION OF THE AMERICAS, PAHO/ACHR

The major thrust of PAHO ACHR had been to develop a basis for definition of science and technology policies in health. This included making recommendations in terms of principles and operational measures related to definition of research priorities, expansion and diversification of services and mechanisms for financing, improvement of management of the R&D information system.

The ACHR recommended that PAHO continue to promote studies in support of policy-making, particularly those on the financing of research, science and technology legislation, training of researchers, and analysis of scientific production. It also recommended that exercises in policy-making in health-related science and technology to be carried out in the countries.

In addition to national policies, research policies are assuming increasing importance at the institutional level. In July 1994, PAHO organized a travelling seminar on this topic. This seminar enabled directors of research and development institutes in Argentina, Brazil, Chile and Uruguay to visit the institutions of other countries in the Region, culminating in a seminar at the National Institutes of Health (NIH) in the United States.

Support for research projects through the PAHO/WHO Research Grants had continued for nearly eight years. Expenditures totalling almost US$4.2 million dollars from the PAHO regular budget have been allocated to finance 250 research projects, 153 of which have been completed. During the ACHR meeting in 1994 the results of a survey of the research teams that had received grants and had completed their respective projects were analysed.

The ACHR recognized the importance of the Research Grants Programme in promoting research and emphatically recommended that it continue to require high-quality proposals, even if all the available funds are not used. With this objective in mind, four workshops on project preparation were programmed for 1994, three of which have already been conducted. Regional competitions are also being held to support projects on topics of particular interest. In 1994, competitions were held on the United State and Health, Violence and Health, and Community Participation in Health.

PAHO/WHO Fellowship Programme: A descriptive study of this programme conducted by the Secretariat noted that of the 5,219 fellowships granted in the period 1983-1987 in 22 countries, none was chiefly directed toward training for research.

The ACHR resolved to urge the Organization to take steps to increase the number of fellowships granted for training in research. In response to this recommendation, a competition was held in the Region in 1994 for the granting of nine fellowships of US$30,000 each to Latin American and Caribbean investigators to develop programmes of study and research on public health in institution in the United States, Canada, and Europe over a one-year period.

PAHO/WHO Programme on Biotechnology. In that same year the subcommittee prepared a Regional Programme for the Development of Biotechnology Applied to Health. Activities related to technology were reviewed during the last meeting of the ACHR, particularly those carried out during the past two years. Among the achievements of the completed projects are the development of diagnostic procedures for malaria through the use of monoclonal antigens; the building of serum reference panels for AIDS; more than 30 isolates of HIV-1 from patients in several countries; the development of an HIV test kit with recombinant antigens, currently marketed by Cuba; and the development of monoclonal antibodies for hepatitis B, which resulted in a reagent that is being used by the Malbran Institute in Argentina. A project of particular interest was the development of an HIV test kit, the result of collaboration by four Argentinian, Brazilian, and Mexican institutions with financial support from PAHO/WHO. PAHO and the UNDP/UNIDO/UNESCO Regional Programme on Biotechnology jointly organized a programme of courses on advanced biotechnology techniques. Three courses were taught in 1993-94 and three more courses in basic biotechnology techniques for less developed countries were approved for the next year. In 1994, PAHO and NIH have established a joint initiative to award grants for biotechnology research projects to investigators in Latin America and the Caribbean. Mention should be made of the joint initiative with the Inter-American Institute for Agricultural Cooperation (IICA) for the preservation and exploration of biodiversity through biotechnology, with emphasis on medicinal plants.

Research on AIDS: AIDS research in Latin America was discussed in the last ACHR meeting. Of the 561 projects, 38% were classified as epidemiological; 30% as social, behavioral, or intervention-related; and 24% as clinical.

The PAHO ACHR expressed its concern about the lack of resources and the trend toward cutbacks in funding for AIDS research.

Regional Vaccine System (SIREVA): SIREVA is a PAHO initiative designed to promote technical cooperation among the countries in the Region, combining the objective of new vaccine development with a strengthening of the scientific and technical infrastructure in this area. Its activities range from epidemiological studies on the prevalence of subtypes of microorganisms through field testing of new vaccines, to applied and development research, production at the pilot plant level, and quality control. SIREVA is widely recognized as the Americas' response - particularly Latin America and the Caribbean - to the call for efforts by the Children's Vaccine Initiative (CVI).

Master Plans have been drawn up for the development of vaccines against meningitis type B, pneumococcal pneumonia, typhoid fever, and dengue. The Canadian International Development Agency (CIDA) has transferred close to Can$1.5 million to PAHO/WHO for a study, already in progress, of prevalence and epidemiological surveillance of S. pneumoniae, with a view to developing a pneumococcal vaccine. Field testing of a new cholera vaccine is also under way funded by a contribution from Sweden of nearly US$ 1.2 million dollars. Phase II, already concluded, was conducted in Colombia, and at the present time, Phase III is being carried out in Peru.

EASTERN MEDITERRANEAN ADVISORY COMMITTEE ON HEALTH RESEARCH

The research priorities of the Region included diseases of modern lifestyle; health aspects of human ecology including health of immigrants, refugees, and displaced populations; and the health of adolescents. These were extensively discussed at the last meeting of EM/ACHR held in April 1994. On these the following observations were made.

(i) Concerning diseases of lifestyle, environmental factors were amenable to prevention. Some of the genetic factors such as consanguineous marriages common in the region might also be amenable for prevention through education. Socio-behavioural factors could be modified. Inter- and intra-sectoral research is urgently needed.

(ii) On health aspects of human ecology, attention should be paid to planning and provision of structural and other facilities such as sanitation, adequate water supply. health services research is important.

(iii) On health of adolescents, rapid and major development adjustments create a variety of stresses with concomitant problems that have an impact on health. Research is urgently needed, through national programmes such as the ongoing one in Tunisia.

Specific recommendations made by EM/ACHR include the following:

Health Systems Research

WHO should:

(a) continue the promotion of Health Systems Research (HSR) through advocacy and extended training programmes, in cooperation with the health agencies of Member States;

(b) provide health information services to research workers, as well as ensure flow of information between Member States;

(c) obtain more funds, including those from the private sector, for HSR;

(d) encourage and assist Member States to give more emphasis to developmental health systems research in order to develop more relevant, efficient and effective health interventions;

(e) give higher priority to assist research proposals that enhance the development of research teams and develop linkages between ministries of health and universities;

(f) encourage countries to develop HSR partnership with NGOs and/or private sector, both for carrying out research and increasing available resources. Such partnership should be designed in a way that does not deprive ministries of health of their research capacities;

(g) encourage HSR in universities and other academic institutions until this form of research is fully recognized, as is currently the case with biomedical research.

Diseases of Lifestyle

(a) Member States should review the present situation of diseases of lifestyle and seek better data on the incidence, prevalence and case fatality rates of these disease, as well as the prevalence of modifiable risk factors.

(b) EMRO should encourage and assist Member States to promote research proposals and implement studies for identifying the various determinants (medical, psychological, genetic, environmental, behavioural, etc.) of lifestyle-related diseases.

(c) Member States should give more emphasis to preventive approaches to avoid the serious consequences of non-communicable diseases. Such effort should be of multisectorial in nature, guided by the scientific information generated and communicated by the health sector to all other relevant sectors, as well as risk groups, both intra and inter-sectoral.

(d) A network should be set up to study the problem of non-communicable diseases across the Region and formulate a regional research programme.

Health care of the refugees

(a) Member States should encourage and assist in the conduct of environmental impact assessments as a tool for the planning of refugee camps and for prioritization of actions needed and possible remedial efforts.

(b) WHO should support research on health aspects of migrant groups of economic importance.

Health of adolescents

(a) Member States should be encouraged to identify and assess the actual needs of adolescents, as well as their perception, attitudes and behaviours related to these needs, and conduct research on the use of school health services, as possible means of reorienting the social and behavioural factors.

An account was given of several workshops, seminars inter-country consultations, held in the Region, on health systems research; schistosomiasis; safe motherhood; primary health care. Research capacity strengthening continued to receive adequate emphasis.

Extensive use of WHO consultants in the Region to help countries to develop strategies for research has continued.

The EM/ACHR had discussed at its last meeting the GACHR monograph on *Research for Health; Principles Perspectives and Strategies* and considered it a succinct text on Health Research.

EUROPEAN ADVISORY COMMITTEE ON HEALTH RESEARCH (EACHR)

EACHR has been working in economically stringent conditions due to the region-wide recession and major social, political and economic changes in the first part of the 1990s. Such dramatic changes have made the issues of health research a less important priority in WHO's European policy and more attention has been needed for generating the response to large-scale acute health problems in CCEE and in NIS countries, and particularly in the former Yugoslavia.

In part, the European health research policies and research activities are successfully carried out by Directorate XII of the EU with its framework programmes, and by the European Science Foundation (ESF) the collaborative organ of the European scientific institutions. This has meant that the modest EACHR health research policy role is less critical for the Region than it would be elsewhere. It is, however, evident that EACHR needs to elevate its both research policy and technical roles, particularly in response to the new situation in the CCEE and NIS.

Unfortunately, the financial situation has not permitted the Committee to meet during the last two years.

Some individual activities have been carried out as research policy elements of other activities or by participation in the research policy activities of other bodies. Research Meetings held in Prague in November 1992, and in Geneva 1994 were attended by representatives of EACHR.

The WHO Regional Office for Europe's Division of Environmental health carried out an extensive questionnaire study among the 51 European countries on several aspects of environment and health, its problem priorities, resources, institutions, policy and research priorities. The results of the survey supplemented by other collected data will be published as an extensive document, *Concern for Europe's Tomorrow* (in print). This data had a strong impact on the Environment and Health Action

Plan for Europe (EHAPE) that was discussed on 20 - 23 June 1994 by the 47 European Ministers of Environment and health who also adopted a Declaration on Environment and Health.

The following objectives were set for Research and Development in environment and health:

- To provide the scientific basis for policies aimed at identifying environmental hazards, assessing risks, and reducing or preventing environmental effects on health.

- To provide appropriate technology and other tools for the maintenance and development of an environment that is conductive to health and wellbeing.

- Product safety.

- Community noise.

- Physical planning and health.

- Ambient air quality.

- Occupational health, including those working at home and in small business.

- Relationship between environmental conditions and lifestyles.

- Psychosocial dimensions.

- Urban environmental health impact assessment.

Future perspectives

It is evident that basic biomedical research is developing well in Europe and produces continuously results and methods which could be more effectively used in the clinical and public health practices. Such research is also needed for health policy-making in growingly complex societal contexts. Many of the European trends signal the need to develop further health research policies particularly for public health and environmental health sectors. Three main priority areas identified are:

a) Promoting health research policy that facilitates the critical evaluation and effective transfer of basic research results into public health practices.

b) Strengthening and accelerating the development of research policies and research structures in the field of health research for the CCEE and NIS.

c) Provision of research policy support for the implementation of the European Environmental Health Action Plan and other special programmes which have health research as an essential element.

However, in order to have an impact in these areas, EACHR would require resources to be made available from the WHO/EURO budget so that EACHR could resume meeting.

SOUTH EAST ASIAN ADVISORY COMMITTEE ON HEALTH RESEARCH

The SEA/ACHR held its Nineteenth and Twentieth Sessions respectively in April 1993 and 1994.

Research priorities in the Region were identified as nutrition; health systems research; health economics research; women's health; health policy research; environmental and occupational health research; contraceptive practices and HIV transmission; nursing research; behavioural aspects of health; vector control; appropriate technology; health manpower development; malaria; Dengue vaccine; aging; and hypertension. SEA/ACHR also considered health research strategy of utmost importance. The regional Research Promotion and Development Programme was on the whole directed towards achieving some of the provisions defined in the report of the Technical Discussions at the 43rd World Health Assembly in 1990. The SEA/ACHR made the following recommendations:

WHO/SEARO: should

(i) assist countries in preparing guidelines for the prioritization of research areas and topics; appraisal of research project proposals; monitoring and evaluation of research projects; and for the utilization of research results;

(ii) promote:

(a) the dissemination of information on research done in countries; and

(b) networking of research institutions in the Region.

Research Capacity Strengthening in SEARO

SEA/ACHR recommends that:

(i) the network of WHO Collaborating Centres should be better utilized to strengthen research capacity in countries; in particular, they should be able to provide reference material and research reagents not commercially available to researchers in countries; researchers and institutions should be made better aware of such facilities;

(ii) WHO should endeavour to improve coordination and harmonization of research capacity strengthening within WHO and with the Special Programmes, and, if possible, with other agencies and organizations, particularly at the country level.

Research Related to Nutrition in SEARO

The Committee took note of WHO/SEARO's wide-ranging activities in promoting and supporting nutrition research within the framework of

the Regional Nutrition Research Development programme and the resources available;

and recommends that:

(i) increasing attention be given to research into the socio-economic and behavioural determinants of nutrition practices and to develop means of changing these to improve nutrition. This includes research on the nutritional implications of changing lifestyles, urbanization, changes in age pattern and societal values (both under-nutrition and over-nutrition), which may lead to chronic, degenerative and other diseases;

(ii) intersectoral collaboration in nutrition research and encouragement of research by other sectors which may be more relevant for improvement of nutrition than those undertaken in the health domain;

(iii) policy research and policy analysis as a means of influencing activities of other sectors which may affect nutrition.

Strategy for Health Research in SEARO

SEA/ACHR recommends that:

(i) the health research strategies of the South-East Asia Region, as contained in *Research Needs for health for All by the Year 2000* (SEARO Technical Publication No.2) and revised as *Health Research Strategies of the South-East Asia Region* contained in the Working Paper SEA/ACHR/19/9, be accepted and adopted with further modifications as hereunder:

(a) to add as an additional strategic approach:

- to promote and intensify intersectoral collaboration in research that had potential for affecting health development.

- to promote and accelerate the incorporation and internalization of the relevant basic methods used in the social, psychological, behavioural and economic sciences into health research.

- to identify, promote and advocate research in areas of relevance to health (within the context of the eight elements of PHC) in non-health sectors and domains, and by scientists and institutions in scientific disciplines other than the health sciences.

(b) to include, in addition to disease control, the attainment of positive health as a goal to which health development would aspire and to which research efforts should contribute;

(c) to emphasize research into women's health in priority researchable areas and research on how to enhance the role of women in promoting health;

(d) to emphasize critical intervention research for the under-privileged, and for vulnerable groups including children.

(ii) WHO transmit the health research strategies of the South-East Asia Region, as agreed and adopted, to the Global SEA/ACHR for incorporation, as desirable, in revising the global health research strategy.

Research for Improvement in Health Care Delivery Systems - Regional Perspective

SEA/ACHR recommends that:

(i) Health systems research continue to be given priority with emphasis on research development programmes of the country by WHO.

(ii) In particular, research into ways and means of improving the referral systems, especially at the district level, be emphasized - including the development and testing of criteria, operational procedures, and feedback mechanisms and financial support appropriate to local situations in each country.

(iii) Research into quality assurance of health care at primary health care and district levels be further promoted.

(iv) Research on the role of community volunteers, their training, supervision, sustainability and their linkage with health care delivery systems need to be taken as a priority.

Strategic Plan for Promoting and Strengthening Health Economics Research: Regional Approach

SEA/ACHR recommends that:

(i) Health economics research receive emphasis in the revised Health Research Strategy of the SEA Region.

(ii) With respect to action required in each country to promote and support health economics research:

(a) Training in health economics research was of importance and be undertaken at two levels:

- for national policy (macro) level health economics research, professional economists should be exposed in-depth to health issues; and

- for district or operational (micro) level health economics research, health professionals be trained in relevant, basic aspects of economics.

(b) Health economics research be institutionalized as a component of HSR in organizations/department responsible for the planning and delivery of health care.

Health Policy Research

The SEA/ACHR recommends that:

(i) In view of the changing economic, social, political, technological and epidemiological situation in the countries of the Region as an integral part of the global dynamics, health policy analysis is urgently needed in order to adjust health as well as development policies accordingly. health policy research should be considered a priority area for promotion and support by WHO.

(ii) WHO/SEARO support national efforts at using HPR to monitor and evaluate the countries' existing health policies with respect to their relevance and impact on health and health infrastructure, and in taking new and more effective and efficient public health actions.

(iii) WHO/SEARO assist ministries of health in developing dynamic relationships with researchers, politicians and planners in non-health sectors where HPR may contribute to the formulation of public policies conducive to health promotion and protection.

(iv) Although policy research covers both retrospective analysis of policy formulation/implementation and prospective analysis for policy development, it is suggested that the emphasis at present should be placed on analytical studies for health policy development.

(v) WHO/SEARO assist Member Countries in developing expertise in health policy research for use at national and sub-national levels and create a critical mass of policy analysts, and foster linkages among countries for regional collaboration.

Guidelines for the Assessment, Development and Transfer of Appropriate Diagnostic Technology

The SEA/ACHR recommends that:

(i) The major aim of research in diagnostic technology should be to enable a shift from use of systems requiring a high degree of skills to simpler, user-friendly systems based, if required, on sophisticated technology but requiring little special skills from the end-user professionals and non-professionals at all levels of health care, especially at primary care level, and including self-care.

(ii) The following are some priority areas for research:

a) Development of diagnostic technology in the field of infective diseases, especially for diseases of national importance where such appropriate technology is yet unavailable.

b) Development of alternative technologies to replace inappropriate or costly methods.

c) Adaptation of available technologies to suit specific regional and country needs.

d) Development of diagnostic technology for psycho-social disorders, injuries and poisoning.

e) Development of predictive diagnostic technology for community health problems.

f) Rational use of diagnostic technology.

(iii) WHO should continue to promote and support the development of policies on health technologies within the context of national health policies, and the establishment and strengthening of mechanisms for the assessment, development and transfer of health technology, including, in particular, mechanisms for access to information on current and emerging technologies available nationally and worldwide.

Strategies for Research on Behavioural Aspects of Health in South-East Asian Countries

WHO/SEARO should:

(i) Strengthen health behaviour research in Member Countries.

(ii) Encourage development of national and regional linkages between health behaviour researchers and health programme managers who are potential HBR users.

(iii) Support national efforts in training health professionals at the operational level in methods and skills in qualitative data collection methods needed for HBR studies.

(iv) Encourage the development of mechanisms for establishing and sustaining effective and well motivated inter-disciplinary teams for HBR.

(v) Assist the countries in identifying priority health areas amenable to solution by HBR.

(vi) Promote the development and use of appropriate and sound methodologies and protocols in HBR studies in the Region.

Several research activities had taken place in the region. Support had been given specifically for strengthening research capacity to selected institutions to undertake HSR and for behavioural research. Training in chemical trial methodology had been conducted. Phase I and Phase II chemical trials of the Dengue Vaccine, developed with the support of the WHO regional office had been conducted. The 8th biennial meeting of the Directors of Medical Research Councils and workshops on research methodologies and development of research proposals had taken place. Consultative meetings were held on Research on Public/Private mix of Human

Resources for Health and on Research in Utilization of Human Resources for Health. Research training grants, fellowships and research grants were being awarded. Thirty new research grants were awarded in the period 1992 - 1994. Research medical councils had been strengthened financial and/or technical assistance had been provided to some countries for the establishment and/or strengthening of national mechanisms for the promotion development and coordination of health research.

Short term consultants continued to be recruited in HSR, molecular biology, biotechnology, demography and health statistics, nutrition surveys, medical sociology and health economics.

A long term multi-centre collaborative research programme on P. falciparum drug resistance had been initiated.

A multi-centre study of the process and outcome of collaboration between the nursing services and nursing education was supported in three countries.

As in the past, 5% of the WHO SEARO's Regional budget was being committed to research.

WESTERN PACIFIC ADVISORY COMMITTEE ON HEALTH RESEARCH

The fifteenth meeting of the WPACHR was held in Manila, Philippines in August 1994 in a joint session with the Directors of the Health Research Councils or Analogous Bodies (HRC/AB). It made the following recommendations.

(a) Universities, academic and professional bodies could perform several roles in regard to research-based policy making. These included synthesizing policy-relevant research for policy formulation; undertaking policy research and analysis on priority health issues; developing and maintaining policy-relevant information and retrievable data for health policy research and analysis; training researchers and policy makers in relevant skills, disciplines and issues; providing technical assistance to policy makers, researchers and trainers; and serving as a forum for policy discussion and exchange among policy makers, programme managers, researchers and trainers.

(b) A framework and strategic plan for health research programmes should lead stepwise from the generation of resources for research to the management of these resources, the conduct of research in priority areas, the production and implementation of research results and the generation of new knowledge.

(c) Priority setting should not be undertaken primarily as a response to tight funding. The criteria for the setting of health research priorities were grouped into those relevant to national health goals and to research issues.

(d) Research on health care of the elderly should be considered as a priority.

The WHO Regional Centre for Research and Training in Tropical Diseases and Nutrition continues to be very active, with the staff successfully obtaining increasing amount of research funds. A three year collaborative programme in tropical diseases research was begun with the Japan International Cooperation Agency in January 1993.

Some variability existed in the standards of individual WHO Collaborating Centres and in the effectiveness of collaboration. It should be noted, however, that most had little or no financial input from WHO, which lessened the influence that could be exerted when improvement was required. In order for the collaborating centres, WHO and the countries to get the maximum benefit, there must be improved exchange of information, better coordination at all levels and more attention to quality control in the processes of designation and renewal.

There was a need for an improved **networking arrangement among the HRC/AB** within the Region. A list of information topics will be developed into a handbook which can be used by Member States to identify the range of activities undertaken by the HRC/AB within the Region. It is intended to have this information updated annually.

As there was a need for more **research funds** in all member countries, consideration must be given to ways and means to increase the funding from both governmental and private sources. The Australian Government's objective of increasing the health and medical research funding to 2% of national health expenditure by the year 2000 was noted.

Relationship between WHO and national research programmes

The role of WHO was promotive, supportive and coordinating. Member countries have differing involvement in WHO programmes, the extent of which varies with the needs of the countries. The important factor was the sustainability of the research programmes. The WHO policy of not funding research which did not have country endorsement should be maintained. Noting that WHO had a tendency to fund only short-term projects, it was mentioned that longer-term projects could also be considered, especially if they were appropriate to the research area and the country needs. The importance of linking the training of research personnel with health research funding was noted.

Research capability strengthening

The example of Guiding principles used in the Philippines to develop human resources for health research include the need for a good match between development of human resources and priority research programmes; the importance of equitable distribution of capabilities in health research; the need for maximum involvement of the Department of Health and other government agencies in human resources development; and a requirement for the private sector to be actively involved.

Review of Research and Development Activities in the Region

Research activities within the 28 WHO technical programmes in the Region have been described in the report of the joint meeting[1].

Thirteen research training grants were awarded during this period. The national workshop on research design and methodology was held in Ho Chi Minh City, Viet Nam (1993). This was the fifteenth workshop held since 1981.

Since the publication of the manual on *Health Research Methodology: A guide for Training in Research Methods* in May 1992, a request to reprint it was received from India and agreed upon in September 1992. The rights to translate and print it in the Croatian language were granted in February 1993. The manual was also published in Chinese (early 1994) and Vietnamese (mid-1994).

Twenty research proposals were supported during the reporting period for a total of US$ 236, 802. Furthermore, eight research-related meetings and activities were held.

In the discussion, it was hoped that research activities in the regions would continue to be enhanced. It was regrettable that the European ACHR seemed to be in abeyance.

HARMONIZATION OF RESEARCH POTENTIAL FOR SYNERGISTIC APPROACHES IN WHO (Agenda item 11)

Dr Szczerban, Vice-Chairman of WHO's Council for Science and Technology made a presentation to the Committee. He reported that in order to ensure harmonization of research programme activities within WHO and following previous discussion and recommendations at the World Health Assembly 1990 and GACHR, 1992, the Director-General of WHO had established a Council for Science and Technology (CST) in headquarters as an internal platform to enable an inter-programme communication on science and technology related matters.

Specific functions assigned to the Council for Science and Technology (CST) are:

a. To advise the Director-General on the orientation of science and technology-related activities within WHO, in the light of policy guidelines provided by Governing Bodies;

b. To serve as a forum for exchange of information among programmes and harmonize overall scientific and technological developments within WHO;

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[1] See Section 4 of Annex 4: Report of the Secretary of the WPACHR.

c. To act, on request, as a consultative group in relation to WHO's mechanisms for the acquisition of scientific and technological advice (e.g. Expert Advisory Panels, Collaborating Centres, Nongovernmental Organizations).

CST appeared to provide a desirable opportunity for transmitting the ACHR recommendations to the research components of WHO technical programmes. The joint meeting between the ACHR Standing Committee and CST (16 July 1993) attended by D.G and ADsG considered major past and future ACHR initiatives, (such as Research Capacity Strengthening in developing countries; Evolving problems of critical significance to health; Health Development research; and Science and Technology for Health) proved its relevance as a valid institutional framework linking advisory and managerial components of WHO's research efforts.

The Council for Science and Technology comprising programme managers of major research-related WHO programmes and senior representatives of the executive management, had met a number of times on various themes of relevance to research policy and strategy. The following specific issues have been discussed: Report of ACHR Subcommittee on Health and Economy; Mechanisms for the acquisition of scientific and technological advice in WHO; Health research strategy update; Resources for research; Progress report of Ad Hoc Committee on Health Research Relating to Future Intervention Options; the Proposal to create a global fund for research.

Intersectoral research received recently renewed attention as the only strategy capable of resolving global health problems. Within the UN system it is clearly the mandatory role of WHO to provide a leadership on research initiatives related to health. The fact that the health sector alone cannot cope with all health determinants, especially those beyond the domain of traditional health sector responsibility, does not diminish the Organization's function in coordinating, organizing and promoting intersectoral efforts and activities directed to health promotion.

However, In the absence of an explicit coordinating mechanism, the health-related research initiatives of different agencies and organizations sometimes appear to be competing with, rather than complementing WHO programmes. This leads in extreme cases to incompatibilities and inefficient use of resources. In view of the scarcity of resources available for health, and in the face of increasing challenges, the combined efforts of all sectors concerned with health must be clearly recognized.

In the discussion which followed, several important issues arose.

Infrastructure

The GACHR warmly welcomed the establishment of new terms of reference for its secretariat, the office of Research Policy and Strategy Coordination (RPS). RPS is responsible for the GACHR and the critical functions related to the development of scientific policies supportive of health for all as well as the coordination of WHO's scientific and technological policies together with those of other UN bodies, and NGOs. It also coordinates and harmonizes the activities of WHO Collaborating Centres.

For RPS to discharge effectively and efficiently its functions it should be given appropriate facilities in terms of working space, professional, technical and clerical staff, as well as funds to catalyse appropriate investigations and pilot studies for developing research and technological policies. The GACHR is of the view that not less than 5% of WHO's operational budget would be necessary for the purpose of equipping RPS to efficiently perform its functions, the organizational support for regional ACHRs should be correspondingly strengthened.[1]

Coordination of research funding

The GACHR was also concerned that the process of generating extra-budgetary financial support for WHO research seems to lack the necessary rigour.

It therefore suggested that consideration be given to the establishment, at an appropriate time, of a joint EB-ACHR Task Force in order to develop a set of rules for the generation/acceptance of extra-budgetary funding for health research.

Coordination of WHO representation at scientific meetings

A related issue is WHO's representation at scientific meetings. Information for decisions related to such representation often tended to flow according to quasi-mechanical rules, whereas high-level professional attention should be used to optimize WHO's representation, as well as the nature of its contribution. This matter falls within the purview of coordination of WHO's research and technological policies.

The Committee was therefore of the opinion that advice for such representation should be provided by its own secretariat (RPS).

Coordination through debate

The Committee noted with satisfaction that an internal forum, the Council for Science and Technology, provided a useful opportunity for debating issues of interest to Programme Managers and for channelling their views to the top management.

The Committee concluded that such a mechanism should be supported and strengthened.

Coordination with NGOs and other UN bodies

The Committee considered this role as one of the essential and vital functions of its secretariat (RPS) to support WHO's leadership in Health Science, Research and Technology and pave the way to implementation. In order to fulfil such a role a stronger infrastructure was indispensable.

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[1] The Committee noted with regret that shortage of resources as well as recent budgetary cuts resulted in the curtailment of simultaneous interpretation.

FUTURE DIRECTIONS FOR ACHR ACTIVITIES (Agenda item 12)

ACHR, noted with satisfaction the Director-General's decision to reinstate annual meetings. It agreed that efforts, over the next year, should be concentrated on the following subjects: research policies and priorities; health policy research; and ways and means to improve collective strategic planning with the regions.

The Chairman would convene "Ad Hoc" working groups to pursue these activities.

COLLABORATIVE RESEARCH ACTIVITIES (Agenda item 13)

(a) With the Council for International Organizations of Medical Sciences:

Dr Bankowski and Dr J. Bryant, respectively Secretary-General and President of CIOMS made brief presentations to the Committee on the activities of their organization. References were made to the XXIVth conference of CIOMS held at Ixtapa, Mexico, which dealt with Health Ethics, Poverty and Vulnerability and the Declarations which emerged from the Conference. CIOMS would continue to coordinate international and national activities in bioethics and ethics of health care.

ACHR welcomed the CIOMS report and future cooperation was assured. But there should not only be consideration of bio-ethics (better biomedical ethics) but also of psycho-social-mental ethics and transcultural ethics and value systems.

It was considered that more and more organizations turn to WHO for advice on all kinds of issues connected with ethics. Therefore, there should be a focal point and CIOMS should be encouraged to widen its scope perhaps also in cooperation with other bodies such as the International Council of Scientific Unions (ICSU) and the various Academies of Sciences.

In addition, the GACHR:

i. was highly appreciative of CIOMS activities in the field of bioethics;

ii. expressed support for the CIOMS programme on Health Policy, Ethics and Human values, and its role in promoting international dialogue;

iii. strongly supported CIOMS initiative to promote a Global Agenda for Bioethics and endorses the Declarations of Ixtapa and the actions following from it;

iv. recommended that WHO provide both technical and financial support to assist CIOMS in carrying out its programmes of bioethics.

b) With other groups and organizations:

The **International Council of Scientific Unions (ICSU)** is a non-governmental organization created in 1931. Its secretariat is located in Paris. It was founded by 7 International Scientific Unions and 38 National Members. Nowadays 23 international scientific unions and 92 scientific academies or research councils are members. There are 29 scientific associates.

Among the participating international scientific unions of interest to Health are: International Union of Biochemistry and Molecular Biology; Pure and Applied Biophysics; Immunological Societies; Nutritional Sciences; Pharmacology; Physiological Sciences; Psychological Sciences.

Scientific associates include the Third World Academy of Sciences; International Union against Cancer; Pacific Science Association; International Union of Food Science and Technology; International Union of Toxicology.

As such ICSU provides a wide spectrum of scientific expertise enabling members to address major international and interdisciplinary issues. ICSU sets up committees to address these issues. Of particular interest to WHO are: COGENE (Committee on Genetic Experimentation), COSTED-IBN (Committee on Science and Technology in Developing Countries and the International Biosciences Networks), COBIOTECH (Committee on Biotechnology).

ICSU expressed the wish to have a direct link with ACHR, suggesting several possibilities for cooperation. A collaboration could be developed along the following lines:

- through the stimulation of the scientific unions and scientific associates in order to develop the health dimension of their programmes;

- through the coordination of multidisciplinary scientific programmes, such as the collaboration with the World Meteorological Organization in the WMO/ICSU World Climate Research Programme;

- through the creation of interdisciplinary bodies, such as for example the existing Scientific Committee on Problems of the Environment (SCOPE).

The **Council on Health Research for Development (COHRED)** was represented at the session by its Coordinator, Dr Y. Nuyens, who gave a brief presentation on recent activities. Since its creation in 1993, COHRED has been in working relations with WHO (particularly with HRP and TDR) and plays an advocacy role for "essential national health research" (ENHR), promoting close cooperation between scientists, the community and policy makers.

REPORT ON THE POCCHIARI FOUNDATION FELLOWSHIPS (Agenda item 14)

The Chairman reported that the Fellowship Committee, consisting of Dr G. Majori, Istituto Superiore di Sanita; Professor T. Fliedner, Chairman ACHR; Professor M. Gabr, immediate past chairman; Professor B. Osuntokun, past chairman; and Professor A. Neri met in Geneva on 8 October 1994 and considered the 34 applications that had been submitted to WHO through the Regional Offices. After reviewing the applications and discussing in detail the promising candidates, the committee agreed that none of these met the criteria at present. However, it identified two candidates (Mr Rolando Sanchez Artigas and Mr Florentino G. Solanzo) who should be invited to submit fresh applications, including a detailed plan of work .

Furthermore, the Committee, noting that the accrued interest since the last session was only US$4510, discussed the possibility of exploring means of increasing the capital value of the Francesco Pocchiari Trust Fund.

Appropriate steps would be taken in due course.

OTHER BUSINESS (Agenda item 15)

There was no other business.

REVIEW AND ADOPTION OF THE REPORT (Agenda item 16)

ACHR reviewed and adopted the report of its thirty-second session, subject to its finalization by the Chairman, the Rapporteur and the Secretary.

CLOSURE OF THE SESSION (Agenda item 17)

The Director-General closed the meeting, promising that the report would receive his full attention. The report's conclusions and recommendations would also be conveyed to the Executive Board in January 1995. ACHR, as a statutory body established through a resolution of the World Health Assembly, would have a primordial role to play in charting WHO's policies, strategies and plans in health research.

It was agreed that the thirty-third session of the global ACHR would be held from 16 to 20 October 1995 in Geneva.

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Annex 1

THE IMPACT OF SCIENTIFIC ADVANCES ON FUTURE HEALTH

PRELIMINARY REPORT

of a "WHO-CIOMS Colloquium"

held in Charlottesville, Virginia 20 - 24 June 1994

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1. INTRODUCTION

Following the "Technical Discussions" on Health Research at the 1990 World Health Assembly, the Advisory Committee on Health Research has devoted considerable time and effort to updating WHO research strategies. These are documented in "**Research for Health - Principles, Perspectives and Strategies**" (WHO/RPD/ACHR(HRS)/93). Developments in science and technology represent a major component of this document and reflect WHO's dependence on new knowledge and the maximum application of science in developing its planning policies and goals.

To further continue and develop WHO research planning and strategies the colloquium was planned with the objective of drawing attention to and documenting certain of the most critical current and potential developments in science which are likely to have a major impact on medicine and public health over the next 20 years. Initial discussions ranged over the health and research implications of advances in biological sciences, physical sciences, technology, epidemiology and health system research, behavioural sciences, social sciences, ecology including the environment, bioethics and also considered future-oriented approaches.

Three introductory key papers presented an interpretation of the present state of science with respect to public health and human development. The interpretation can be summarized by the following positive and negative developments and trends. Positive global developments are seen to include: increasing life expectancy and diminishing infant mortality; an improving ratio of population/health workers; developments in primary health care; decreasing incidence of some of the "diseases of poverty"; gradual "democratic transition" of governments; reduced threat of global nuclear war; encouraging examples of collaboration between scientists and decision-makers and effective work of NGO.

Negative global trends included: decreasing public expenditures on health coupled with rising costs; 1.1 billion people below the nutritional minimum; no reduction of inequities within and between countries;

continuing low intensity warfare, i.e. local conflicts and militarization of the third world; export of polluting technologies to the third world; insufficient involvement of scientists in finding research solutions to priority problems, i.e. safe water supply and waste disposal technologies and unemployment.

Several imperatives were identified during initial discussions: economic factors, information needs, the role of the scientific community, equity and ethics.

Economic considerations

The application of scientific and technological advances for the benefit of health of communities cannot be achieved without the provision of adequate resources - including funding; economic considerations are therefore paramount. Funds could be generated from public or charitable sources, or from industry. However, substantial constraints are being imposed on, especially industrial, sources because of the transition to a market economy in some countries, and the consequences of legal factors (intellectual property laws, tort decisions, adverse regulations and price controls) in others. The re-allocation of funds in the light of the overall balance of advantage is one possibility that could be pressed upon governments in both developing and developed countries, and on philanthropic donor bodies and other international agencies. WHO could have a role.

Information needs

There are three important domains of information need in health care. First, the most valuable scientific advances can only come into use if their existence is known and their potential appreciated. Health care providers and policy makers at all levels therefore need ready access to information about what developments are occurring. Second, specific information is required for planning health care services. Here the need is not for new types of information but for the most effective means of interpreting the data informatively in order to assist the formulation of policies, planning and implementation. New developments in information technology, provided that their use is properly managed, are likely to be

of special value. Third, feedback information about the effects and consequences of implementing policy is equally vital; here the need is for effective information planning.

Role of the scientific community

There is great and urgent need to mobilise the scientific community; more attention than hitherto must be directed to application of advances in science and technology for health and human development. Scientific communities (academies of sciences or engineering, universities, research institutes) are potent sources of advances in science and technology and should be encouraged to help solve major problems of critical significance to global health and human development. The special problems of developing countries in respect of health and capacity-building could be emphasised by being declared, by ACHR and WHO, as requiring special and focused attention.

Challenges for the scientific community include expansion and promotion of science and technology as a societal force in its own right vis-a-vis governmental power and religious power and the reorientation of scientific research from being largely directed to industrial competitiveness and problems of the North to the solution of global problems. A strong case could be made for a Science and Technology Summit for Health.

Equity and Ethics

It is certain that advances in science and technology will continue to be the main basis of socioeconomic transformation and human development. The tremendous impact of scientific and technological advances on health care have great potential for promoting equity, as for example in the production of readily available potable water, vaccines and food. Equity in health care or access to health care is captured in the concept of health security. Health security rests on equity and "encompasses the principle of universality in health care, so that all human beings may live with the knowledge that they can seek health care which is available, affordable, relevant and of quality". Adequate attention must be paid to the utilitarian objectives of equity and justice through accessibility and

particularly to the needs of the vulnerable. It is important that ethical safeguards are put in place to guarantee that the safety and rights of both individuals and communities are adequately protected in health related areas. For example in the absence of an internationally adopted code of ethics in genomic research, the commercial network of new biotechnologies with potential impact on health care may be too costly to be affordable by those in greatest need, especially the Third World countries. It is also ethically desirable that developing countries should be participants rather than observers in the development of scientific and technological advances for health care and human development. It is ethically just that all countries and communities should have the rights to the benefits of scientific and technological progress.

SPECIFIC THEMES

Participants decided to structure detailed discussion under six main theme headings. No attempt was made to cover all main areas of science and technology; fields such as epidemiology, immunology, the neurosciences, cellular biology, cognitive sciences and the social sciences were not considered explicitly during this colloquium, although their importance is beyond question. The themes selected reflect the evident potential of certain areas of basic and applied science, the importance - perhaps less well recognised - of various technological developments, and the value, as perceived by the participants, of attempting to evaluate the impact of likely developments from different perspectives. Theme headings were: 1) Basic Science; 2) Applied Science; 3) Future Perspectives on Concepts of Disease; 4) Public Health and the Economic Environment; 5) Public Health and the Constructed Environment; 6) Public Health and Societal Behaviour. A synopsis of these themes and discussions follows.

2. BASIC SCIENCE

The discussions of basic science centered on the "DNA" technologies. It was agreed that past and future developments in these and molecular biology represent the most important and significant advances in the basic sciences relative to health. A review of these technologies was presented.

Technologies currently being applied include:

- cloning
- sequencing
- polynucleotide synthesis
- detecting polymorphism; in vitro hybridisation
- Polymerase Chain Reaction (PCR) - selective DNA amplification
- gene splicing
- RNA - ribosymes
- monoclonal antibodies
- transgenics (cell manipulation, nuclear transplantation)
- transplants
- phage presentation
- protein sequencing and in vitro assembly.

The common commercial availability of required reagents makes the application of these technologies globally possible.

The application of these technologies fall into the following categories - investigative, diagnostic, therapeutic, manufacturing and transgenics. Current investigative interests include gene cloning, thromboretins, Alzheimer's disease, hantavirus and chemical and radiation toxicology. Examples of diagnostic application include drug resistance (i.e. TB), gene syndromes and forensics. Therapeutic interests include somatic gene therapy and antiviral chemotherapy. Manufacturing developments relative to the methodology are human insulin, vaccines, hormones and antibody production. Transgenics currently involve plants and animals for vaccine development and organs for transplants.

Relative to health, the technologies are currently being applied to the investigation, treatment or control of many major problems. Examples are in infection control (diagnosis, vaccines, vector control, chemotherapy, etc.), heart disease, auto-immunity, cancer (research, diagnosis, prophylaxis, therapeutics, etc.), genetic defects, pathological ageing, family planning, mental disorders and food production.

In discussing problems associated with the cost of "DNA" products, expansion of the technologies and associated ethical problems, the feeling

was expressed that products produced by biotechnology are too expensive and that affordable products are needed. Emerging controls on research, i.e. patent rights, governmental regulations and profitability, suggest that they could, and do, restrict the growth of much research. It was stated that patent rights should not interfere with scientific investigation and that the ACHR could possibly make some observations or recommendations on how to alleviate this problem. It was stressed that any applications of the technology pertaining to humans should be conducted with respect to privacy and ethical conduct or else in many cases be completely averted.

It was agreed that:

a) Efforts should continue to explore and expand the applications in diagnosis, therapy, prevention and investigation of pathogenesis of diseases, particularly as they apply to infections, heart disease, autoimmune disorders, cancer, ageing, mental disorders, family planning and food production. Molecular biology technology also has enormous potential in the manufacture of valuable protein products (thrombopoietin, vaccines) in production of transgenic animals, transplants, anti-viral agents and in cellular regulatory processes.

b) Ethical aspects of somatic gene therapy have raised no new issues, but germ line therapy should be discouraged. The WHO and CIOMS should continue in cooperation with other international organizations to explore international agreement on a code of ethics in molecular biology especially on the human genome project.

3. APPLIED SCIENCE

The technological scene looks very different from a few years ago. Apart from molecular genetics and biotechnology, there are new diagnostic and therapeutic possibilities due to technological advances. Some are costly; some are more cost effective at less expense; some have cultural overtones. New therapeutic possibilities exist. Laser technology and opportunities for rehabilitation using new materials for internal or external prostheses illustrate the possibilities. Basic science is illuminating brain functioning with the aid of positron emission tomography and associated technologies, offering the hope of understanding more about the degenerative diseases of the elderly. Information technology allows

the effective gathering and utilisation of public health information; modern computing technology and the use of computational logic provides new opportunities for system modelling and for the use of advanced decision support at all levels from PHC to national planning for both design and management of health care delivery systems.

Technology and equity. Thus challenges are facing health planners due to such advances in science and technology. Inequities can easily be created. Deciding how and where to allocate resources to the new opportunities may be difficult. The balance of possibilities between treatment and prevention may have altered but making choices can now be aided by decision support "tools", although major economic, cultural and ethical issues must be recognised. Human factors constitute an important "input" variable to be considered in identifying what health care is acceptable and in designing systems through which health personnel provide acceptable health care services. Careful thought about these various factors is therefore appropriate.

Both established technologies and new, "horizon" technologies offer potential for improving health care. It is possible to identify existing technologies that are discernably becoming important to the health sector, and to recognise how they are likely to develop. It is also interesting to risk a few speculations about how some of the emerging "horizon" technologies could contribute to future health.

Taking a different viewpoint, it is possible to identify areas in the health sector which are seriously in need of new knowledge or innovation, and then to search for possible technological solutions. In the context of the needs of developing countries, it is useful to examine the characteristics of the technologies they need, the sources from which these could be acquired and the channels through which this is achieved. But even given the necessary technology, it is important to ensure that knowledge, effort and resources are effectively employed; it is argued that a need therefore exists for strategic planning of the use of technology in health.

Rapid advances are being made in many established technologies and the health sector could benefit from a number of these, illustrated by a

few examples such as information technology; communications technology; computer software "tools" for decision-support and system planning; silicon chip technology; mathematical modelling and biosensors.

The over-riding requirement that development of technological hardware for developing countries should be directed to robust, cheap, readily maintained equipment can hardly be overemphasised. Imaging technology has made a substantial contribution to diagnostic medicine in the industrialised countries, but at a significant cost which cannot be justified in the context of the health problems and economic position of developing countries. Nevertheless, there is a need for inexpensive methods and devices for which the technology may exist but has not yet been identified as relevant or adapted for use in the PHC situation.

New materials in the form of ceramics, glasses, composites (including bone-tissue composites) and lightweight magnetic materials offer considerable potential: for instance, in producing lightweight external prostheses and other equipment and improved laboratory and diagnostic equipment. Rugs made from electrically charged fibres, using electrets, seem to have the ability to trap mites and dust, that are thought to be involved in chronic asthma, and may have other applications for vector control. Superconducting quantum interference devices ("squids") offer the long-term prospects of measuring the magnetic field generated by body electrocardiological or even electroencephalographic activity; the big attraction is the "non-contacting" measurement which would speed up and simplify the electrophysiological screening of population samples for at least some cardiac, brain, audiological or visual abnormalities. Silicon technology can be extended to produce physical force sensors and also "microeffectors" that generate localised physical forces - such as to close tiny valves - ultimately usable perhaps for implantable control devices. Membrane technology now has the prospect of producing "designer membranes" for the selective transport of specific materials; this has some interest in both artificial organs and in the biosensor field. Another technology in its infancy as far as health is concerned, is robotics. Coupled with "keyhole surgery" the long term target of reducing the cost and duration of inpatient care may be brought nearer by the wider application of this technology.

Technological strategies. It is easy to identify many needs, but putting them in priority requires a health technology strategy. However, to select some basic needs of direct technological concern, one might focus on the supply of clean water; the provision of sewage waste disposal; the need for attention to environmental pollution and to industrially-linked disease and disability; methods for early warning of developing health hazards and problems; support devices for the disabled and elderly; the reduction of traffic accidents; and the need to establish better technical methods of compiling national statistics in developing countries on mortality, including infant mortality, and for improved and facilitated methods of screening sample populations for early signs of disease or for incapacity. While some research and development is under way in each of these areas and technological solutions - or at least technological advances - seem to be feasible, the needs should be drawn to the attention of the scientific and technological community as areas requiring and justifying more effort than they are currently getting.

It was accepted that the term "technology" should be recognised to encompass the original scientific knowledge and the range of processes and operation that convert basic scientific knowledge into useable products, processes or services, through development, design assessment, production and distribution to users. Technology involves information, know-how, organization and human factors; it includes monitoring the efficacy and safety of the end product in user hands. Technology selection for health can and should take into account the appropriateness of the technology in light of user needs and wishes and the context of the country at large. The need is emphasized for affordable, appropriate technological solutions to health problems.

Various origins of new technology for health can be recognised. Both universities and industry, separate or collaboratively, may be involved. but money and other resources are required to make new technology available. The most important channel through which developing countries can obtain new health technology is technology transfer hitherto mainly involving multinational industry, and the role of industry in providing skills and resources for development and transfer is recognised. Nevertheless, the availability of adequate incentives is often crucial in making specific technologies available to meet specific health needs.

Subsidies may be an important element and a clear rationale for subsidies can be made if governments accept the economic value of social benefits that result. Other funding sources might be found; in particular circumstances international funding agencies might be willing to channel funds into subsidies instead of other forms of foreign aid. But in any case, on the skills and resources of industry must be superimposed the requirements essential to health technology, technology assessment and quality control.

At the user end, there must exist the necessary infrastructure, and willingness to receive the technology and a capacity to absorb and where necessary to adapt the technology, provide the means to distribute and create an appropriate pattern of human and organizational performance in using, maintaining and supporting the technology. From the industrial viewpoint, tort liability is seen as a major inhibiting factor for the future and regulatory agencies are not yet addressing the design of specialised contracts that provide protection against tort liability while protecting the reasonable interests of users.

Amongst major areas of still existing need for new and better health technology are the provision of clean water and safe waste disposal and access to controllable energy at the point of use, for instance water purification. Additionally better and more comprehensive health related indicators are urgently required. A major line of development, and use, is seen in multi-dimensional (vector type) indicators needed to replace the uni-dimensional (but perhaps multi-component) indicators which, it is argued, can obscure important phenomena. There may also be scope for the development of knowledge-based indicators which make use not only of quantitative measurements and qualitative observations but also of significant information existing in the form of relevant semantic knowledge perceived by and so, known to experts.

Future developments. Turning to the most significant rapidly maturing developments in technology, particular potential is seen in the communication and information technologies and the enabling technologies of decision-support computer algorithms, and the rapidly growing range of new light-weight strong materials. To highlight information technology specifically, this will facilitate the flow and increase the volume of

information in the health sector. Two consequences follow. First, it will make available detailed data with which, in principle, better informed decisions about resource allocation and response to need can be made; but a multifold increase in information flow will inevitably constitute a threat and a confusion to planners who are not equipped or trained to deal with it. Secondly, and as a result, development of better methods of data acquisition in the health sector, and dissemination of proven methods of decision support will be both essential and beneficial.

One development that will require special attention is the technique for longitudinal and correctional monitoring of physical and biological variables in individuals as a guide to changes that are likely to affect significant numbers of people. Audiological changes (with long term exposure to noise) or cardiovascular alterations are examples of measurements that would be made if suitable non-invasive, non-contacting technology were available for the measurement. In both cases, the steady growth in the potential of magnetic detectors to replace electrical measuring devices using contacting electrodes suggests that the technology that will permit efficient sampling schemes should soon be available. But at the same time, new techniques of mathematical statistics will be needed to improve sensitivity to small early changes in the monitored population.

The growth of computer software technology in the broad areas of pattern recognition and diagnostic support, and the rapidly diminishing size and cost of hardware, offer the early possibility of hand-held computer-based devices for use in the PHC to support diagnosis and decision-making in the field. The availability of effective communication by satellite suggests that ready consultation between para-medical field workers and distant experts will soon become practically feasible. Then impending developments could lead to the need for a major recommendation of how rural and peri-urban health care systems are structured.

New technologies are thus being created from new discoveries in science and from progress in R&D; however there are also many existing technologies that could be developed and adapted to serve health care needs. But not all such technologies have proved successful in practice. This shows the need for a strategy for the use of technology in health, to replace the often ad-hoc attempts to transplant a technology, however

promising. From another country or another application, the components of a strategy, and the consequences, need careful attention.

4. FUTURE PERSPECTIVES ON CONCEPTS OF DISEASE

Disease, like health, is not a strictly definable concept, in the sense that it cannot be mapped homologously to any particular set of observable phenomena. The notion of disease is rooted in folk psychology and its explication is a task for anthropology. Yet, the impossibility of a logically rigorous definition and classification of disease does not mean that the concept should be abandoned. It is extremely rich in connotations, its cultural transmission can be traced back to the millennia of human history, and it would be counterintuitive to avoid it. Besides, disease is a concept which absorbs new meanings in each consecutive era of social and scientific history.

The current concept of disease is a hybrid of ideas stemming from two major intellectual streams of philosophy: Platonic realism and nominalism.. Plato postulated the independent reality of prototype ideas (universalia) of which the physical things (res discretae) are only the partial and imperfect exemplars. Sydenham, who introduced the "modern" concept of disease, believed that, like the plant species, diseases were natural things, i.e. entities existing in our environment and had their "natural history"; he therefore wrote of the pox the podagra, and the dropsy. The founder of modern pathology, Virchow, defined disease as a structurally changed part of the body, i.e. as a physical entity. The current concept of "disease carrier" is clearly an offspring of this tradition. At the other extreme, nominalism claimed that only the particular things (e.g. individual patients) have a real existence; "disease" is just an abstract, generic name for similarities of attributes which have no independent existence. The current concept of disease is polythetic, i.e. it is a class defined by any number of the following characteristics:

a) clinical abnormalities (symptoms and signs, forming syndromes);
b) pathological abnormalities of structure and/or function;
c) aetiological agents;
d) biological disadvantage (reduced fitness & survival); and
e) "therapeutic concern".

Abnormality has no strict definition; it means either a statistical deviation from the population norm, or a deviation from certain societal values.

Notwithstanding the difficulties in defining "disease", recent conceptual advances articulate the general idea of disease into more meaningful empirical components. For example, the triad "disease - illness - sickness", where disease refers to the objective biological abnormalities, illness - to the subjective experience of disease, and sickness - to the social role of being a patient (the "sick role") is useful in social research. Similarly, the triad "impairment - disability - handicap", where impairment denotes the structural or functional lesion; disability - the loss of capacity to perform particular social or occupational roles; and handicap - to the adverse social consequences, is the basis for the WHO classification (ICIDH). Generally, the current tendency is one towards a multidimensional or multiaxial conceptualisation of disease phenomena, which includes several relatively independent dimensions; (i) clinical syndrome(s); (ii) structural/functional abnormalities; (iii) aetiology; (iv) co-morbidity; and (v) social functioning.

There are considerable advances in the operationalisation of diagnosis and in clinical measurement in the individual case. The reliability of diagnosis is improving due to the development of standard (operational) diagnostic criteria. There is a clear trend of applying decision-making theory and epidemiological databases to the clinical diagnostic process, which has resulted in the evolving new discipline of clinical epidemiology. Algorithms and flowcharts have been developed for different classes of diseases and for different users and settings (including primary health care in developing countries). Computer diagnosis relies on three main approaches: pattern recognition, prototypes, and Bayesian decision trees. A major need to be met in future research will be the development of population or region specific epidemiological databases to support the application of new diagnostic technologies.

At the population level, diagnosis and measurement are applied in the context of epidemiology which maps diseases in terms of:

- incidence and prevalence
- lifetime risk
- relative risk (odds ratio) and attributable risk
- mortality and SMR (standard mortality ratio)
- DALY (disability-adjusted life years) and QALY (quality of life-adjusted years).

A range of new problems are likely to arise in the next decade (some have already arisen), and many concern our concepts and definition of disease. Examples:

a) Dimensional versus categorical definition of disease. Current quantitative research tends to portray disease as dimensional; societal expectations and, in particular, the premises on which health insurance operates, imply a categorical (present or absent, all or none) concept of disease. How is the contradiction going to be resolved?

b) With the increasing capacity to diagnose preclinical disease, and especially with the capacity of predictive testing (e.g. by genomic probes), we are faced with serious ethical, social, and economic dilemmas (disclosure of information, justifiability of screening, equity in the access to new diagnostic technologies).

c) There is a tendency for the conceptual boundaries between disease and non-disease (which are artificial anyway) to become blurred, due to the availability of interventions that can be applied to conditions not considered "disease" earlier: e.g. mild and moderate mental retardation, personality disorders, sexual orientation, drug abuse, violent behaviour, short stature, etc. This list is likely to grow, raising challenging questions to society, scientists, and politicians.

In the discussion the following points were made:

a) The growing number of "non-diseases" leads to the rise of medicalizing social problems, a point to consider with the blurring of the conceptual boundaries.

b) There is need for a common language and world-wide agreement on definitions of impairments, disabilities and handicaps and the use of multi-dimensional constructs in distinguishing disease from health.

c) It is desirable to develop models of morbidity and mortality in specified populations by subtracting from the current picture of disease the prevalent patterns of morbidity and causes of death and examining the likely changes that would occur.

d) AIDS is a particularly useful model embodying many of the social, ethical and economic problems relating to the concept of disease and its diagnosis.

e) Indiscriminate use of the present version of DALY may turn out to be misleading unless it is made clear that much research and development effort must be invested in developing a new comprehensive (synthetic) health indicator before it can be meaningfully applied to health data based upon actual observations.

f) It is desirable to encourage the widespread application of clinical epidemiology to the measurement of reliability and validity in the diagnosis of diseases and to the use of diagnostic algorithms (based on country and region specific data bases).

g) Research is needed on the value of diagnosis of presymptomatic disease (e.g. Parkinson's disease, Huntington's disease) and the value of intervention of behaviour disorders including suicide, substance abuse and violence in the pre-disease stage.

h) There is need for a new partnership of science and ethics based on the concept of "beneficence in trust". The role of CIOMS as the "ethical watchdog of WHO" will be highly relevant with regard to the emerging problems.

5. PUBLIC HEALTH AND THE ECONOMIC ENVIRONMENT

The discussions concentrated on the developing world although some aspects were applicable to the developed world as well. These latter aspects center on the questions of who pays for health and health care and the universal prospect of its rationing.

Eight health tendencies in the developing world are outlined relative to income and nutritional status.

First tendency: health in a purely quantitative (length of life) sense has improved markedly.

Second tendency: estimates of child nutritional status show that although the proportion of children under 5 malnourished in the developing world fell from 42% in 1975 to 34% in 1990, their number rose from 164 to 184 million. Subsaharan Africa has been particularly negatively affected.

Third tendency: daily calorie supply per capita for the low income countries rose, on average, from 2000 in 1965 to 2400 in 1990 (excluding China and India, the increase was from 2000 to 2300). However, the weighted averages above conceal very divergent performances from one country to another.

Nineteen countries showed declining daily calorie supply per capita while simultaneously not meeting their requirements. Twenty-four countries revealed increasing daily calorie supply per capita but not meeting their requirements.

Fourth tendency: the World Bank estimated that up to 1.1 billion people in the developing countries did not have sufficient income to obtain adequate energy from their diet. While the number of poor and malnourished declined markedly in most parts of the world, the situation in South Asia is still serious and Subsaharan Africa shows a net worsening.

Fifth tendency: the great majority of countries with declining calorie supply per capita as well as those not meeting their requirements have not yet entered the demographic transition stage.

Sixth tendency: two input indicators correlated with health, population per physician and per nursing person improved, on average, particularly the former. The only countries where the situation worsened are: Ethiopia, Angola, Tanzania and Ghana (higher population per physician in the eighties compared to 1965).

Seventh tendency: there is some evidence that during the 1980s another important health-related input indicator, public expenditures on health (both as a proportion of total government expenditures and on a per capita basis) has declined in a number of countries. Furthermore, most current public spending goes for expensive curative services provided largely by hospitals benefitting mainly the rich in contrast with

inexpensive health measures (in terms of the cost of each death averted) such as immunization and prenatal care.

Eighth tendency: the incidence of diseases of poverty is falling while that of diseases of affluence is rising.

The main inferences from these indicate that length of life is being extended but nutritional levels are lower as are other indicators such as unemployment and poverty. Therefore a lower quality of life is indicated. Thus the question is asked - is longer life necessarily good?

From these the following issues were identified.

a) Impact of stabilization and structural adjustment policies on health. Is it possible to have social security with a human face?

b) In the long run what are the key success elements of countries that have grown fast and have achieved a low level of poverty and good health (East Asian Miracle):
   - investment in education
   - outward-orientation
   - reliance on markets
   - selective government interventions
   - asset (e.g. land) redistribution
   - technology transfer

c) Improved criteria for allocating and channelling foreign assistance - e.g. is food always desirable?

d) Implications of automation on employment, the dependency burden and their impact on who pays for improved health?

e) The need for designing better indicators of the quality of health. To what extent can such multidimensional (vector) type indicators be transformed into a single (scalar) indicator such as DALY.

f) How can unfavourable health effects during the epidemiological transition be reduced?

It was agreed that better multidimensional indicators of health quality are needed. Any unique (scalar) measure of health is, by itself, incomplete. Composite indicators based on weighted averages of a set of partial indicators are suspect since the choice of components and the adopted weighting scheme is arbitrary. A promising approach would be to move towards a health profile or "knowledge map".

Assuming that the underlying data suggesting that caloric intake worsened between 1965 and 1990 in a number of developing countries (particularly in Sub Sahara Africa) while life expectancy continued to grow and the infant mortality rate continued to decline, the causes of these apparently conflicting trends need to be better investigated. Some participants expressed doubt that improvements in and transfer of medical and sanitation procedures by themselves could explain these trends. It was suggested that research at the country level on incidence of immunization, quality and quantity of obstetrical care, the ratio of population to physician and other measures during the same period (1965-1990) could help answer the above question.

Further research is suggested on the key success elements of countries that have grown fast and achieved levels of good health at low income levels. Some evidence suggests that favourable factors include investment in education, selective orientation of manufacture, reliance on markets, selective government intervention, asset redistribution and technology transfer. Other factors worth investigating (e.g. nutrition, "household" factors and levels of information) in countries in close geographic relationship may be important.

The merits and demerits of the DALY concept were discussed in some detail. The participants, in general, expressed serious reservations about the scientific validity of the concept and agreed that it should be critically evaluated - especially before it is used as a basis for allocation of resources. It was recommended that the ACHR, in its next session, should advise the Director-General of WHO that a Blue Ribbon panel be invited to undertake a critical evaluation of the DALY methodology and its potential operational usefulness. Such a panel should be constituted of physical, biological and social scientists.

With respect to reduction of unfavourable heath effects during epidemiological transition it could be of value to assess ongoing large scale interventions for control of non-communicable disorders in developed countries and also to study usually isolated populations which have shown rapid changes in the incidence of such non-communicable disorders.

6. PUBLIC HEALTH AND THE "CONSTRUCTED" ENVIRONMENT

The problem of man's ability to maintain and even improve his health in an ever increasingly difficult and hostile environment was discussed. This evolved around the individual as part of a complex "eco-system" consisting of chemical, microbial, physical, biological, economic, social and psycho-mental environments which have natural and man-made components.

The health of an individual as well as that of a society as part of this eco-system is determined by genetic factors, age and history (own personal history, i.e. illness, education, etc.). The integrity of the human organism exposed to these continuously changing environmental conditions is based on neural and cellular systems capable to "cope" with environmental exposures by maintaining homeostatic equilibria. "Coping" and "repair" mechanisms are of crucial importance. Failure occurs when these mechanisms are temporarily exhausted (disease) or irreversibly damaged (death of organ or organism).

Historically the "First Hygiene Revolution" (mid 19th century to mid 20th century) introduced measures to enable man to cope with changing environmental conditions of the time. The "Revolution" introduced the recognition of pathomechanisms of infectious diseases which caused public awareness and resulted in public health measures being introduced by society. These were based on the scientific evidence of Pasteur, Pettenhofer, Koch and Virchow. Continuing scientific advances and curiosity resulted in further preventive measures, i.e. inoculation and immunization which in turn resulted in increased life expectancy and eradication or diminution of some of the major communicable diseases.

The present health situation now calls for consideration of population dynamics and migration, industrialization, energy needs, food production, etc. which result in chemical and physical risks of increasing importance. These include pollution of the air, surface and ground water, the food chain (by chemicals) and contamination of the general environment by ionizing radiation and electromagnetic fields. Public health has to be concerned with the development of "environmental medicine" to assess the

increases in chronic low level exposures which result in an increase of neoplastic and non-neoplastic impairments.

This suggests the need for a "Second Hygiene Revolution" in order to maintain the health of the individual and society. To do this, it appears necessary to establish an "inventory" of environmental increases (physical, chemical, microbial and psychomental factors) and to monitor continuously the possibilities and limitations of the organism(s) to tolerate multi-factorial (over) exposures. Preventive measures would include for instance reduction of risk, replacement of toxic substances by less toxic substances, detoxification and heath education.

A research agenda for the future was thus proposed which would provide the information required to develop programmes and public health measures to meet these emerging stresses. The proposed agenda would encompass human health assessment; global environmental epidemiology; ecosystem dynamics; integrated chemical, physical and biological monitoring; environmental engineering and systems research. Examples of these initiatives follow.

a) Human health assessment. The issue is to elucidate the correlation of environmental changes with the health of human beings living under a variety of conditions and belonging to different age and ethnic groups.

Examples:

- improvement and development of methods for long term monitoring of health in humans in relation to an "environmental exposure inventory";
- toxico-kinetic and dynamic studies on environmental effects on homeostasis in relation to dose, dose rate and complex chemical interactions;
- development and use of remote sensing techniques to analyze and predict probable decrements in human health;
- assessment of dietary and life styles with respect to environmental contamination.

b) Global environmental epidemiology. The issue is to study the environmentally induced changes in human health that are linked to changes

in natural eco-systems and ambient environmental exposure. This would require participation of a global network of collaborating centres using standardized methodology.

Examples:

- case studies i.e. risk assessment models;
- studies on sensitive sub-populations i.e. infants, pregnant women, etc.;
- remote sensing in relation to environmental and biological markers:
- molecular mechanisms relevant to risk assessment;
- occupational vs. non-occupational exposure studies;
- assessment of exposure markers and effects of complex mixtures.

c) Eco-system dynamics in relation to health. The issue here is the promotion of the understanding of the complexity and inter-activity of eco-systems in relation to human health. This would require a knowledge of the basic mechanisms of ecosystems to maintain equilibrium for the human habitat.

Examples:

- temporal variations at the eco-system level, i.e. interrelation of climatic, hydrological and biological factors;
- transport mechanisms among the environmental compartments;
- a means of "early warning" of environmentally caused system impairment relevant to human health.

d) Integrated chemical and biological monitoring and environmental engineering. The issue is to analyse the global status of environmental pollution in terms of migration dynamics - fluxes from sources to pristine areas. The goal is to establish a continuously updated map of environmental pollution and contamination as a basis for regulatory activities.

Examples:

- establishment of world-wide exposure measurements;
- establishment of a human specimen bank (i.e. surgical samples) as a basis for decision making;
- establishment of networks of systems theory, environmental chemistry, ecosystem research, remote sensing and environmental medicine.

- development of tools to monitor environmental dynamics in relation to human health and health of the eco-system;
- remote sensing technology;
- environmental health policy decision support systems.

e) Systems research. The issues are planning and organization of environmental research at the global level, requiring new approaches in systems research which would incorporate modelling, scenario development, risk assessment, information and communications processing technology, and knowledge processing.

Examples:

- modelling of growth and death processes, for instance in agriculture (i.e. fertilizer problem and ground water) or the dynamics of growth of towns or industrial complexes in relation to eco-system dynamics and human health;
- models for global and regional planning with emphasis on the devastating effects of further over-population;
- estimation of economical, toxicological or epidemiological factors of world wide importance.

It was agreed that a form of "global developmental dynamics" for human health will be of key importance for human health in the next century. A second "Hygiene Revolution" to allow the human society to survive in spite of environmental changes requires an effort of the scientific community to mobilize all possible intellectual resources to analyze the present and expected problems and develop methods to cope. Such an effort goes clearly beyond medicine. WHO should be encouraged to act as a pacemaker for a transdisciplinary programme on human health development in a global situation of dramatic changes.

The research needs in this are numerous especially in global environmental epidemiology ecosystems dynamics in relation to human health, integrated health and ecological monitoring, environmental engineering and systems research.

The interaction between the natural environment and social environmental is deemed critical to require concentrated research. In particular the increasing industrial growth and centralisation has caused population migrations, areas of increased pollution, with attendant social problems of consumerism and unemployment. It is pointed out that unemployment, for instance may well be the greatest problem facing the world in the next century. Further, unemployment must also be recognized as a health hazard because of the attendant problems of violence, drug abuse and suicide.

7. PUBLIC HEALTH AND THE SOCIETAL BEHAVIOUR

Formulating a perspective on the future of public health requires (a) reflecting on the past, (b) examining current problems that represent important trends with implications for the future; and (c) projecting not only what the problems will be but what the expected capacities for dealing with such problems will be.

The health transition. Exploring the parameters of the health transition - the nature of the epidemiological change, the role of family members in recognition and action, and responsiveness of the health care system - needs to be extended across the full range of health transitional problems, particularly related to noncommunicable diseases, which now account for nearly 50% of the burden of disease of developing countries. This approach should be included among priorities for future research, including special concern that ways and means be developed for facilitating the incorporation of research findings into relevant health system development. Growth in capacity must particularly include developing countries whose needs in this area are the greatest.

Population-based, equity-oriented, primary health care. This is an area of need where principles and research have come together to provide some useful models, but widespread implementation and adaptation to local conditions are seriously lacking. The challenge of Alma Ata has only been responded to in partial ways. It has been amply demonstrated however that it is feasible to provide primary health care characterized by universal coverage, care according to need, effectiveness and affordability, with

active participation. For instance models of PHC developed for and applied in urban squatter settlements of Karachi reduced the IMR by 50% (126 to 64) at an annual per capita cost of $2 to $3.

Once the basic model is in place, several challenges remain:
a) to extend analysis of causes of infant mortalities to more resistant causes, often imbedded in socioeconomic, cultural and environmental parameters, and to address these through appropriate interventions;
b) to work with government, NGOs and international organizations to extend these approaches to other settings where socioeconomic, cultural, political and health care variables are different.

Health services research focused on population-based, equity-oriented, primary health care located in different socioeconomic, cultural, political settings, requires expansion. There needs to be special concern for facilitating the incorporation of research findings into relevant health system development in various developmental settings.

Community participation/empowerment in health system development. It is increasingly appreciated that communities have critical roles to play in national development, and this will become more so in the future. There are limited examples of communities being a part of research-based approaches to dealing with such roles of communities. One of the goals of primary health care is to involve communities in ways that empower them for their own further development. There is an apparent contradiction between wanting to give autonomy and encouragement to communities to take action in the face of heavy disease burdens and resource scarcity, on the one hand, and the complexities inherent in developing health services that are effective and affordable, on the other. Carefully built partnerships are necessary between communities, and health care providers. There are times when the dilemma can be expressed as empowerment of communities without impact on health vs. impact on health without empowerment of communities. Obviously, the goal should be empowerment with impact. Here is a place for strong involvement of social science disciplines in combination with epidemiology and health systems research.

This is another example of where there are no universal solutions or blueprints for primary health care and community involvement. There needs to be adaptation to local needs, ingenuity and resources.

Incidentally, this is one of the puzzles of bringing science to bear on the processes of development. A key characteristic of science is that its findings are generalizable. In development settings this principle confronts the reality that each setting is unique and the findings of science, or their applications, have to be adjusted to local reality.

Partnerships in health policy formulation. An important matter for the future of public health has to do with how policies are made and implemented. Science is sometimes lost in the process of policy formulation or failure to make policies relevant to advances in science. Relatively little attention has been given to how health policies are developed, yet this process is at the heart of advances in health. As an example, one study made an examination of historic approaches to health policy formulation and compared it with local approaches. The differences were highly informative, and especially relevant to developing country settings. Researchers developed the concept of social policy formulation based on the thesis that the policy makers and the researchers worked in separate worlds, with the following sequence of activities:

- the policy maker formulates the policy question;
- the policy question is translated into a research question by the researcher;
- the researcher carries out the research;
- the researcher translates the results of the research into policy relevant terms which are communicated to the policy maker;
- the policy maker formulates the policy;
- the policy maker implements the policy.

A proposed partnership between the researchers and governmental health policy makers followed a very different pattern:

- the policy maker and researcher worked in partnership;
- together they formulated the policy question;
- together they considered the research approach;

- the researcher carried out the research, involving communities, in continuous communication withe the policy maker;
- the researcher and policy maker together examined the results of the research;
- the policy maker formulated the policy, advised/encouraged by the researcher;
- the policy maker and research worked together to ensure implementation of the policy.

While generalizations on the basis of these limited observations cannot be made, it is time to encourage wider studies of how policies are formulated and implemented. Special attention must also be given to the linkages between advances in science and policy formulation and implementation.

Ethics and health policy making. Advances in science bring challenges to the ethical understandings of health problems and interventions to improve health, and these understandings may vary according to the values of a society. Interactions with health policy making are particularly important. Ethical principles and practices are grounded on the values and sense of right and wrong of a society. Health policies are one of the fundamental instruments of governance in which plans, concepts and values are made operational. Accordingly, ethics has a critical role in guiding the construction of policies. But uncertainty abounds. There are tensions between what is desirable in terms of both ethics and policy and what is possible in the face of resource constraints. New technologies or new uses of technologies raise questions that are entirely new for both ethicists and policy makers. Uses of technology raise different questions in different societies. There needs to be growing capacities for ethical analysis in all societies, as well as a sensitivity to linking ethics with policy formulation.

Promoting widespread adoption of advances in public health that will benefit the public. There are many important advances in public health (including health system development) that are well-supported by research, but which are lacking widespread acceptance and implementation. These weak linkages between science and its usages have important implications for the future. There should be strong initiatives directed toward identifying

failures of implementation and developing strategies for remedying such failures. Efforts to do so should include at least three sets of interested parties: first, scientists functioning in the capacity for generating knowledge; second, scientists functioning in advisory capacities, as to the ACHR; and, third, scientists, policy makers, health services leaders, and educators - who should join forces in the important effort. It is a matter of considerable importance that policy makers, health services leaders, and educators should not deal independently with these issues, absent the involvement of scientists. Likewise, scientists should not address these questions absent their colleagues who are involved in the operational aspects of health development. Major attention needs to be given to identifying failures to implement advances in public health (and health system development) which could benefit substantial populations. Efforts to identify such failures and implement such advances should involve the joint efforts of scientists, policy makers, health system leaders, educators, community representatives and other interested parties.

Capacity building for advancing science and its implementation. It is not enough to look at the impact of sciences on future health without special attention to the capacities of developing countries to participate as full partners in the relevant processes. The time is long past when extending the benefits of advances in science to developing countries can be seen mainly as acts of charity and beneficence. Developing countries must be seen as full partners in the process of international efforts to promote greater capacities to cope with burdens of disease and to develop effective interventions. Of course, many developing countries have serious gaps in these areas, and capacity building strategies and programs are necessary. Universities, NGOs and ministries are the focal points where capacity building is most needed. It is important to appreciate the reality that advances in science that are particularly relevant to health and social development can seldom be applied directly to recipient countries. They need to be adapted, absorbed and modified, and local people and their organizations need to be brought to readiness for effective utilization. Capacity building for more effective partnership in transfers and uses of such advances are a central feature of national development. Thus careful attention must be given by developed countries and international organizations to building the capacities of developing

countries for more effective partnership in the generation and utilization of advances in science that are relevant to the health of the public.

8. CONCLUDING REMARKS

The colloquium was not designed to predict the scientific advances required to meet future health needs. Rather it provided the forum to assess the present state of science relative to health, to review the trends in science and technology with respect to future health projections and to identify existing and potential constraints regarding their application to problem solving in human health and development. In so doing, the colloquium set the stage for more definitive and objective efforts to promote and develop scientific and technological advances to meet health requirements expected for 20 years hence.

The meeting was concerned that substantial programmes of health research and development are being planned on the basis of insecure, quantitative indicators and recommended that such concepts should be critically evaluated by a panel of physical, biological and social scientists prior to their use.

It was the opinion of the colloquium that there is a great and urgent need to mobilize the scientific communities to devote more attention than hitherto to the application and development of scientific advances for health and human development. With respect to this, it was the further consensus that CIOMS with WHO should create a forum for the scientific community to discuss the needs and implementation of research necessary for global health development including a science summit for health research.

The meeting also agreed that CIOMS has a special mission to fulfil in continuing to perform its advocacy role for international order and a code of ethics in health research. Both WHO and CIOMS are to disseminate widely to the scientific community, policy makers and UN agencies documentation on the theme of this colloquium.

The entire proceedings of the colloquium will be published.

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Update / Le point

Research for health: principles, perspectives and strategies*

Advisory Committee on Health Research[1]

This article describes the development of a health research strategy for the control of diseases associated with poverty, tropical diseases (infectious as well as noncommunicable), diseases associated with affluence, the treatment and care of the sick, and the delivery of health services. Since socioeconomic, technological and behavioural changes determine the process of health development, the severe constraints in financial, material and human resources must be addressed by promoting better methods of policy analysis, planning and research. Countries with very limited resources should give higher priority to research and services in nutrition, immunization and sanitation.

In 1990 the World Health Assembly called for a clearly enunciated health research strategy in order to translate the research goals, priorities and programmes into coherent and coordinated action in support of health for all (resolution WHA43.19). To fulfil this, the Advisory Committee on Health Research (ACHR), drawing on the work of its own task forces and subcommittees — in the fields of science and technology, health development research, evolving problems of critical significance to health, research capability strengthening, and health and the economy — considered that new dimensions were needed to give proper emphasis to the infrastructural, economic, environmental and socio-behavioural aspects of the health research strategy given in 1986.[a]

This article summarizes the essence of the earlier strategy (*1*) and outlines the additional thrusts which are now being emphasized.

Principles

Restatement of the strategy

The earlier statement[a] interpreted the goal of "health for all by the year 2000" as aiming to achieve a substantial improvement in health in all countries, particularly those where the need is greatest. It stressed that "it is not unrealistic to define more precisely a level of health below which it is hoped that no country will fall: infant mortality below 50 (per 1000 live births) and life expectation at birth of 60 years."[a] These levels were reached in the middle of this century by the developed countries and more recently in some developing countries.

The determinants of the global health picture were also described and the consequential approaches to research planning were discussed,[a] based on the following key observations:

- The human genetic constitution is much the same today as it was a hundred thousand years ago, before the advent of any form of pastoral or agricultural

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* This article was prepared by Dr B.G. Mansourian (Secretary of the ACHR), based on a document bearing the same title (unpublished document WHO/RPD/ACHR(HRS)/93, 1993). Requests for reprints should be sent to Office of Research Policy and Strategy Coordination, World Health Organization, 1211 Geneva 27, Switzerland.

A French translation of this article will appear in a later issue of the *Bulletin*.

[1] Members of the Advisory Committee on Health Research (ACHR) are Professor M. Gabr, Egypt (*Chairman*); Professor T.M. Fliedner, Germany and Professor A. Neri, Argentina (*Vice-Chairmen*); Professor P.G. Svensson, Sweden (*Rapporteur*); Professor O.O. Akinkugbe, Nigeria; Professor J.M. Borgoño, Chile; Professor A.M. Davies, Israel; Professor K.Z. Hasan, Pakistan; Dr B.P. Healy, USA; Professor L. Kaptué, Cameroon; Professor W.A. Karczewski, Poland; Professor M. Manciaux, France; Professor L. Malcolm, New Zealand; Professor B. McA. Sayers, England; Dr T. Shimao, Japan; Professor C. Suwanwela, Thailand; and Professor Zeng Yi, China.

Reprint No. **5500**

[a] **Advisory Committee on Health Research.** *Health research strategy.* Unpublished document WHO/RPD/ACHR(HRS)/86, 1986.

activity. That is to say, we now face vastly changed conditions of life with the same genetic equipment of our ancestors who were hunter-gatherers.

- The modern transformation of health in the developed countries and the associated increase of populations, which began more than a century before effective medical intervention was possible, is to be attributed largely to improvements in living conditions.
- Research has shown us the nature of infectious disease and the possibility of its prevention by environmental measures and immunization.
- It has been recognized in the last few decades that most noncommunicable diseases are also preventable by changes in living conditions and behaviour; the most striking evidence is the recent decline of coronary deaths and the findings that most cancers are potentially preventable.

Specific research efforts should now be focused on:

— control of diseases associated with poverty using well-known, effective measures and applying existing knowledge;

— control of both infectious and noncommunicable diseases, which are specific to the tropics, using all available resources including basic, clinical and epidemiological research;

— control of diseases associated with affluence, using applied research or, when the influences are unknown, epidemiological research into the disease's origins;

— treatment and care of the sick, based on biomedical research, science and technology;

— delivery of health services (by working with policy-makers and communities) through the process of assessing needs, planning, financing and implementing programmes and evaluating them in terms of coverage, efficiency and effectiveness.

Perspectives and strategies

Relevance of the economic environment to health

Affordable health care is everywhere dictated by economic factors: at the macro-level, through the allocation and distribution of national resources; at the meso-level, through the use made of those resources; at the micro-level, through the impact of family budgets on health care. National policy, often driven by international forces, dictates the resource allocation for health in the light of national economic needs, but it is also recognized that the health status of the population will influence the nature and pace of economic development. Limiting the resources made available to the health care delivery system not only increases the problems of managing the health system itself, but also demoralizes the personnel who operate the system.

Consequences of structural adjustment. The impact of national policies on health is a central issue. It is particularly significant where structural socioeconomic adjustment policies have been put into effect, since these have a major social impact, including that on health. In fact, their damaging effects on health hit hardest at the household level and on those least able to resist them.

Three consequences of socioeconomic policies on the health sector have been described: (1) a direct effect on health (e.g., a shift from foodcrops to export products, with a negative impact on nutrition); (2) deterioration of health services because resources no longer flow; (3) lower rewards and incentives for personnel in the health sector leading to a descending cycle of lower morale and, subsequently, lower standards.

Accordingly, much more needs to be known about the effects of adjustment, people's attitudes to those effects, means of ameliorating the consequences for the most needy, and the design of administrative structures to face up to the changed economic scene. For example, what distinguishes countries that have coped successfully with the consequences of adjustment from those that have not? How important are the determinants of organizational behaviour at the managerial level?

Health and national economic development. Determinants of health need not only originate in the health sector; there are numerous multisectoral contributions. For instance, economic factors affect health through social provision, housing, availability of suitable food, quality of nutrition and so on; industrialization influences health through the availability and nature of employment, environmental effects, consumption or creation of foreign exchange for health- or nutrition-related purposes and perhaps through the provision of health-related products. Conversely, health affects other sectors. Superficially even, health is a factor in the physical and mental quality of manpower, in the sickness-absence record in employment, as well as in the consumption of resources that could otherwise be used for economic or social development. Hence the interactions should be investigated, in order to provide a rational level, within all sectors including that of health.

There is a time-lag between interventions and disturbance in large-scale economic and societal systems and the consequences that they produce. In

this sense, the system is dynamic and hence long-term monitoring and trend assessment are important.

Global problems and global solutions

The past decade has seen rapid and often unpredictable changes in the global political situation, world socioeconomic conditions and the environment, as well as demographic and epidemiological transitions. For example, rapid aging of the population and change in lifestyle and the environment account for the increasing prevalence of cancer, cardiovascular disease, diabetes, accidents, suicide, dementias and other chronic conditions. The double burden in developing countries of communicable diseases and "diseases of affluence" is being aggravated by the spread of the AIDS pandemic and the resurgence of such ancient scourges as malaria, tuberculosis and cholera. Many of these health problems transcend national boundaries, calling for global solutions which require coordinated and intensified research.

Demographic growth remains a priority issue since, under the United Nations' medium-variant projections, world population is expected to reach 6000 million by the end of the century and to exceed 7000 million in 2010. The age structure of the world population is changing rapidly and the older population is growing faster in the developing than in the developed countries (annual growth rates of 3% compared to 1.8% during the period 1985–90). Attempts to check the rate of population increase have not so far led to satisfactory results. Research on health education and other aspects of population control is vital.

The finite nature of natural resources, indiscriminate storage of industrial wastes (e.g., nuclear) leading to pollution, the widespread use of aerosols causing ozone depletion, and carbon dioxide emissions producing the greenhouse effect — all these are well-publicized examples of global problems that transcend national boundaries. Research is needed on the behavioural and social impacts of industrialization on the introduction of new technologies in both developing and industrialized countries.

The issue of energy usage is linked with the process of industrialization and technology development. Various technical and ethical issues confronting politicians and the scientific community require further investigation. For example, in addition to health hazards resulting from individual behaviour (smoking, alcohol abuse, etc.), thousands of environmental contaminants are being encountered, particularly in occupational settings. Further development in methodology is needed to assess the impact of low doses of contaminants typically found in the ecosystem.

With regard to food supply and nutrition, investigations are required at the *individual level*, where education and the behavioural sciences play an important role; and at the *socioeconomic level* concerning accessibility to food (financial and other issues), production and distribution, legislation (pricing policies), marketing and food control.

Research is needed on the origins of health-damaging behaviour and — more important — to identify the approaches and the means by which health-promoting behaviour may be encouraged among individuals, families, communities and organizations, including the individuals within such groups.

Health research and human development

Health has been viewed in terms of survival rates. The population explosion in the 19th century was characterized by low survival rates; so a logical goal would be that when the population stabilizes in the 21st century, there should be high survival rates at all ages, with minimal disability.

In situations where there is no strong economic growth, there is a population explosion which largely accounts for the poor state of health, as seen in the developing countries. During the last quarter of the 20th century, many of these countries have nearly doubled their population (more than double in Africa). Although Asia and Oceania will, by the end of the century, constitute nearly 60% of the world population, they have succeeded in slowing down their population growth rate and the positive effects on health have already started to appear. Morbidity in the Third World is characterized by the predominance of infectious diseases, whose severity largely determines the mortality profile.

A classical indicator of health is the infant mortality rate, a good proxy measure of underdevelopment. Infant mortality rate is also closely related to women's literacy, and it has been demonstrated that, for specific income groups, countries with a higher proportion of literate women have an infant mortality rate considerably lower than countries with a low level of female literacy. For example, in countries within the same income group, say higher middle, those with a better than 90% proportion of literate women have an average infant mortality rate which is more than three times better than countries with a less than 35% proportion of literate women (31 against 107 deaths per 1000). Comparable gradients apply for countries within other income groups.

Despite such differences, overall literacy — a critical determinant of health globally — continues to increase in the South, as can be measured by the gross number of literate persons. Figures for primary,

secondary and tertiary enrolment in the South in 1985 are comparable to those for the North in 1950. Thus, the educational lag between North and South is of the order of one generation (30 years) while the industrial lag has been about 100 years.

In the physical environment both water supply and sanitation are key factors influencing health development; much remains to be done, particularly in the rural areas of Africa, South Asia and Latin America. The costs involved run into hundreds of billion dollars, with the countries concerned competing for very limited resources and facing difficult maintenance problems. Thus, effective coverage by these services within a country is bound to be uneven.

There are also important differences in the causation of nutritional disorders. Whereas in the industrialized countries malnutrition is related to affluence, in the developing countries it is often the consequence of maldistribution. Although, on average, the world has a growth rate of agricultural production which can easily feed its entire population, famine is still widespread in large parts of the African continent.

To feed people, jobs must be provided. Estimates of the labour force arriving on the market have been made, and the numbers are staggering, particularly in the former centrally planned economies and in the developing countries, which together contribute only a small fraction of the world's GNP. Indeed, the ratio of total GNP between North and South is roughly 4 to 1. Expressed per capita, it would be of the order of 20 to 1. This imbalance is closely paralleled by the distribution of resources for research and development, and the number of scientists and engineers.

What conclusions should be drawn from these observations? First, there are obviously close linkages between health, science and technology, and the overall process of development. Secondly, it might not be very effective to subordinate the promotion of health to economic development, since the latter progresses slowly and unevenly. Thirdly, the minimal resources available for research in the South should be used selectively to maximize their impact on health. It is highly important to foster reliable partnerships with the North, in order to strengthen the overall infrastructure in science and technology, and to equip the decision-making apparatus with appropriate capabilities in policy planning and policy research.

Science and technology policies

Policy is required to ensure that an adequate response is made to the demands, needs and opportunities in relation to the use of science and technology for the purposes of improving health, whether individually or nationally. This is achieved firstly by establishing mechanisms for recognizing and assessing the needs and opportunities, and secondly by specifying guidelines for deciding the choice, or balance, between different options that arise. In addition, help may be needed by planners in making good use of decision-supportive procedures, by which they can prioritize and allocate resources within the national context.

An appropriate technology policy is essential to ensure that technology needs are identified. At national level, this may require the assistance of experts who would, *inter alia*, take a critical look at existing problems in the light of the available technology and resources. Continuous evaluation and monitoring of new developments in science and technology are essential to avoid wastage and repetition of mistakes already made elsewhere.

Implementation of solutions based on science and technology is an important component of professional work, and the initiative must lie with those who understand the technology concerned. Planners should be fully conversant with the potential and cost of any new technological applications, which means that an effective dialogue between planners and informed professionals must exist.

Training of personnel will certainly be necessary. It may also be vital to ensure that their individual and cultural attitudes are not against the technology or its use in practice. Incentives may be needed to ensure that the technological equipment is properly installed and maintained, and that the operating personnel can guarantee the continued quality of performance.

The emergence of new ethical issues

Biotechnology is becoming the source of significant new ethical problems; this is illustrated by research on the human genome. The mapping of the human genome, which may be completed within the next ten to fifteen years, is a scientific development of potentially revolutionary impact on biomedical technology and health care. It will speed up significantly the identification of the genetic basis of widespread diseases, enable early diagnosis before clinical signs appear, and facilitate the development of new techniques of prevention and risk assessment, and effective therapies. Related advances in genetic engineering and biotechnology are already producing novel drugs and vaccines.

However, these developments can have controversial implications and may result in difficult ethical and social dilemmas. Much of the current research and development in genetic engineering and

biotechnology is carried out by private companies, and there is an increasing tendency to commercialize and profit from scientific advances. Recent attempts to obtain patent protection for specified human DNA sequences and for genetically engineered organisms, such as transgenic animals, should be seen as early warnings of likely future scenarios of conflict between private and public interest in this area. In the absence of an internationally adopted code of ethics in genomic research and of appropriate legislation, the commercial cost of new biotechnologies with their great potential impact on health care may be too high for those in greatest need, especially in the Third World.

Another potential risk which may be extremely difficult to control is the possible misuse of genetic diagnosis for employment-related or insurance-related screening. Such practices could infringe upon individual human rights, and enhance prejudice and discrimination against minorities.

Although most scientists, public health decision-makers, and the general public tend at present to view such hazards as being rather improbable, the lessons of history should teach us that the risks should not be ignored. It is therefore important for WHO to study these problems and formulate options for appropriate action.

Research capability strengthening

The basic requirements for the conduct of nearly all research are manpower, resources and infrastructures. The most important of these is manpower, i.e., the people who constitute the knowledge and skill base and the power of the society. Health research capacities will continue to vary from country to country, but national health systems will not develop without a national capacity to carry out health research. Research capability strengthening (RCS), particularly in developing countries, is critical for the training of researchers and the building up of research institutions. Determining the scope and size of a research establishment is a national responsibility and an important and integral part of health development. As such, it is of paramount importance to obtain national commitment, at the highest level, to promote and provide the required support for building and sustaining RCS.

Ministries of health play a pivotal role in obtaining this national commitment. However, in view of the multisectoral scope of health research, several ministries should collaborate to mobilize support from other sectors such as education, science and technology, and planning. External support for health research and/or RCS should be seen as complementary to that provided for this purpose from national resources.

Experience in several developing countries has also shown that while qualified physicians or science graduates can be trained to carry out national health research, every type of health worker — even at the most peripheral level — can learn scientific approaches and apply them to analyse health problems in a systematic manner and take steps for dealing with them. It may not be possible to employ researchers on a full-time basis in the majority of developing countries. A system of incentives including appropriate career structures should be available, if required, to attract and retain potential research workers. Similarly appropriate incentives should be made available to well-trained scientists who are working in developed countries to return to their developing countries.

Based on studies carried out by the ACHR, the main features which determine the success and sustainability of a research institution include:

- a history of consistently strong leadership, dedicated to quality work and constant improvement;
- a tradition of scientific inquiry coupled with a sense of discipline and rigour in research management;
- systematic documentation of professional and research activities, including publications;
- a critical mass — in professional, technical and financial terms — to guarantee momentum;
- an environment conducive to research, which is one of the main conditions for motivating young scientists (this includes an appropriate infrastructure, such as technical and bibliographic facilities);
- a close relationship with policy planners and decision-makers to ensure the stability of support at government level, particularly the Ministry of Health, which can chart the course of health systems research; and
- external cooperation and networking to attract further technical support and funding from international sources.

Conclusions

The above policies and strategies are complementary to and an expansion of the health research strategy presented in 1986. Since socioeconomic, technological and behavioural changes determine the process of health development, the severe constraints in financial, material and human resources must be addressed by promoting better methods of policy analysis, planning and research. The synergistic efforts of all sectors determining health status and health services are essential.

The need for more effective, multisectoral approaches to health research is consistent with an earlier ACHR statement:[b]

"In developed countries, the infections declined because of (*a*) increased resistance brought about by improvement in nutrition and, later to a lesser extent, immunization, and (*b*) reduced exposure, which resulted from hygienic measures (in respect of water, sanitation, food and housing) introduced progressively from the late nineteenth century. In the developing countries, the decline of mortality appears to have been due predominantly to better nutrition, for in some countries which in a few decades have attained Western standards of health there were no substantial advances in the other major influences. However, there were some other developments which contributed powerfully if indirectly to health: education, particularly of women; equity of access to health resources; political and social will to improve health; and, above all, control of fertility, which safeguarded the advances from the effects of rising numbers.

"In the light of this assessment of the contribution of different influences, developing countries which do not have the resources needed to provide all the services specified under primary health care — and that is the position in which nearly all are placed — would be well advised to give high priority in research and services to nutrition, immunization and sanitation."

At present, details of these research priorities for amplification of the concepts and implementation of the principles and policies are being discussed by the ACHR.

[b] **Advisory Committee on Health Research.** *Priorities in health research and service policies in developing countries.* Unpublished WHO document ACHR29/88.5, 1985.

Acknowledgements

Special thanks are due to the Chairmen of the ACHR Subcommittees and Task Forces: Professor A.M. Davies, Professor T.M. Fliedner, Professor M. Gabr and Professor B.McA. Sayers, and to Professor B.O. Osuntokun, Past Chairman of the ACHR.

Reference

1. **Davies AM, Mansourian BP,** eds. *Research strategies for health.* Lewiston, NY, Hogrefe & Huber, 1992 (based on the Technical Discussions during the 43rd World Health Assembly, Geneva, May 1990).

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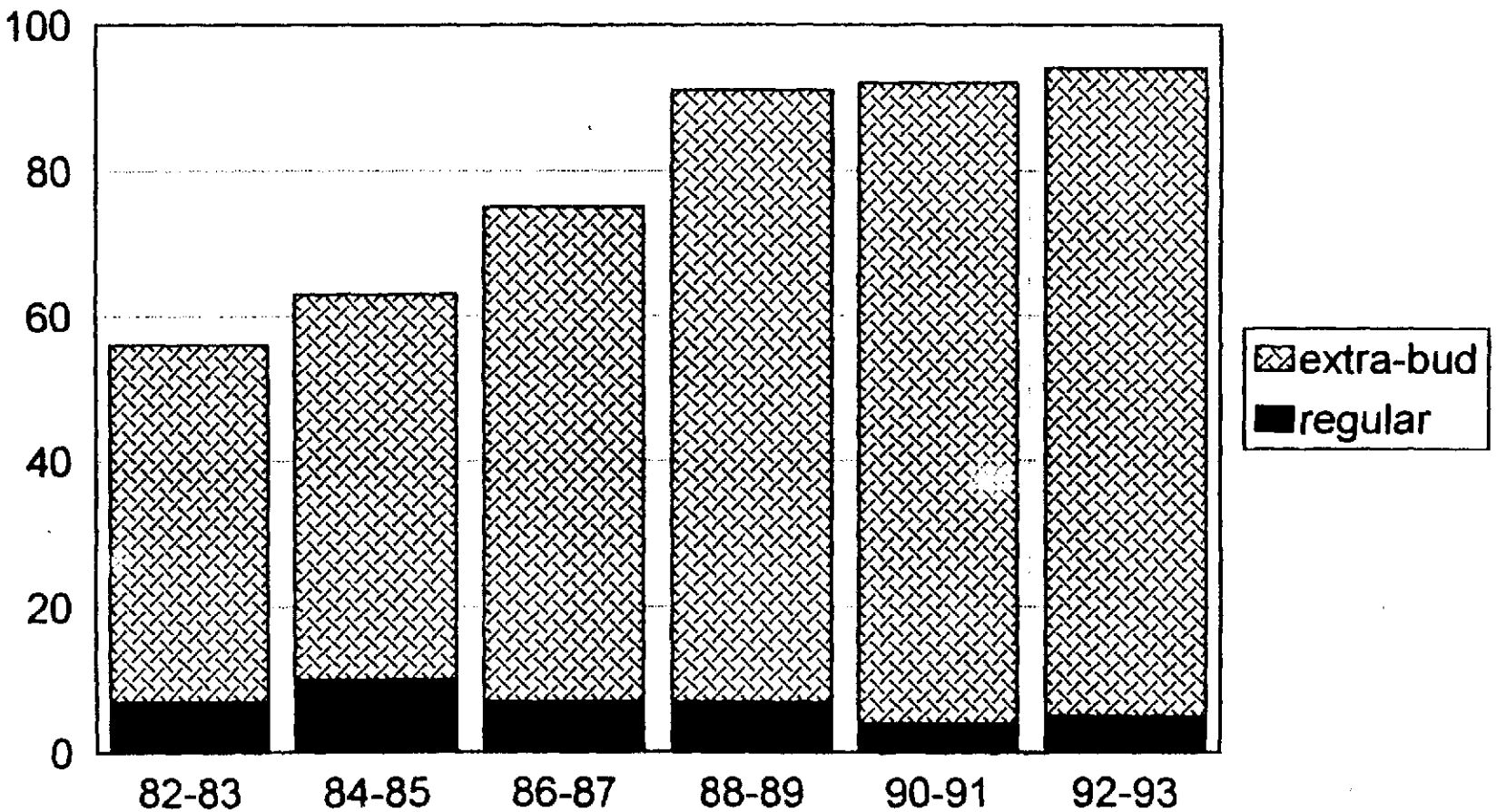

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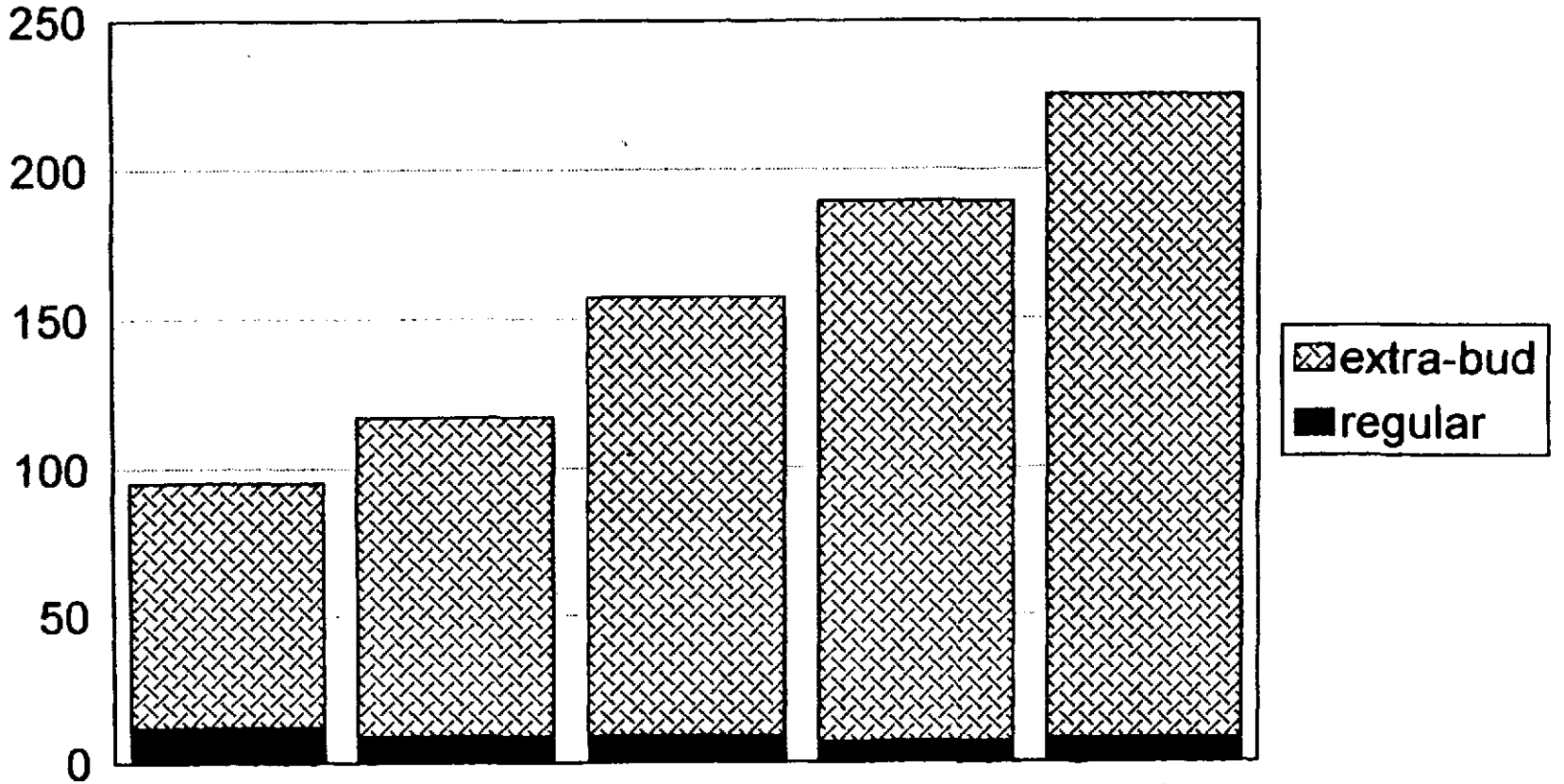

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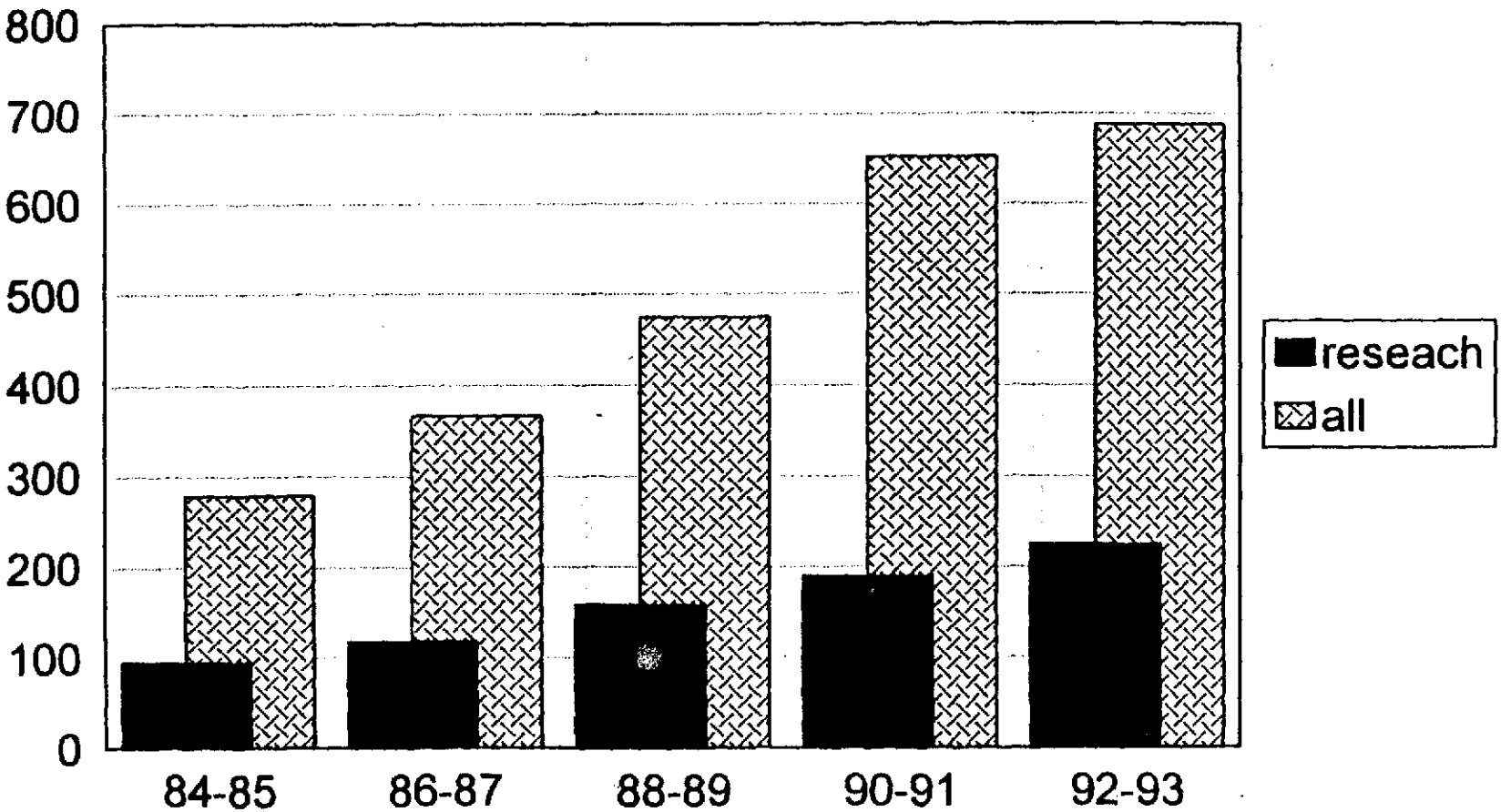

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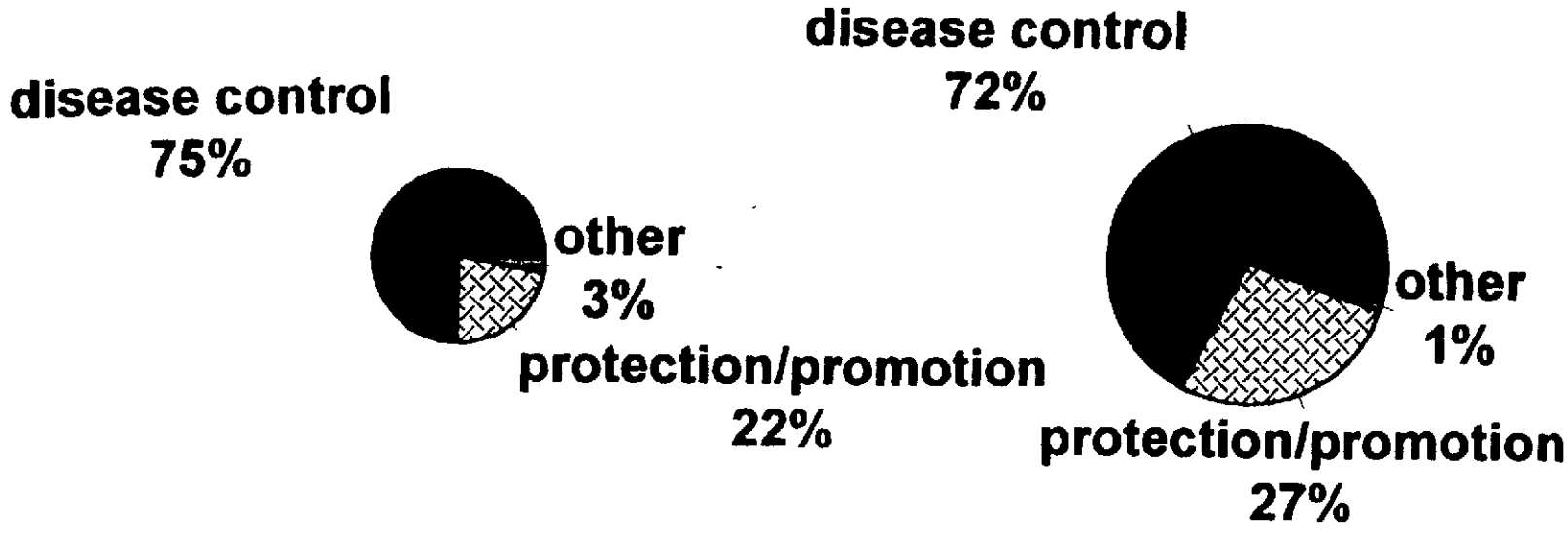

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ADVISORY COMMITTEE ON HEALTH RESEARCH

Thirty-second session

Geneva, 10 - 14 October 1994

Agenda item 8

Annex 4

HEALTH POLICY RESEARCH

Preliminary note by the Secretariat

Health Policy Research

A preliminary note by the Secretariat

Defined in simple terms, health policy research is the process of scientific investigation in setting policies, leading to the formulation of strategies, priorities and plans for health development. Health development is considered as a positive change in health status, where health benefits are maximized and health hazards are minimized.

To plan health development effectively, the consequences and costs in terms of what happens in other sectors must be taken into account, preferably in advance, and preferably in circumstances that would permit a trial to be made of any particular strategy, adopted to aim at a chosen health development target.

The development of objective and quantitative methodologies for the assessment of the determinants[1] of health development is both a critical and crucial issue for policy makers at all levels in the health care field for the following reasons:

(1) Limited resources (both material and non material) require a rational framework for the establishment of priority scales for resource allocations.
(2) It is now generally recognized that changes in health levels represent multifactorial processes that are determined primarily by the interplay of forces between the make-up of a host (an individual or a society) and his environment.

A 'systems' approach has been widely used in health policy planning, usually based on the following major steps:

(1) Identifying and defining the problem.
(2) Identifying and priority ranking of objectives within the framework of a valid value system.
(3) Identifying resources, as well as the groups competing for these resources.
(4) Considering alternative solutions.
(5) Choosing the optimal system for implementation of the chosen solution.
(6) Synthesis of the system.
(7) Updating concepts, equipment, characteristics, and data.
(8) Testing the system.
(9) Refining the design based on a correlation of test data and requirements.

Several papers[2] will be presented to the ACHR, for discussion. The Committee may wish to review critically the subject and make recommendations for further investigation, possibly by a Working Group.

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[1] A "determinant" is defined here as a factor that affects health and health development, either by itself or in conjunction with other determinants. The action of a determinant is thus a necessary, but not necessarily sufficient condition for a change in health. A "cause", on the other hand, is an agent that is both necessary and sufficient to induce a specific disease.

[2] One of which is annexed.

DYNAMIC MODELING AND HEALTH POLICY RESEARCH

E. O. Attinger

1. Health as a Policy Issue

Four decades have elapsed since WHO first defined the multidimensional nature of health. During this period the individual right of access to health care, which had been recognized in Europe since the beginning of the century, has gained political acceptance in North America, and in many developing countries. Simultaneously there has been an extraordinary development and growth of health care technology, much of it of the "halfway" type. Stimulated by government interventions, health care systems have expanded rapidly, particularly with respect to the traditional settings of medical care in hospitals and clinics, and health care costs in terms of fraction of the Gross National Product have more than doubled. Despite WHO's emphasis on the mental and socio-economic components of health (1), the large majority of these developments remained focused on the application of conventional medical care for the physical components of health, which still remains the essence of the physician's education in medical school.

Yet, despite the massive infusion of medical resources, the results in terms of improvement of population health levels that can be attributed to the health care system per se have been disappointing (2). It is, of course, true that infant mortality and age-specific total mortality have decreased rapidly (Fig. 1), but a large fraction of these improvements must be attributed to better living standards. Overall health statistics are similar in the USA and in England, although the former spends twice the fraction of its Gross National Product on health care than the latter. The introduction of the antibiotic era and of vaccines against microbial and viral diseases was heralded as the beginning of the end for infectious disease, yet in 1980 septicemia had risen to the fifteenth rank among the causes of mortality in the USA for the first time since World War II, a tenfold increase in this particular mortality rate between 1950 and 1980 (3). Accidents, homicide and suicide still rank unacceptably high as causes of mortality (4th, 10th and 11th respectively in the USA) (3), and emphasize that the origins of many health problems are related to societal structure itself and therefore not necessarily amenable to traditional health care. The same point also applies to the contribution of many societal subsectors to health problems (inappropriate nutrition, sanitation, housing, etc.)

The improvement in population health levels must represent the major objective of a rational health policy. The solution of obtaining such improvement through restructuring health care systems along traditional lines is clearly inadequate because of the multi-factorial nature of ill health. Constraining the escalation of health care costs through rationing of health care represents at best a partial solution, although the effects through consumer education may be considerable. In contrast, a comprehensive approach must

include considerations of a variety of societal sectors that impact population health care levels. These impacts are not constant, but depend on the level of performance within these sectors, the cultural background, and the stage of socioeconomic development of the population under consideration (4).

The complexity of the tasks involved becomes intuitively obvious by considering Fig. 2, which indicates the three main components of a societal system and their interrelationships (5): a human reservoir (the individual members of the society under consideration), a societal reservoir (institutions,beliefs, and products) and finally the environment which, containing most of the biomass, serves as a general source and a general sink for the inputs and outputs of the other two components. Only part of the output of one component is available as input for the other two components; the other part of the output is needed for maintenance of the subsystem. Furthermore, each component has its own hierarchical structure which determines the distribution of the overall output in accordance with anticipated or actual needs as they relate to existing or past value systems. A mismatch between these needs and the corresponding output components, either from the subsystem itself or from the other two components, leads to stresses and systems instabilities, as indicated by the circles in the figures. (For example, SE includes pollution of the environment). Depending on the scale in which a subsystem is considered and the variety between the individual parts of any of the three components, it will be necessary to identify a larger number of subsystems at each level, if their characteristics are such that aggregation of more generalized categories of variables lead to the wrong conclusions. For example, highly skewed distributions of income, education and caloric consumption can result in greatly misleading per capita statistics on a national basis.

Furthermore, human requirements are highly age dependent (Fig. 3); the youngest and the oldest age groups being most vulnerable to disease, and the middle age groups traditionally providing for the livelihood of both the young and the old. (In some cultures this tradition is rapidly changing). Marked decreases in infant mortality due to improvements in conditions first related to nutrition, then to sanitary measures and education of the parents and finally to immunization and use of antibiotics, led to the initial increases of life expectancy at birth over the first half of this century (Fig. 1). Over the past thirty years (at least in the USA) the proportionate decrease in mortality in the older age groups has been larger than that for infants, perhaps for the first time in history (3,6). The latter gains are substantially a result of the reduction in cardiovascular death rates attributable to a large extent to efforts to change the profile of overall cardiovascular risks for Americans. As a result the age distribution of the USA (as well as that of most western countries) has assumed a rectangular shape with a compression of mortality in the range of the middle seventies, in contrast to the triangular shape of the age distribution of developing countries. Unless the high morbidity rate of the older (and retired) population groups can be significantly decreased, the economic burden for the care of this population group by the relatively reduced "productive" age groups will increase dramatically (7,8). In fact, if the entitlement program for end stage renal disease were extended to all types of "end stage" diseases, half of the population would be fully occupied to provide health care for the other half.

2. The Concept of Multi-sectorial Models

Returning to the simplified model of Fig. 2, it is apparent that for purposes of policy analysis one is dealing with a multi-input-multi-output model, a concept very familiar to economists since the introduction of input-output tables first developed by Leontief (9). In such a model, any policy decision directed to a particular component of the public sector will also impact other sectors in either a positive or a negative direction. Hence for each policy decision dealing with the solution of a particular problem, a wide range of alternatives are available. In general, an optimal solution is one which achieves the desired objectives with a minimum of undesirable side effects.

Because of the very high rate of change in the complexity of socioeconomic developments during the last few decades, past experiences have become unreliable predictors for the future (10). Since the human short-term memory is incapable of handling more than 7 ± 2 concepts simultaneously, decision makers tend to simplify, linearize and consider only a few of the many variables that may be involved in the problem under consideration (11). Traditionally the choice between different options is made on intuitive and political rather than on comprehensive rational grounds. The use of models in long range planning and of decision support systems is relatively recent. For example, industrialized countries have been using econometric models as decision aids only since the sixties. While the predictions of such models are as yet far from perfect, they provide at least for a consistent change in output for a specific change in input, the unambiguous identification of prediction errors and therefore for logical improvement in the model structure. The success of any model still depends on the intuition and experience of its designer. Critical issues like the inclusion of all the pertinent variables and their reduction to manageable numbers, the specification of the assumptions upon which the model is based, and most importantly, the quality of the input data must be carefully considered. Leontief, in particular, severely criticized theoretical economics because of its tendency to package detailed information into a relatively small number of bundles labeled "capital", "labor", "raw materials", "intermediate goods", "generalized price labels", etc., since this kind of aggregation results in models with symbolic variables and parameters that cannot be related to observable variables in the real world. He also emphasized that government statistics are compiled for political, administrative or business but not for scientific purposes and therefore fall far short of what would be required for concrete, more detailed understanding (12).

Some of the complexities involved in the consideration of health policy problems are illustrated in Fig. 4. Population health is represented by three blocks: a health-problem incidence model (the illness pattern at a given point in time), a health-problem dynamics model (the evolution of that pattern with time: cure, chronic diseases, disability or death) and a behavior model. Health status is characterized by the results of the processes occurring in the health-problem dynamics model. Because of their availability, mortality rates and measures of life expectancy are the most widely used indicators, although it is recognized that the reliability of mortality statistics leaves much to be desired. Nevertheless, the use of age- and disease-specific mortalities has been of great help in identifying differences and changing disease patterns across communities, and since the pathbreaking work of D. Rice (13), in arriving at some estimate of the cost of premature deaths.

Morbidity and disability statistics provide another important dimension of population health levels. Many chronic and infectious diseases (i.e., malaria) are associated with prolonged periods of illness and disability that are not reflected in mortality statistics. Morbidity statistics are considerably more difficult to interpret than mortality statistics, since morbidity represents a dynamic process, characterized by type, severity and duration of illness as well as the subjective perception thereof by the patient and the physicians consulted. According to the health belief model (14) the perceived threat of a disease depends both on individual perceptions (perceived susceptibility) and perceived seriousness (severity of the disease) as well as on modifying factors. The latter include demographic variables (personality, social class, peer and reference group pressure, etc.). The likelihood of entering the health care system and thus being included in morbidity statistics depends on the expected difference between perceived benefits and perceived barriers offered by the health care system.

Measures of social, mental and physical functions developed during the last 40 years add other important dimensions to the measurement of health and have been successfully applied to populations (15). They have led to the concept of quality-adjusted life years (a concept that provides an estimate of the psycho-social costs of disease and of therapeutic interventions). Active life expectancy is an extension of that concept, where the endpoint is determined by the loss of independence in the activities of daily living rather than by death. This latter group of indicators is based on population surveys (through questionnaires and interviews) and therefore very expensive to establish. Since they are not value

free, their reliability is tainted by the fact that the perception of decision problems and the evaluation of probabilities and outcomes produce predictable shifts of preference when the same problem is framed in different ways (16).

The model illustrated in Fig. 4 is based on the concept that health levels are a function of both medical and non-medical determinants. The former include the health care system itself as well as prevention, behavior modification and nutrition programs. The latter can be associated with demographic factors (the population model), economic factors (the economic model), the infrastructure (housing, sanitation, transportation and communication), the socioeconomic background, as well as with education and the physical environment. Note that in most instances these determinants of health are themselves affected by the level of the health status. For example, aging of a population strongly affects the health problem incidence model, while the rate of births and deaths are primary determinants of the population model. Poverty is associated with higher death, morbidity and disability rates (17), while lower health levels have a negative impact on productivity.

The identification of individual and community risk factors associated with excess mortality and morbidity in the last few decades emphasizes the importance of behavior modification for health improvement. The feasibility and cost effectiveness of such an approach on a large scale has been proven in the North Karelia project (18). In the United States, marked improvements in the control of hypertension have occurred during the last 15 years, the proportion of adults who smoke has declined by more than 20%, the aggregate consumption of foods high in total fat, saturated fat and cholesterol has decreased 10-15% and the proportion of the population undergoing regular exercise has increased by as much as 100% (6). Other risk factors are less amenable to intervention. For example, data from the human population laboratory in Alameda County indicate that the absence of a social network (lack of social and individual ties) are associated with an excess mortality of 2.3 for men and 2.8 for women (19). This association is independent of the self-reported physical health and socioeconomic status, as well as of health practices such as smoking, alcoholic beverage consumption, physical activity, utilization of preventive health services or a cumulative index of health practices.

The elimination of community risk factors requires, in general, policy changes with respect to non-medical determinants of health. Jenkins et al. (20-22) have studied excess mortality from a number of diseases by correlating demographic, social and economic data with age-sex standardized mortality ratios in some 39 catchment areas in Massachussetts. Their results established a community risk profile for hypertensive disease, ischemic heart disease, cancer, homicide and death due to fire and flame that is characterized by low occupational status, low median education, widespread poverty, broken families and substandard housing. Quite different social indices were associated with excess mortality due to respiratory diseases and stroke, an argument for some specificity of association rather than a general impact for all causes of mortality. Jenkins also emphasized that this type of analysis, i.e., the correlation of disease-specific mortality with population characteristics is subject to the ecological fallacy, that is, the findings represent the characteristics of population groups and not necessarily those of the people who actually died from the disease.

The feedback from the behavior model to the health-problem dynamics model (Fig. 4) does not only include behavior modification within the framework of the health belief model discussed earlier, but also the effects of discontent, frustration and aggression. For this reason, we have used death rates from violent causes as a component of the indicator of health in the model discussed in the next section(4).

The health care system (on the right of Fig. 4) is thus only one of the inputs that affects population health levels, and, as already stated, there is increasing concern worldwide about the disproportionate rise in health care expenditures, compared to the results obtained. Major fractions of the health care budget are invested into the care of the critically ill (23-25) . A recent comparison of outcome and costs between matched patients in a private university medical service and a community hospital showed that

charges for patients in the community service were about one third of that in the private University service, the length of stay was about half, but the death rate in the community hospital was nearly twice as high. However, the survival rate one year after discharge was the same for both facilities (16.7%) (25). Although there are numerous examples of the beneficial effects of modern medicine, Garber's study (as do many others) strongly indicates that serious problems exist with the allocation of resources in the USA. It is therefore not surprising that Hadley found in a widely publicized study that a 10% increase in per capita expenditure would result in a decrease of 1.5% in mortality rates (26). Using 1970 statistics this translates to 1.2 deaths averted per $100,000 spent, a very low cost benefit ratio indeed. Ironically the results of the study were used to lobby for increases in health care expenditures. Hadley used an ingenious approach drawing a detailed analogy between the economic theory of production and the processes that determine health levels. He explored a number of policy options based on a simple Cobb-Douglas production function, using disease-specific mortality rates as an indicator for health care and medicare expenditures as an indicator of the use of medical care, thus committing the common error of confounding the extent of services with quality. Mandelbaum (27) and others (5,28) have repeatedly pointed out that the conventional economic production functions must be modified by including not only quality changes in capital but also in labor. It is true that no entirely satisfactory measures for quality of health care exist. In a comprehensive review article Anderson (29) bitterly complained about the dismal state of quality assessment in health care. While quality and price are generally related in a competitive industrial sector, such relationships do not necessarily hold in non-competitive public service industries that generate their own market for a poorly informed but service-dependent public.

Donabedian (30) has recently attempted to develop a framework for relating quality and cost of health care to improvement in health status. The proposed assessment methodology includes two components: a definition and measurement of health status on the one hand, and a specification of the medical care associated with any given change in the health status on the other hand. Although conceptually attractive the method faces a number of pratical problems in terms of consensus about definitions and specifications. It also appears to underestimate the effects of non-medical health determinants.

To summarize the model illustrated in Fig. 4, there are many options available to the health-policy maker who wants to improve the health level of the population for which he is responsible. These options include manipulation of the population model, the economy, the educational system, the infrastructures and the environment, each of which has constraints of its own. The effect of medical determinants of health may be altered through prevention programs, nutrition programs, education, behavior modification, or restructuring of the health care system. At present, the relative impact of any of these changes is not well understood, particularly with respect to the many risk factors that are being discovered at an alarming rate. Clearly some determinants must be considerably more important than others and the establishment of such a priority list represents a major challenge for modern health services research.

3. Example of a Multisectorial Model

Some years ago, we made a first cut at this problem (4,31). We analyzed the national statistics of 29 developed and 25 less-developed countries from 1950 to 1975 in an attempt to assess the relationship between population health levels and the performance of seven socioeconomic subsectors (demography, economy, education, communication, housing, nutrition and health resources) as a function of time. We selected 29 indicators for the characterization of the socioeconomic sectors and six indicators for the characterization of the health status. The selection of these variables was constrained by a trade-off between significance, availability and reliability of collection for a given indicator. Additional constraints were imposed by the selection of the analytical methods which set boundaries on the numerical relations between the number of countries and the number of variables to be analyzed.

Considerations related to the nonlinear correlations between key variables led us to divide the 54 countries into a group of developed (Group 2) and a group of less-developed countries (Group 1). Table 1 lists the average values for the indicators in the different sectors for the beginning and the end of the 25 year period for both groups of countries. The relationships between the socioeconomic subsectors and health were found to be not only different quantitatively but also to change at different rates. Changes in one subsector were often closely associated with changes in another subsector only until a certain development level was reached. Fig 5 shows the relationship between life expectancy and per capita gross domestic product (PCGDP). The two solid lines represent curves of best fit for the data of 1950 and 1975. It is apparent that at low levels of PCGDP small increases in the value of this variable are associated with large increases in life expectancy, while at higher levels of GCGDP the effects of even large increases are minimal. In fact the data approach an asymptotic limit for life expectancy of around 78 years. Furthermore the relationship has moved upward between 1950 and 1975 as indicated by two solid lines. Although PCDGP is measured in terms of per capita income, it is clear that at low levels of economic development it must represent the overall effect of all those sectors that depend strongly on the level of the economy, while at higher levels the purely economic component diminishes in importance and other sectors (such as education and housing) assume a more important role.

Fig. 6 shows another example of rapidly changing correlations, between life expectancy or infant mortality versus nutrition. For DCs the initially high correlation for life expectancy has decreased continually, reaching negative values after 1965 , probably an expression of the risk factors associated with poor nutritional life styles in affluent nations. In LDCs, this correlation has steadily increased since 1955, reflecting the value of nutritional programs. For infant mortality the correlation has continuously decreased for DCs, while it has been increasing in LDCs.

Based on the value of key indicators for all socioeconomic sectors as well as for the health level, all the countries were ranked along a socioeconomic and a health dimension (Fig. 7), and the data subjected to cluster and principal component analysis. The cluster analysis yielded four clusters for the LDCs (labeled 1 to 4 on Fig.7) and four for the DCs (labeled 5-8). (The points within a cluster are characterized by closer similarity among themselves than with any member of another cluster). The increase in the levels of socioeconomic development and of health proceeds from the upper right hand corner to the lower left hand corner . Most countries follow a path of development that is balanced with respect to both dimensions, as indicated by the two solid diagonal lines. Countries in transition shift from the LDC clusters to DC clusters and back with time. Countries to the left of the upper diagonal are characterized by a poorer health level than expected from their level of socioeconomic development. The converse holds for the countries to the right of the lower diagonal. The former may thus be classified as health efficient, the latter as health inefficient. The major factors accounting for the difference in health levels between the efficient and the inefficient countries relate to crude death rate and to violence.

Over the 25-year span 2 countries have improved their overall standing by ten ranks or better (Japan, Thailand), while 5 have decreased it by at least 10 ranks (Austria, Finland, East Germany, Ireland and Hungary). The relative gain in health standing compared to socioeconomic standing has been at least 15 rank orders for 9 countries (Barbados, Costa Rica, Cuba, Trinidad and Tobago, Japan, Thailand, Poland, Rumania and Spain), while 5 countries lost at least 15 rank orders (Argentina, USSR, Czechoslovakia, Belgium and Portugal).

The individual factors accounting for rank orders were assessed by principal component analysis. Four factors explained 89.4% of the variance for the LDCs. Economy and communications formed the dominant factor accounting for 57.7% of the variance, the second represented a social factor (13.1%), consisting of medical resources, nutrition and housing. Health and education formed separate factors, contributing 11 and 7.9% to the explained variance.

For the DCs 5 factors accounted for 83.2% of the variation in sectorial ranks. Communication, housing and education formed the major dimension (43.2%). Economy as a separate factor accounted for only 9.9%, health (15.6%), medical resources (8.6%) and nutrition (5.6%) represented the other dimensions contributing to the explained variance.

A multiple regression model, patterned along the concepts illustrated in Fig 4. was constructed using key variables from the seven socioeconomic subsectors as either direct or indirect inputs for a health model whose output was measured by life expectancy, infant mortality, crude death rate and death rate from violence. An inverse model, using health variables as the input and economic variables as the output, was also analyzed. The model explained health levels on the basis of performance of other societal sectors better for LDCs than for DCs while the converse was found for the assessment of the effects of health on the economy.

Our model represents the first attempt at an analysis of the interactions between various societal sectors, their effects on health and their changes with time. Other attempts to assess socioeconomic development were either based on data for a single year (32) or neglected the health sector altogether (33-35). Despite the shortcomings of such models (discussed in the next section) our results provide insight into changes in interaction between societal subsystems that have not been available before (5,10) and re-emphasize the need for considering health care systems within the context of the entire social structure. Because of such changes, conclusions from the past are often unreliable guides for predictions for the future. Improvements in the health sector through support from other sectors depend on the level of development of a society which has important implications for technology transfer in general and the health sector in particular. The increase in gaps in economic productivity in the last 25 years indicates that technology transfer has been ineffective in many countries. The finding that health variables account for a larger fraction of the variance in our data for the developed as compared to the less developed countries suggests that the economic sectors predominate for the socioeconomic development in the latter.

4. Caveats for Model Builders

It is intuitively attractive for a decision maker to have as much relevant information at his disposal as possible. The available evidence suggests that the present understanding of complex systems is often insufficient to choose rationally among available alternative variables in terms of relevance to the problem under consideration. It is also apparent that we have not yet found an effective way of dealing with the existing information overload. The collection of information and the measurement of variables are expensive processes, both in terms of dollars and potential risks to patients, and in practical applications these expenses have to be reviewed with respect to the value of the obtained information for a particular decision process. Futhermore, a point may be reached where the accumulation of measurement errors exceeds the gain made by the refinement of assumptions. Complexity in a model represents costs that must be justified in terms of a more realistic behavior. If a model is transparent a reasonably sophisticated user can judge it by himself, an advantage which the developers of medical decision support systems believe would considerably enhance a model's acceptability (36).

The selection of variables for the characterization of systems performance is of crucial importance in any modeling effort. Often these choices are determined more by the feasibility of the measurement than by the importance of a variable (37). Socioeconomic statistics in particular abound with data related to quantities, but are singularly lacking those related to quality. In most situations we are interested primarily in a measure of the overall relationship between two sets of variables (i.e., input and output variables or predictor and outcome variables) and we are therefore seeking those variables in either set that contribute most to strengthening the interrelations between the two sets. Frequently, however, a third type of variable must be included in the analysis, namely covariates. (A covariate is a variable which relates to the predictor and/or

outcome variables and whose effects have to be statistically controlled for as a substitute for experimental control). Any such analysis of covariance, however uses up some of the degrees of freedom in the available data.

Having dealt with the errors due to covariance, we are left with two major error types: errors of measurements and errors of assumptions. Any measurement has associated errors: they may originate in the measuring instrument, the interphase between the instrument and the variable to be measured or be due to the observer. It is therefore customary to express numerical values for measurements with an error term attached (for example mean $\pm$ standard deviation). Errors of assumption arise from misunderstanding or from simplification of the process we are trying to model (for example, linearization, omission of variables that are considered insignificant, or aggregation of variables (5)).

Alonso has shown that the magnitude of these two error types varies as a function of the complexity of the model (38). At low complexity of the model the unrealistic nature of the assumption results in large errors that decrease exponentially as the assumptions are refined by increasing the complexity of the model. Because of the simple assumptions inherent in models of low complexity, few measurements are needed and measurement errors are relatively low. The introduction of more refined assumptions requires also more measurements and the sum of the measurement errors increases exponentially as the complexity of the model increases. The total error (the sum of the two components) is at a minimum at some intermediate level of complexity. It is important to realize that the lower the reliability of measurements, the lower the level of complexity at which the error is minimal. The number of variables used to describe a system can be reduced by a variety of scaling methods which identify the underlying systems structure in terms of fewer latent factors. In such a parsimonious systems description the complexity of the model would correspond to the minimum level of error.

A number of questions have to be considered before a set of data (for example in observations on a response and several related variables) is subjected to formal analysis. Among the most important are the following (39):

(1) How did the data arise ? As a result of an experimental design, from a survey, or as chance observation, etc.?

(2) Are the data representative of a system which we are trying to model? Were the important variables selected? Is the range of the response obtained adequate? How reliable are the data? Is there multicollinearity in the variables? Any missing data, etc.

(3) Is it reasonable to expect that these data could lead to a good predictor? Is there a cause-effect relationship or simply a strong correlation which itself may depend on an unmeasured variable?

(4) Do we have prior information on the system? Is this information conjectural or validated?

Many of these questions can at least tentatively be answered by "informal" methods such as inspection, sorting, graphing and simple pre-analysis of the data. Since the available data are generally already stored in some database preliminary screening, such as distributions, bivariate correlations etc., can be performed rapidly and efficiently. Unfortunately, in our age of canned statistical packages, these preliminary assessments of data are all too often omitted, leading to the use of inappropriate statistical methods (40) and to underestimates of statistical variability (41).

A number of methods are available for the assessment of the range of validity of predictive models. Cross validation techniques have been used for a number of years for the development and assesment of prognostic indicators (42), but they do in general not indicate which parts of the model are responsible for a given fraction of the prediction error. Both Keyfitz (43) and Alonso (38) have proposed the use of transparent models as

modes of comparison. The strategy involves building a set of weak alternative models that among themselves include all of the available data, instead of constructing a "mastermodel". The intersection of these weak models will produce robust theorems. Since as alternative models they deal with different aspects of the same problem, their average would yield predictors that are far stronger than those derived from individual models.

Another approach aims at the identification of the dominant variables. Through an experimental decomposition of the action of the model (43) the method consists of subsequently assessing the effect of different levels of an input variable on an output variable, and arranging the results in a matrix where the rows represent the various levels of the input variables and the columns the several outputs. The elements of the matrix indicate the extent to which a particular output is affected by a particular input. In the second step, rows and columns are interchanged in such a way that the large matrix elements are being concentrated in the left upper corner. The matrix is then truncated, so that only those rows and columns with appreciable values of the elements are retained, resulting in a simplified and more transparent model.

5. Conclusions

The recognition that health is not the exclusive domain of the health care establishment is increasing and the need to evaluate the impact of both medical and nonmedical determinants of health in quantitative terms is becoming pressing. The dependence of health on a multitude of factors can only be analyzed by comprehensive, and therefore complex models. The validity of such models rests primarily on the reliability of the databases available for the assessment of input and output variables. At present these databases are inadequate in most aspects and unreliable in others. The multidimensional aspects of health require access to a combination of age and disease-specific mortality and morbidity data, disability data and data relating to the quality of life. Socioeconomic statistics abound with indicators of the quantity, but not of the quality of inputs and outputs in their respective sectors.

The health care industry has become a major economic force in many countries. But unlike private industry, the investment in research and development efforts rarely exceeds 1% of the operating costs. The development of more reliable and more comprehensive databases must be the first priority if policy decisions are to be based on verifiable observations rather than on anecdotal evidence.

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Table 1.

Changes in Performance of Seven Socioeconomic Subsectors and in Health Levels Between 1950 and 1975 for Two Groups of Countries.[a]

	1950			1975		
	Group I	Group II	Ratio II/I	Group I	Group II	Ratio II/I
Demographic						
Sex ratio (males/females)	0.98	0.96	0.98	0.99	0.97	0.98
Population density (per hectare agricultural land)	4.41	3.4	0.77	4.4	5.0	1.14
Percent urbanization	36.2++	51.2	1.41	44.4	66.6	1.5
Percent population in cities > 20 000	29.2+	37.4+	1.28	42.	50.4	1.2
Crude birth rate (live births/10^3 population)	37.8	22.6++	0.6	30.9	17.3	0.56
Health						
Crude death rate (per 10^3 population)	14.1++	10.2	0.72	9.7	9.3	0.96
Infant mortality (per 10^3 live births)	96.1	51.4+	0.53	51.2	17.4	0.34
Life expectancy (years)	49.6+	66.7++	1.34	62.5	73.0	1.17
Violence (violent deaths (BE47-50) per 10^5)	48.3	56.7	1.17	57.8	67.6	1.17
Health Resources						
Population/hospital bed	467.	152.	0.33	400.	117.	0.29
Population/physician	3217.	1121.	0.35	2151.	711.	0.33
Nutrition						
Calories (per day per head)	2302.+	2908.+	1.26	2683.	3343.	1.25
Calories (percent of requirements)	95.5	111.0	1.16	110.1	130.9	1.19
Protein (g/day/head)	63.4	86.9	1.37	69.7	95.1	1.36
Fat (g/day/head)	45.5++	111.4++	2.4	64.2	129.6	2.02
Cereal(g/day/head)	380.	309.1	0.81	323.	221.1	0.68
Sugar(g/day/head)	54.6	88.8	1.63	86.5	116.2	1.34
Economy						
Per capita gross domestic product ($)	281.++	965.++	3.43	870.	4271.	4.9
Unemployment (as percent of labor force)	7.0	3.3	0.47*	6.6	3.5	0.53
Per caput energy use (kg coal equivalent/yr)	481.+	2206.+	4.59	1302.	4663.	3.58
Investment ratio (percent of GDP invested)	18.	21.	1.17*	20.	24.	1.2
Communication						
Newspapers (daily circulation/10^3 population)	60.++	254.	4.23	99.	301.	3.04
Radio (receivers/10^3)	40.+	181.++	4.53	175.	392.	2.24
Phones (instruments/10^3)	11.	90.+	8.18	50.	295.	5.9
Housing						
Persons/room	1.7+	1.1+	0.65	1.7	0.9	0.53
Percent housing units with piped water	20.1++	52.4++	2.61	40.8	88.8	2.18
Percent housing units with toilets	64.5	75.	1.16*	73.9	90.1	1.22**
Education						
Post secondary (percent of 25 + population)	0.8	2.6++	3.25	3.6	8.6	2.39
Median school 4 yr (percent of 25 + population)	2.08++	5.15+	2.48	4.2	7.25	1.73
Illiteracy rate (percent of 15 + population)	39.2+	11.7	0.19	20.5	5.1	0.25

[a] Group I: developing; Group II: developed countries. Note the marked increase in the gap in the economic production sector and the decrease in the educational and communication sector (columns 3 and 6). The membership of the two groups is listed in Table V.

* 1960. ** 1970. + First key indicator. ++ Second key indicator.

Figure 1.

Changes in Total Mortality and Infant Mortality Between 1900 and 1980.

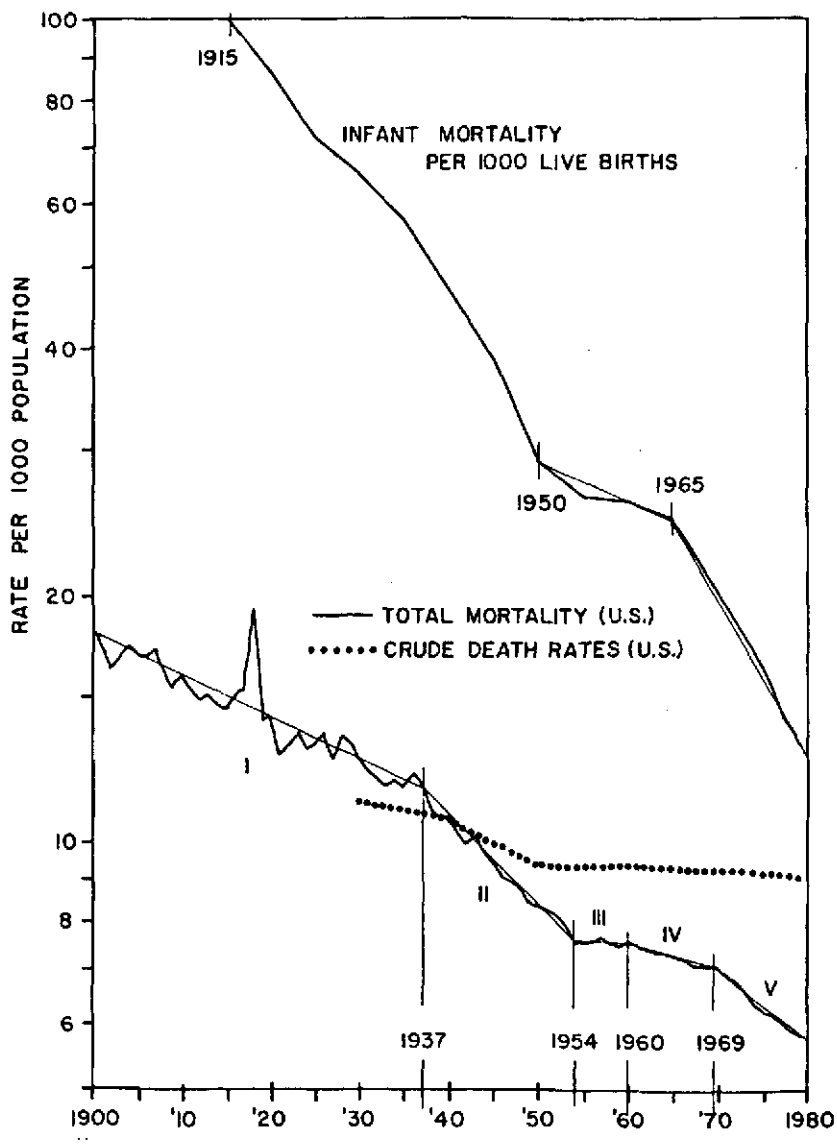
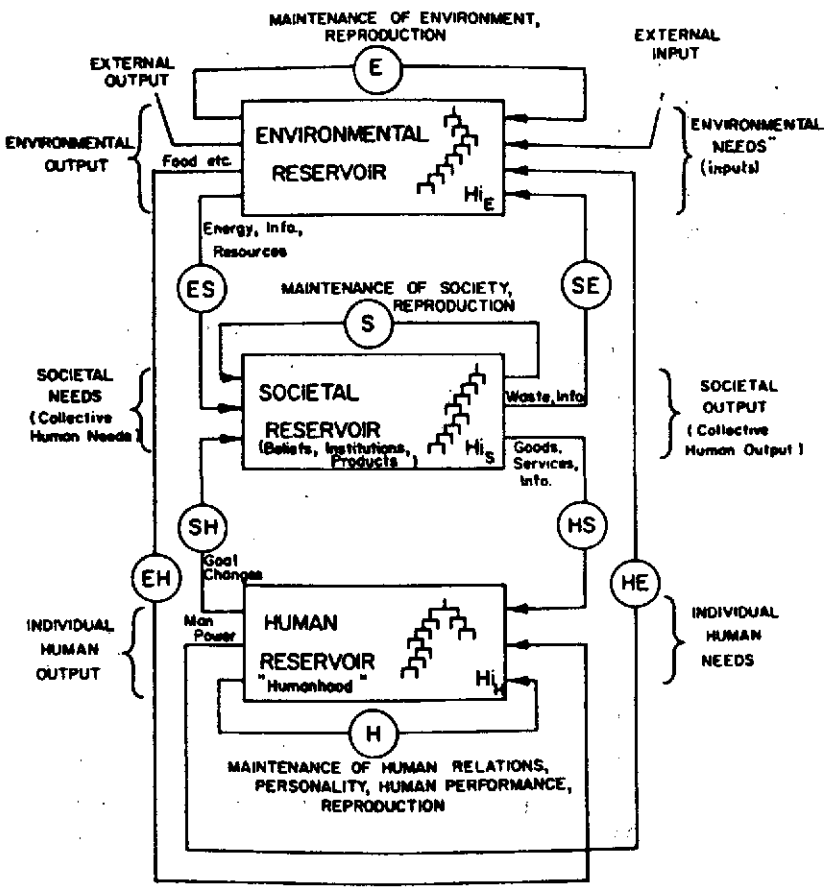


Figure 2.

Interdependence of the three major components of societal organization. The tree-like symbols in each reservoir indicate its hierarchical structure. The output of each of the three reservoirs is required in part for maintenance of that component, and only the remainder is available as input into the other two components. The circles indicate the potential for mismatch between input and output which may lead to stress and instability.



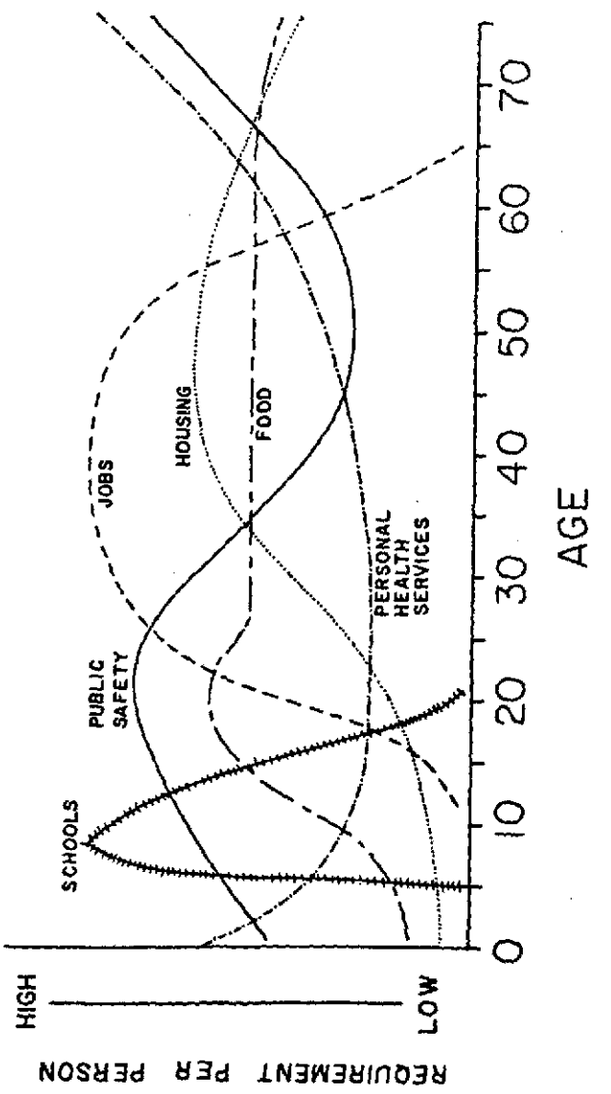


Figure 3.

Variation in Human Service Requirement with Age.

Figure 4.

Impact of Different Societal Sectors on Population Health levels.

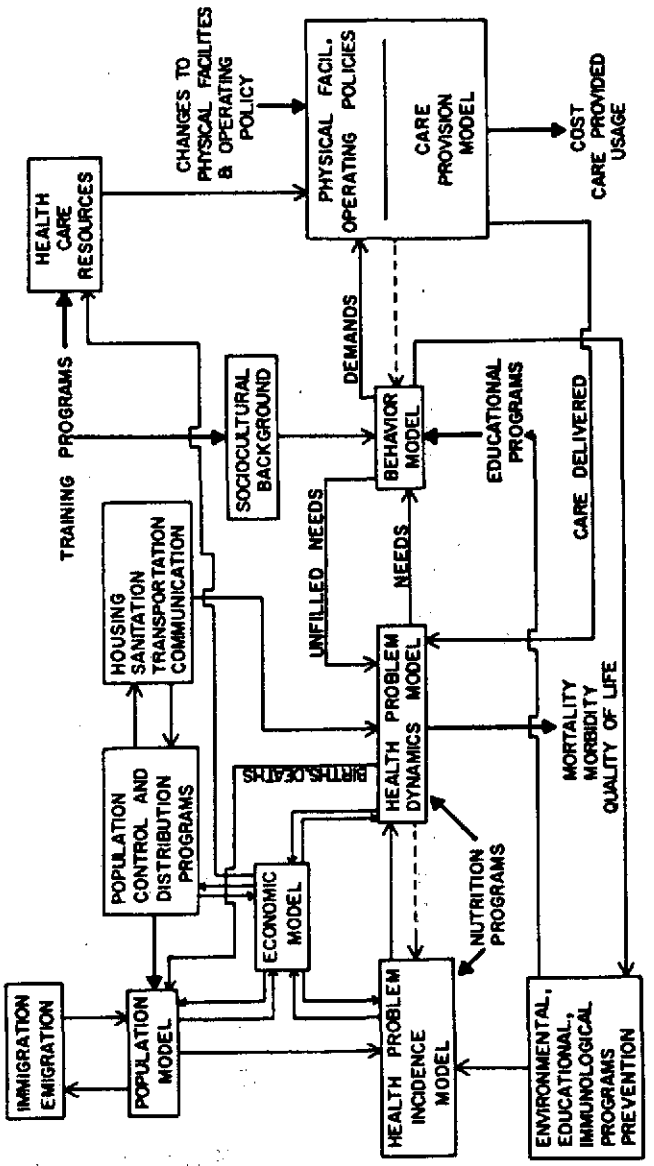


Figure 5.

Relation between life expectancy and per capita gross domestic product for all countries and all two years. Two logistic curves are curves of best fit for 1950 and 1975. Point of maximum curvature was selected as criterium for division between developed and less developed countries. An asterisk represents solitary point and numerals represent number of overlapping points.

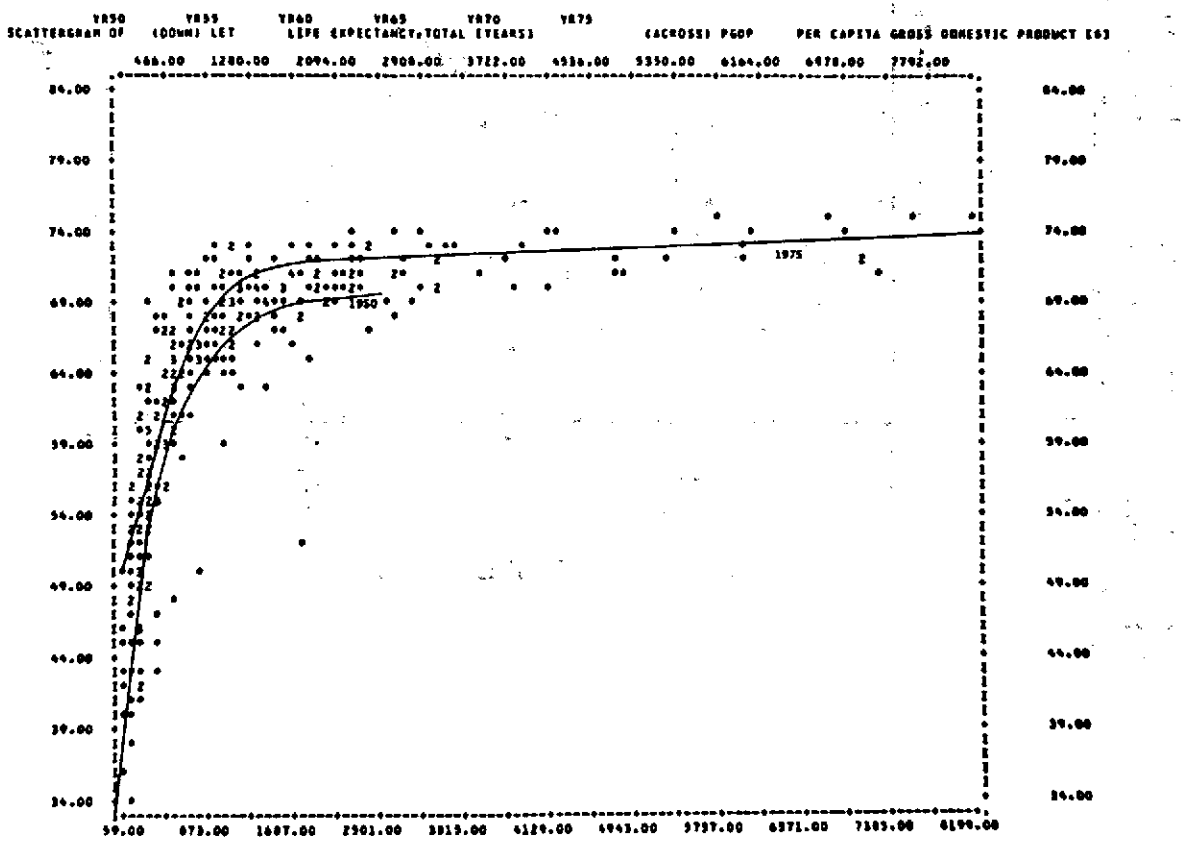


Figure 6.

Change of correlation coefficient between life espectancy (L), infant mortality (I), and per capita calori consumption over time: solid lines are for developed countries (DCs), broken for less developed (LDCs).

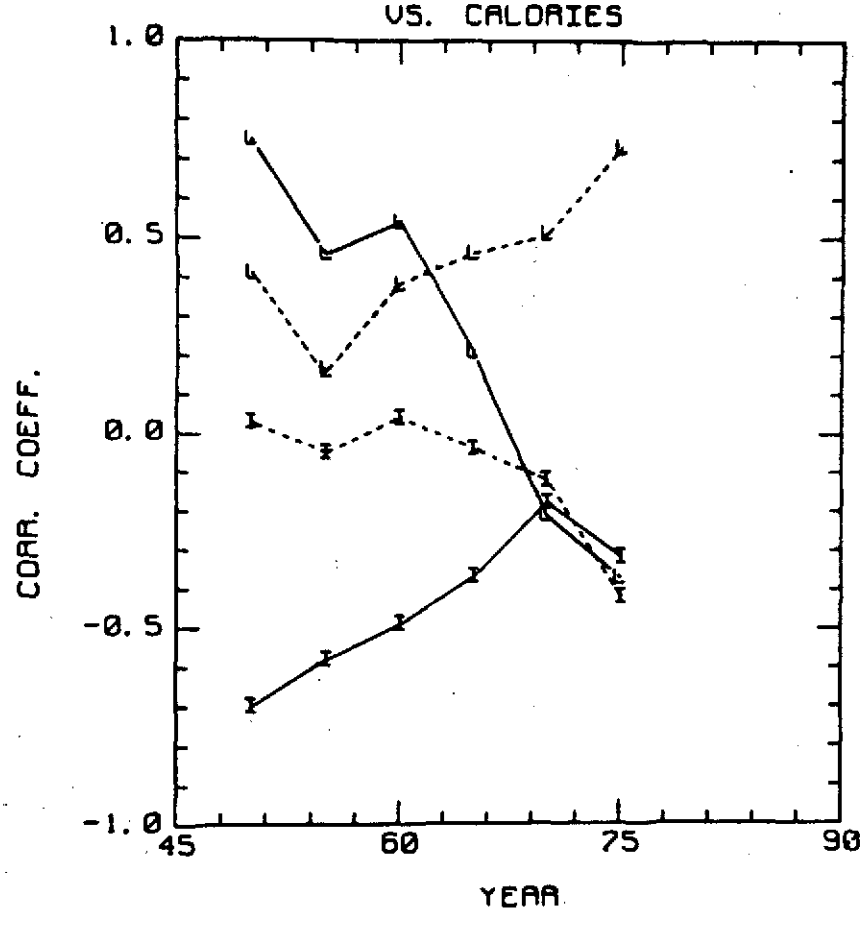
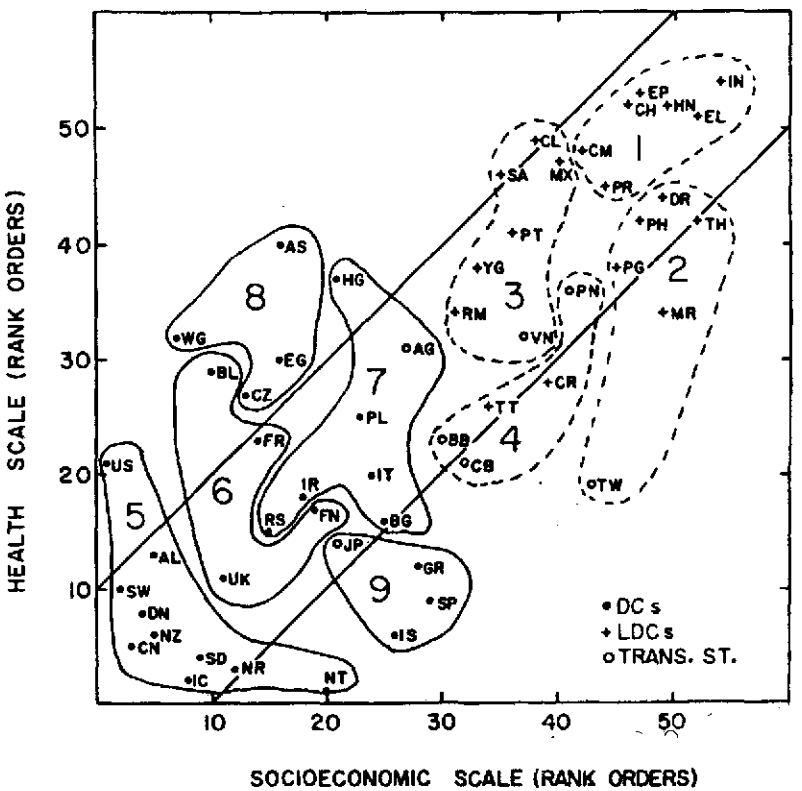


Figure 7.

Ranking of 54 countries along a health and a socioeconomic scale for 1965. Contours indicate the grouping obtained by cluster analysis. The diagonals separate health inefficient (upper left) from health efficient countries (lower right) (See text.)



WORLD HEALTH ORGANIZATION
ORGANISATION MONDIALE DE LA SANTE

DISTR. : RESTRICTED
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ACHR32/94.10

ORIGINAL: ENGLISH ONLY

ADVISORY COMMITTEE ON HEALTH RESEARCH

Thirty-second session

Geneva, 10 - 14 October 1994

Agenda item 8

Annex 5

HEALTH POLICY RESEARCH IN WHO

Health Policy Research

by

Dr Agus Suwandono(*)

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(edited)

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TABLE OF CONTENTS

HEALTH POLICY RESEARCH

PART ONE: AN OVERVIEW OF HEALTH POLICY RESEARCH (HPR)

I. INTRODUCTION

At the nineteenth session of the South-East Asia Advisory Committee on Health Research (SEA/ACHR) held at the Indian Council of Medical Research (ICMR), New Delhi, 10 to 15 April 1993, one of the topics recommended for technical discussions at the twentieth session was health policy research.

The SEA/ACHR suggested that the discussion should cover research for policy analysis, policy development and health planning, with particular attention to the impact of economic development and government policy trends on health.

This working paper prepared for use as a basis for discussion on health policy research at the twentieth session of (SEA/ACHR) consists of four parts. Part I provides and overview of health policy research covering the areas of policy and the health sector, the relationship of health policy research to health systems research, and the potential roles of health policy research. Part II deals with the current and future capacity in health policy research includes a critical review of health policy research in the SEAR, and strategies for improving capacity building. Part III identifies the priority areas for health policy research. Finally, Part IV contains some suggestions and recommendations for the promotion of health policy research in the SEA Region.

II. POLICY AND THE HEALTH SECTOR

Health policy in any country is part of the economic, social and political structure in general, and is influenced by government policy with respect to regional development and its priorities.

The health resources and health care delivery mechanisms of any country require economic support. Since there are many competing needs in a country, there must be a mechanism for deciding the budget and the procedures for channelling money into health sector programmes. Unlike food and shelter, the need for individual curative health care cannot be predicted, and the need for many valuable promotive and preventive services may not even be recognized. Moreover, the ability of the various sections of the population to pay for health services in relation to their needs is dependent on income level.

There are various sources of health finance in developing countries such as public enterprises, voluntary agencies, local community and foreign aid. The precise composition of these sources of health finance differs greatly among developing countries. In most developing countries public financing of health services is below the level required to meet the health needs of the population or a standard suggested by the WHO (5%). These financial deficiencies are greater for low-income segments of the population.

Weaknesses in national planning and budgeting for the health systems also contribute to deficits in health finance. One of the major causes of this weakness is the inability of health managers to convince national leaders of the importance of the health sector in improving productivity and the quality of life of the population. In many developing countries health financing by the private sector substantially exceeds that of the public sector, leading to great inequities in the distribution of health services to the people.

In certain developing countries, the main difficulty in defining the socio-political setting of health policy is in the identification of the principal features of the setting. A socio-political framework that vests greater power in the government leaves little room for private enterprises. This centralization in the general socio-political structure would yield a unified set of controls, standards and management of the health system. Decentralization on the other hand, result in more flexible health policies, systems of financing, controls and programme implementation based on the local situation and conditions. In general, a unified political structure would almost certainly lead to the merging of all health responsibilities, including policies, programme priorities, finances, manpower and management in the Ministry of health.

Health is a major concern to everyone and the improvement in the parameters of human health is widely accepted as a major indicator of development. However, the health sector generally remains a neglected entity in development policy planning. The various ways in which the economic, social, political and other environmental factors interact with health in the context of development have rarely been seriously analysed in depth. Policy makers in the health sector tend to be influenced by the past and present performance of health status indicators, political pressures, policies for national development and the priorities of donors agencies for programme planning for the future.

Health, population and development are inextricably intertwined. Social development for example, requires higher education levels for women, which is one of the principal underlying factors in improving child health and survival. Economic development is generally associated with large population displacements towards urban areas as the foci of economic growth. Cities are more than economic powerhouses; they are social and cultural centres, and each city has its unique character and sense of place. Urbanization can provide more employment opportunities, better education, better housing, better food and better access to health services, all of which contribute to better health. However, rapid urbanization in developing countries can bring with it a large burden of disease and premature death caused by deficiencies in housing, roads, safe water, sanitation, and basic health services. The size of population, its sex and age structure, and its geographical situation as well as rates of change in these variables, will have a significant influence on the health services. Thus, demographic changes can cause transformations in the epidemiological configuration of a community or a country.

An assessment of the likely changes to each component that influence, or are likely to be influenced by health status should be made in order to obtain a picture of future scenarios. These scenarios need to be analysed either component-wise or in relationship with other interacting components,

in order to develop different models that would lead to the achievement of the desired health status of a community or a country. By reanalysing these models, appropriate health interventions and policies can be developed and presented to the decision makers for final selection.

III. HEALTH POLICY RESEARCH (HPR)

A. Health Policy Research, Formulation and Evaluation

Experience suggests that very seldom does the straight inspection of data (even from sophisticated information systems) result in an obvious policy decision (House 1982). It is usually necessary for one or more experts to analyse the available information and transform it to a form useful for decision-makers. Often, a considerable amount of data on the various facets of a problem has to be studied and merged together to provide a composite picture from which a decision can be made or an issue structured. In the field of public health, as the techniques became more sophisticated, and as the quantum of data available increased, a new formal discipline came into prominence: health policy research.

HPR is the application of scientific methods in the formulation of policy options and the description of consequences or implications of each option. HPR may deal with general health policy issues or options on "what to do" as well as with strategic and operational policy issues or options on "how to do". HPR can be done as a proactive or prospective exercise or as a retrospective evaluation/assessment study.

In a proactive or prospective study, HPR is used by the researcher as a process in problem-solving which starts with the identification of a health problem and an in-depth analysis of all the factors related either directly or indirectly to the problem. The results of these analyses are used to develop health policy options to solve the problem. The factors found in the study can also be extrapolated to determine the trend of each or of multiple factors in the future.

Retrospective studies in HPR are usually used for evaluating the effectiveness of health policies which have been implemented. This type of HPR addresses the qualitative implications of a given health policy for accomplishment of specified health goals and objectives. These studies can also analyse the effectiveness of resources allocated and utilised under a given health policy. For evaluating or assessing the implications of a health policy, HPR usually employs certain normative parameters of values. The values or norms used as parameters can be at the global, national, provincial, or district level, or at a combination of different levels. Generally, according to Taylor (1986) in policy analysis the following components should be taken into account: (1) assessment of health needs; (2) production and distribution of health resources in terms of manpower, facilities, supplies and knowledge; (3) broad definition of the organizational structure of the health system; (4) management of health services at community, primary, secondary and tertiary levels; (5) economic support from both the public and private health systems; and (6) evaluation and feedback of the results of health activities.

HPR can be regarded as a subset of Health Systems Research (HSR), and hence the principles, methodologies and approaches of HSR can also be used in HPR. As adopted from the HSR process described by Pathmanathan (1992), the following stages should be carried out to develop HPR: (1) identification of HPR areas of concern, (2) prioritization of the HPR problems and generation of HPR problem statements, (3) formulation of a HPR proposal and protocol, (4) approval and funding of the HPR, (5) implementation of HPR project, and (6) formulation and utilization the HPR results. In all these stages, researchers have to work in close collaboration with the health service managers.

The complexity of health problems and factors affecting them which is the domain of HPR interest, requires the use of methods from various scientific disciplines. These may range from the biomedical and public health sciences to economics, sociology, psychology, management, operational research and systems analysis. In certain cases, HPR may require the implementation of new research interventions in order to sharpen the analysis of the effectiveness of certain policy options. However, in implementing HPR, one may also use the results of HSR, economic, epidemiological, biomedical or other kinds of research. Whatever the methods and type of HPR used, the end product of HPR is the formulation of policy options and description of the implications and consequences of each of the policy options.

The problem then, is how health policy options are formulated to guarantee that the decision-makers will adopt one of the options. Health policy formulation itself is a complex process which is affected by many different factors such as the type of issue the health policy addresses, timing, the number of individuals or groups who will be affected by the health policy and the strength of their influence and the prevailing social, political and economic climate. Thus the complex nature and diversity of framing health policy options makes it difficult to develop generalized rules of effective health policy formulation. On the other hand, a better understanding of the factors that can influence the process and how they do so, would assist decision-makers in both the selection of health policy choices and in achieving more effective health policy outcomes. Health policy formulation also involves the matching of the expected consequences of each health policy option with the goals of health development. According to economic rationality, the lowest cost option would be selected. However, decision-making is often based on value judgements, since there will rarely be a "best" solution which satisfies equally the needs of researchers and decision-makers. The decision criteria which govern health policy selection will include more than just economic variables. In reality, the search for a solution is directed towards finding one that is acceptable to most participants rather than the "best" one. At some point during health policy formulation, the number of alternatives or options is narrowed down through rejection of some proposals and modification or consolidation of others. The emphasis shifts increasingly toward identifying the one alternative option that has the greatest chance of gaining approval from all or most researchers and decision-makers. This is often achieved through the building of coalitions, establishing consensus and achieving majority support. The existence of multiple pressure groups, often with divergent goals, creates the need for bargaining, persuasion, negotiation, personal approaches and compromise so that an acceptable course of action can be worked out.

Health policy implementation involves the framing of rules as well as the development of a tactical plan for operationalizing health policy measures and monitoring them. The tactical plan should specify the actions to be taken, when and in what sequence, by whom, the staff, and financial support needed, and lines of management, authority and communication.

Health policy evaluation first taken place during the policy formulation stage when the effectiveness of alternative policy options is assessed. Evaluations may focus either on policy outputs, on policy outcomes or effects, or may encompass both. A comprehensive evaluation should be directed not only at the costs, benefits and efficiency of achieving intended outcomes, but also at coordination with, or overlap and duplication with other policies and programmes. It is important to ensure that measured changes are the results of the policy under review rather than the result of other factors. Health policy evaluation should involve a multi-faceted approach such as the following: (a) impact on the defined target problem or population addressed by the policy; (b) impact on groups other than the target population; (c) impact on short term and long term conditions; (d) resources devoted to the programme; and (e) the indirect costs of the policy. (Huddart and Ewart, 1985).

B. Input to Health Planning Process

Stark and Nuyens (1992) stated that the ultimate goal of any national health development process is to enable its people to reach a level of health that at least enables them to participate actively in the social and economic life of the community in which they live. To attain this objective, the existing health system and policies must be redirected to achieve equitable reallocation of resources for health - total coverage, increased accessibility to health care services, either promotive, preventive, curative or rehabilitative. It is also relevant to develop appropriate mechanisms to promote effective community participation in simple preventive and curative measures and in the promotion and maintenance of health. Such redirection of health systems may require changes in health-care planning and government policy. Changes can be in the organization and administration of health and related services, in the financing and budgeting of systems and procedures, and in the selection and application of appropriate technology.

During the past decade, conceptual and research approaches to support health development have evolved rapidly. Many of these have been described by specific terms such as operations research, health services research, health manpower research, policy and economic analysis, applied research and decision-linked research. Each of these has made crucial contributions to the development of health planning, but their limited and highly focused approaches to problem solving have resulted in their being integrated within the scope of HPR as a subset of HSR, while at the same time describing their unique contribution to the health planning process.

HPR is ultimately concerned with improving the health of a community by providing a formulation of long, medium and short term health policy options as an integral part of global, national or regional development including socio-economic development. The purpose of HPR is to provide health managers at all levels of the administration with relevant information, data and policy options to solve the problems they are faced with. These inputs are very pertinent in the planning process,

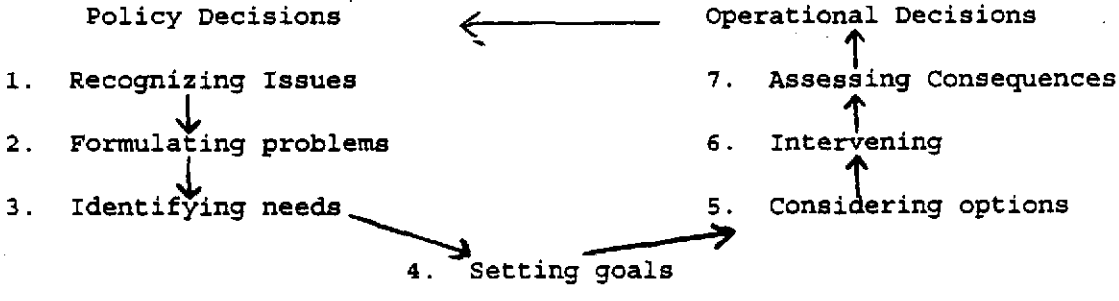
particularly in providing supporting information and data for the analysis of past, current and future health scenarios, strategies, policies and finally for developing appropriate programme interventions.

Planning is simply a process of systematically preparing future activities to achieve certain objectives. The purpose of health planning is to prepare health programmes and activities which will finally improve the health status of the community. To develop a realistic, appropriate, effective and efficient health plan, past health policy should be reviewed and analysed to determine achievements, problems and potentials. The present and future population structure, socio-economic, cultural, political, global developmental and other environmental factors which would influence health status should be assessed, predicted and analysed. The goals and objectives of long, medium and short term plans for development should be prepared and analysed and appropriate health interventions should be developed in relation to these goals and objectives. The proposed health interventions should be analysed and prioritized carefully and the resources needed for the implementation of the interventions should be determined. All the steps outlined above needs support and inputs from HPR.

C. Health Policy Research as a Decision-Making Tool

Health managers in the Ministry of Health are continually faced with the task of decision-making as they attempt to set priorities, formulate policies, implement programmes and readjust their decisions in the course of their work. The decision making process is a series of steps that first focus on policy and then on operational considerations as follows:

Figure 1. Decision Making Process



Source: Brownlee (1992)

At each step in the decision-making process, the use of relevant information can improve the quality and output of the deliberations. Some of the information needed may be available already and assembled easily by the decision-makers, but in many cases additional information and considerations are crucial and may be obtained through the HPR. Adjustment of either policy or operational decisions is needed in order to develop health programmes more efficiently and effectively as well as to maintain their sustainability.

As the decision-maker seeks to pinpoint issues, formulate problems and identify needs, research concentrating on problem analysis may be particularly useful. As managers move on to set goals for programme interventions, studies that identify and analyse alternative programmes may

be of special assistance. Also, when programmes are implemented the consequences must be assessed and research that assesses the efficiency, effectiveness and impact of programme intervention can provide essential feedback.

Based on the above discussion, it could be stated that HPR as a decision-making tool focuses on four major areas:

1. Analyses of the past, current and future trends of possible factors that influence the health status and health system including vision, scenarios and strategies. The results of these analyses can provide a deep insight for decision-making by recognizing issues, formulating problems, identifying needs and setting goals of health programmes for the future.

2. Analyses of the objectives and goals of health development based on the norms or standards decided. The results will stimulate the decision-makers to think about how realistic they are in setting the goals and considering the options of health interventions.

3. Analyses of current policy issues including the effectiveness, efficiency, equity and quality concerns, and appropriateness of the health resources as well as the health management system. The results will provide an understanding to decision-makers on the appropriateness of decisions for developing and managing the health interventions.

4. Formulation of alternative policies and their implications based on other research or analyses Nos. 1 - 3. The decision-makers will then have additional options for decision-making on health policies.

D. Health Policy Research as a Subset of HSR

At the 43rd World Health Assembly Health Research (HR) was defined as a process for obtaining systematic knowledge and technology which can be used for improvement of the health of individuals or groups. It provides basic information on the state of health and disease of the population; it aims to develop tools to prevent and cure illness and mitigate its effects and it attempts to devise better approaches to health care for the individual and the community. Much of the range of this definition is included in health systems research (HSR).

According to WHO (1983) and Taylor (1984), HSR is concerned with finding solutions for the strengthening of health care after considering problems in a social context and will involve the study of populations under various sets of circumstances. HSR has several typical features. It is aimed at improving the delivery of health services, is multi-disciplinary with emphasis on the social sciences, helps to promote the application of biomedical knowledge, uses comparative methods of investigation, provides a foundation for health planning and policy formulation. HSR is focused, not on individuals, but on populations providing or receiving health services, and usually organized in some way. It is generally directed toward solving problems in the organization, management, financing, or delivery of health services, in order to improve their efficiency and effectiveness.

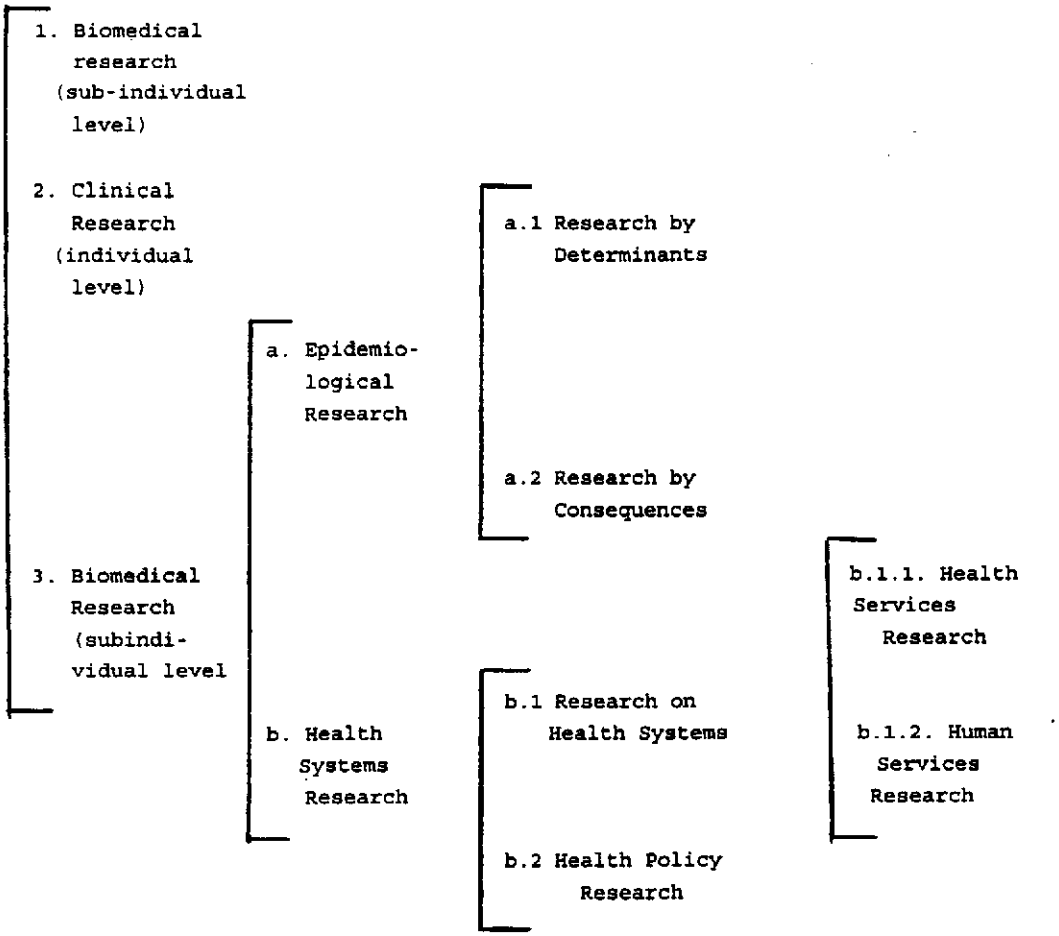
HSR belongs to one of two general types: (1) descriptive and analytical, or (2) evaluative and judgemental. Descriptive research may present the detailed structure and functions of one health programme or institution. Descriptive data may also be gathered by field surveys of populations and certain health problems or practices may then be correlated with particular population characteristics. Evaluative research always involves comparisons between two or more situations, in one of which there has been a specific intervention. Comparison may be within a single setting or on a before and after basis (past and present events or present and future events), between two similar settings or may simply be a comparison with a theoretical standard.

The range of HSR subjects includes the study of: (1) inter-relationships of the health system with the total physical and social environment, (2) the nature and extent of the health needs in a population, (3) the production and distribution of health resources, (4) the components of and the organizational structure of health systems, (5) the patterns of delivery of all types of health services, (6) the management of health systems, (7) the diverse methods of economic support of health systems, (8) the impact of health programmes on populations and (9) the involvement of members of the community in the establishment and operation of health programmes.

Bankowski (1989) quotes Edmund Pellegrino, an American physician and philosopher who describes health policy as a strategy for controlling and optimizing the social uses of medical knowledge and resources. Nagel (1980) describes policy analysis research or policy research in social fields. By combining Pellegrino's and Nagel's descriptions and applying them to the health field, health policy research (HPR) can be defined as the how-to-do-it method associated with determining the nature, causes and effects of governmental health decisions or policies designed to cope with specific social problems. In that sense, the methods of health policy research could focus on: (1) taking health policies as given and attempting to determine what caused them, (2) taking social forces as given and attempting to determine what causes them, (3) taking health policies as given and attempting to determine what effects they have, or (4) taking effects or goals as given and attempting to determine what health policies will achieve or maximize those goals. The Centres Working Group (1990) has also described HPR with similar concepts and definitions as mentioned above.

Frenk (1992) explains that HSR includes two major categories. The first can be called "research on health system organization", which is focused on the micro and intra-organization level of the health system. It studies the combination of various resources for producing health services of a given quality and technological content. Thus, it includes research on health resources and on health services. The second category of HSR is called "health policy research" or HPR, and it is focused on the macro and inter-organizational level of the health system. Its purpose is to investigate the social, political and economic processes that determine the specific forms adopted by the organized health sector. Therefore, it studies the determinants, design, implementation, and consequences of health policies (see Figure 2).

Figure 2. Classification of Health Research



Source: Julio Frenk (1992 b.)

E. Health Policy Research and Its Relationship to Health Economic Research

According to the report of the nineteenth session of the South-East Asia Advisory Committee on Health Research held in 1993 in New Delhi, health economic research (HER) is presented as a subset of HSR or as a separate 'discipline', the substance of HER is the same. HER provides information which can be used to support decision-making at all levels, on how limited resources should be best utilized to improve the health of the communities.

At the national or macro level, HER, deals with prioritization of resources to and within the health and other sectors that affect health in a cost-effective manner within the total GNP/GDP available. At the intermediate and local or operational (micro) level, distribution of resources within the health sector should take into consideration not only the cost-effectiveness but also the quality of life of individuals and communities. As a framework for HER factors to be reckoned with are: on the supply side - health care provided by both the public and the private sectors and on the demand side - consumer needs, including intermediate variables such as choice, awareness, resources and technology.

The assessment of the cost-effectiveness of providing health care, either curative or promotive, can be undertaken by decision-based HER. There may also be a need at the national and local levels to determine the cost-effectiveness of inputs from other non-health sectors, such as education, housing, agriculture, that would cause an improvement in the health status of the community. Some of the operational or micro level research needs to be done at the local level because no one local area is necessarily the same as another.

As mentioned before, HPR is also a sub-set of HSR. However, the emphasis on exploring policy options and their consequences distinguishes HPR from HER, Epidemiological Research and others. HPR simultaneously explores all possible consequences of a given policy option. It analyses the consequences of the option for the accomplishment of the goals and objectives of health development. At the same time, HPR also examines the implications of a given policy on the health system as well as allocation of resources. Beyond the health sector boundary, HPR also assess the implications of a given health for development in general and the interrelationship between health and development. Results of HER can be used for HPR and methods of HER can also be used for HPR.

PART TWO: CURRENT AND FUTURE CAPACITY IN HPR

IV. A CRITICAL REVIEW OF HEALTH POLICY RESEARCH IN THE SEAR

A. Current Knowledge and Work on Health Policy Research

Much of the following critical review is derived from the report of The Centre Working Group (1992). Some information regarding Indonesia has been obtained from the International Health Policy Programmes/IHPP (1933), and International Science & Technology Institute/ISTI (1993). All information collected by these agencies may not be complete, but they give a rough indication of the state of development of HPR in the countries mentioned. A review of an assessment and evaluation regarding the development of HPR in some countries in the SEA Region is given below:

1. Indonesia

Some analysis and research in health policy has been carried out, either by universities or by the Research and Development Unit of the Ministry of Health, in cooperation with the Technical Division of the Ministry. While the degree of the utilization of research results for policy development varied, the fact that the Ministry of Health has insufficient personnel capable of doing policy analyses has been identified as a shortcoming. In order to fulfil the need of health policy research, the Health Economics and Policy Analysis Unit (HPAU) sponsored by USAID was established in 1989 under the Bureau of Planning, Secretariat-General of the Ministry of Health. In 1992 the HPAU was brought under the aegis of the National Institute of Health Research and Development (NIHRD) with the Ministry of Health. The HPAU has now been transformed into a new group called the Group of Research in Health Policy and Resources.

The reasons for conducting HPR activities in Indonesia are as follows: (a) to increase the efficiency and effectiveness of the work of health policy-makers; (b) policy planning and implementation should have a rational and sound basis, including quantitative elements when necessary;

and (c) rapid changes in demography, epidemiological, socio-economic, health technology and other fields related to the health sector are currently underway, all of which require continued situational analysis.

Every unit in the Ministry of health (from the central office down to the provincial office) and National Development Planning (central and provincial office) should have the capacity to do health policy analysis.

The issues of national health policies that demand immediate actions are as follows: (a) inequitable distribution of health services; (b) the low quality of services; (c) centralization versus decentralization of health services delivery (involving planning, budgeting and related laws and regulations); (d) the need for adequate planning for health-related human resources; (e) progress toward an adequate distribution of the roles for the delivery of health services between the government and the private sector; (f) over-priced and inadequately distributed drugs; (g) appropriate implementation of health protection among workers; and (h) appropriate cooperation among ASEAN countries on several health areas.

There are some health policy analyses and research being carried out at present. Examples of HPR carried out since 1989 are: (a) The Health Trend Assessment in Indonesia, an input for the Second Long Term Health Development Plan in Indonesia (1994-2018); (b) The Cost of Analysis of Health Centres in Indonesia; (c) The Cost Analysis of Village integrated Health Posts or "Posyandu"; (d) The Review of Existing Policies of Ministry of Health; (e) The Health Transition Analysis in Indonesia; (f) The Disease Priorities Cost effectiveness Study in Three Provinces; (g) The Policies of Public/Private Mix in Indonesia; (h)The Development of Policies in Village Health Assurance in Indonesia; (i) The Evaluation of Policy by Representative of Ministry of health Office at District Level; (j) The Development of Research Information System Networking in Directorate General of community health in Indonesia; and (k) The Implications of Health Law No. 23/1992, Insurance Law and Assurance of Social Protection Law.

Beginning from May 1993, the International Health Policy Programme has assisted the NIHRD in capacity-building of the Group of Research in Health Policy and Resources through the development of Health Policy of Urban Poor in Two Biggest Cities in Indonesia.

2. Thailand

Health status in Thailand has been improving, and the pattern of health problems is in transition. However, there are a number of inadequacies in the formulation and implementation of health policy, including the division of responsibility for policy among multiple agencies, and the absence of any mechanism to link policy-makers and researchers.

Since the advent of modern medicine in Thailand and the building of the first hospitals, hospital coverage has expanded to the point where each province has at least one hospital, and a hospital for each district is an explicit goal. Private hospitals are on the increase. Primarily health care is provided through health centres at the sub-district level.

The government share of total spending on health fell from 30.3% in 1977 to 24.1% in 1986. During the same period, health expenditure rose from 3.4% to 5.7% of GNP, and the use of third party payment mechanisms is increasing. For these reasons, there is a need for development of a national health policy, to cover both the official and unofficial sectors.

Since the private sector accounts for a proportion of health services delivery, there is a difference between national health policy and the policy of the Ministry of Health. Since not all health services are provided by the governmental sector, there is no unity of planning and targeting of health services for the whole country.

Health policy is supposed to be integrated into National Economic and Social Development Policy or NESDB. In practice, the health sector is not yet fully integrated into the socio-economic context of the National Plan.

Health policy is formulated by policy-makers and civil servants based on real or perceived health needs of the people, using available data. Since this information is often deficient, policy-making may in practice be based on past experience or intuition.

The government does not draw heavily on research in support of policy-making; most researchers and research institutions are not policy-oriented. Few channels exist to make available to the Ministry the results of HPR undertaken.

There are several existing institutions for such activities. A major presence in the field is the Centre for Policy Studies at Mahidol University, which conducts work in the health sector. There have been numerous interactions with the MOH, but improvements are still possible in defining the research agenda, in absorbing and utilizing critical findings, and in timely response to findings. Thammasat University has developed expertise in health economics and has an ongoing relationship with the Ministry's Planning Division. Chulalongkorn University is also active in the broad area of health economics, and collaborates with WHO and INCLEN. The National Institute of Development Administration has been involved in policy studies, and some work has been done in health policy by the Thailand Development Research Institute. The MOH also conducts research internally; and the Rockefeller-supported national Epidemiology Board has organized studies.

In general, most health policy research to date has been conducted by health economists, and the view has been expressed that there should be more interdisciplinary work, as well as inter-institutional linkages. Short courses have been offered in the past by the MOH's Planning and Training Divisions, and a short course in health Economics is offered by Thammasat University. Chulalongkorn has introduced a Master's degree in Health Economics.

3. **India**

As early as 1946, the Bhore Committee report stressed improvements in primary health care emanating from preventive care and from housing sanitation and water services. However, it set ambitious targets, which were not subsequently attained. The Mudaliair committee of 1959 assessed progress of two five-year plans of the intervening years, and partly as a

result of its two five-year plans placed a stronger operational focus on the provision of health services and on coverage. The emerging strong presence of vertical programmes necessitated greater efforts to link programmes. In the late seventies, it also became apparent that more coordination was needed to integrate the voluntary and private-sector providers of health with the public machinery. These non-governmental providers came further to the fore as a result of the propagation of the Alma Ata Declaration within India.

In the study carried out by the Centres Working Group in 1989, it was found that terms such as policy, planning, analysis and research were not always synonymous in decision makers' minds with conventional definitions. Policy could include intentions, goals, guidelines and strategies. Central policy-makers tended to feel policy could only delineate intent, whereas state-level officials defined it more in terms of operational guidelines. A minority of interviewees focused on the need for and use of information. Policy formulation in the Indian context was seen to be part of a formalized five-year planning process. After policy is formulated, time and financial constraints have to be taken into consideration.

Health planning occurs at the central level and is not followed by formation of an action plan. Budgets and targets are then transmitted to the state and district levels. Policy analysis, diverges still more from the conventional Western definition. It is conducted only in the Planning Commission. Policy research was understood to mean an variety of things, although most agreed it was applied and could or should influence policy formulation. Health policy is focused on supply of health services rather than on the frequently evoked principles of equity, participation and empowerment. The national health policy is well conceived, but the operationalization process of policy is reduced to the distribution of meager resources. Health policy-making would benefit from greater multi-sectoral inputs and coordination than currently the case.

There is a lack of necessary information and data collection is poorly coordinated. This is a major impediment to policy analysis. On the research side, there appears to be a preference for expensive large-scale multicentric studies which seldom produce timely results. Research is under-funded and a number of issues in need of evaluation are "off-limits" for political reasons.

Many aspects of health policy are entrusted to other Ministries such as Public Works or Social Welfare. Dissemination of policy directives is partial and unsatisfactory. Funding comes both from the national and state level, and the priorities of the two sources may differ. Health status and service quality differ considerably between states.

In the area of policy implementation, a number of problems were identified, including the role of hierarchy, targets, lack of feedback and lack of accountability. India has a very extensive infrastructure for health services delivery; however, it could be more effectively used. Despite the decision to develop a multipurpose health services delivery approach, various vertical programmes were subsequently introduced. Constant changes in policy goals and objectives require frequent and wasteful readjustments. Better management skills and practices are needed,

and a better system for two-way flow and use of information should be introduced. NGOs which have great potential to contribute are not effectively integrated into the state sector.

Evidence supporting the impact of interventions on policy was sought. There is evidence that the consultation of a panel of experts in support of National Health Policy have influenced policy making; indeed, if such meetings were more frequent and more diverse, greater benefit might accrue. State health officials should be more involved in decisions affecting their state. The evidence suggests that large-scale research projects have not influenced policy, and that the findings are neither widely known, nor designed with policy issues in mind, nor presented in a form usable to policy-makers. It was conceded that the expected benefits from decentralization had accrued less to the health sector than to three other sectors which had also been decentralized, perhaps because communities felt less well-equipped to take over responsibility for an area entailing much specialized knowledge. Links between policy-makers, health administrators and researchers appeared to be weak at all levels.

More and better information is needed by policy-makers; and greater incorporation of public opinion is needed for improved policy-making. When policy analysis is undertaken, papers should be distributed and comments solicited. Administrative services staff should be rotated less frequently and less arbitrarily, in the interests of better policy-making. Any institutions developed to improve health policy research and training must assist in improving health panning at the state level too.

There needs to be a diversification of health policy research energies away from large multicentric studies. There also needs to be a greater incorporation of the public's voice into the policy-making process. There are several networks of health professionals; what is required is their mobilization and cooperation, for example in order to play a public advocacy role. Health education policy in particular is in need of improvement.

The Indian study, with its focus on interlinking existing institutions and networks, and on ultimate improvements of health delivery, preferred the terms "forum" or "initiative" to "centre".

B. Problems or Deficiencies and Potentials in the Current Strategies and Approaches to health Policy Research in the Region

Several problems are still identified in the current strategies and approaches of HPR. Some important problems are as follows:

1. Lack of understanding of the concept of HPR among the researchers. this may be due to the fact that they do not understand; they do not want to understand or that the concept itself is still unclear. Some researchers still misunderstand the concept of HPR, and especially in relation to HER.

2. Insufficiency of resources to carry out HPR. There is an insufficiency of researchers both quantitatively and qualitatively in implementing HPR. At the provincial and district levels, it is very rare to find HPR units or researchers who are familiar with HPR. Computer facilities, supplies and other infrastructure support for

HPR are deficient in many developing countries. A budget for HPR is often unavailable or if it is available, it is inadequate to implement effective HPR studies.

3. Inadequate support for HPR from decision-makers. In some cases, poor communication between decision-makers and researchers has been identified as one cause. However, in some other cases, the decision-makers do not appreciate the value of HPR results particularly because it takes time and the processing of results is difficult.

4. Inadequate knowledge of the methods used in HPR and lack of guidance in implementing HPR, analysing the data, formulating the policies and in formulating the policy options for use by the decision-makers, especially in terms of prospective HPR, (e.g., health trend assessment).

5. Lack of relevant information or data and if available, the poor quality of the available information and data to be used for HPR.

6. Lack of a networking system for HPR among the researchers, research institutes including the universities and between the researchers or research institutes and the decision-makers.

7. Lack of an agenda for promotion and development of HPR.

8. The desire of some donor agencies to promote some of the health programmes or packages is often more convincing and acceptable to health managers as compared to the use of HPR.

However, the potential for promoting the use of HPR exists. These include among others, increasing the awareness of the decision makers to the uses results of HPR for improving the health programmes. The development of some networks is expected to contribute more towards the development of HPR.

V. STRATEGIES FOR IMPROVING CAPACITY IN HEALTH POLICY RESEARCH

A. Training and Staff Development

One of the main reasons for the current lack of HPR is the shortage of trained personnel with appropriate technical skills and field experience. This is not surprising, since HPR is essentially a new field which is till drawing together the multiple disciplines which can contribute to it. There is also a continuing need for fora to sensitize political leaders and administrative decision-makers on the potentials of HPR.

The tremendous need worldwide for competent research workers in the field of Health Policy means that a major educational effort is required and this must be carried out through several parallel mechanisms. A HPR unit needs personnel adequately trained in Health Policy and Public Policy as well as in the fields of Health Economics and Health Planning. At least one or two staff members of such a unit should be trained in public health fields such as epidemiology, biostatistics, population dynamics, nutrition, environmental health, MCH, medical anthropology, occupational and industrial health, public health education, public health administration,

hospital management, health information system, future health, computer application in health, etc.

Short training courses in the fields of HPR, HSR, Health Economics Research, Health Planning Research, Future Health Research and Advanced Epidemiology as well as Anthropological Research are needed to develop manpower for HPR. Short training courses for decision-makers and routine meetings of decision-makers and researchers in HPR are also needed.

B. Institutional Development, Including the Establishment of Networks

1. Institutional Development

Due to its importance, a unit or a group that is responsible for HPR should be created. There are various places where the unit could be located based on the needs, situation, bureaucratic system and the benefits expected from such a unit. However, since there is usually a Health Research and Development Division in the Ministry of Health, it would be strategic to locate the unit in this division. The major benefit of such a move is that it would stimulate the division to become more functional and recognizable in the Ministry of Health and among the National Policy institutions. A major weakness of such a placement is that the input from this unit will not be directed to the decision-makers in the Bureau of Planning or the Secretary General of the Ministry of Health.

In order to solve the above major problem it is desirable to develop a national network for HPR and other Health Research. The functions of this national network should be: (1) to collect information regarding HPR and other health research carried out by the universities, implementing units and others; (2) to incorporate the results and information so collected in the d-base system; (3) to obtain information from the decision-makers on their major needs for policy changes or development as well as for solving new issues by using research; (4) to do quick but clean review to ascertain the needs of the policy makers and a situation analysis of the health status and the factors influenced by health status; (5) to provide health policy options to the decision makers based on their needs; (6) to develop a specific health research agenda for HPR; (7) to seek financial support to implement the research agenda; and (8) to select and delegate to the network members priority areas for carrying out HPR.

This network should have a Secretariat to coordinate all of its activities. The Secretariat should preferably be in the Research and Development Division of the Ministry of Health. The Indonesian system can be an example for such a network (Figures 1 and 2 of Annex). In Indonesia, the Secretariat has linked the decision-makers directly to the 'Think Tank Group' which consists of representative of decision-makers in the Ministry of Health, researchers from the Ministry of Health, Universities and Professional Organizers.

In Indonesia, the responsibility of developing and conducting HPR is vested in the Group of Research in health Policy and Resources, under the Centre of Health Services Research and Development (CHSRD), National Institute of Health Research and Development (NIHRD). This Group consists of 15 researchers, four of whom hold doctoral degrees in Public Health Policy, Population Dynamics, Population Planning and International Health. Five of the researchers have master's degrees in Public Health

Administration, Epidemiology and Nutrition. The other researchers hold Bachelor's degrees in Biostatistics, Political Science, Management, Economics and Dentistry.

2. The SEA HPR Network

With the encouragement of IHPP, attempts have been made to establish the SEA HPR Network. The IHPP developed the Centres Working Group in the late 1980s. This group prepared and important document on the development of SEA HPR Network. At a meeting in Bangkok in 1992, that plan and the formation of the network were discussed. However, this meeting was attended only by the representatives of the Philippines and Thailand. At the fifth annual meeting of IHPP in Cuarnevaga, Mexico, in 1993, the South East Asia (SEA) countries sponsored by the IHPP agreed that it was important to establish this network. The coordinator would be Thailand and other countries such as Indonesia and the Philippines would be members. It was agreed by the SEA countries that to begin with, the activities of the SEA HPR Network would be restricted to exchange of information on HPR activities in the Region, especially in the field of Health Economics Research. However, to date the establishment of this has not yet been completed.

C. Development of Systems and Software

It is important to develop HPR systems and Software to support the implementation of HPR. The HPR system that is developed should be based on the agreement of the decision makers and the heads of health research institutions. For example, in Indonesia, as mentioned earlier, HPR will be a sub-system of the national Health Research and Development Network. This will cover research institutions - government, private or non-government organizations, implementing units of health programmes (national and provincial), health professional organizations, universities (national and provincial) as well as related health research institutions from other Ministries. This system will be attached into the global health information system developed by the Centre of Data in the Office of the secretariat General of Ministry of Health. The first activity will be development of data-base software of health research. The second activity will be the development of the national network for health research and development. The third activity will be the compilation of data on health research related to health policies and of health policy directives issued by the Ministry of Health. The fourth activity will be an analysis of the health priorities, based on which the health research agenda would be developed. The fifth activity will be formulation or modification of health policy based on the analysis resulting from the fourth activity. The sixth activity will be presentation of health policy options to the decision-makers.

The software development has been carried out by the group of researchers who are familiar with data-base systems and Clipper systems. Another important component is communication software. Due to the rapid improvement of information and communication systems, there is plenty of communication software that can be used for exchange of information through the computer.

PART THREE: PRIORITIES IN HEALTH POLICY RESEARCH

Since, the priorities for HPR vary from one country to another, a set of criteria should be developed to determine priorities. For example in Indonesia, there are several criteria for choosing the priorities of HPR, which include: (1) High priority problems to reduce mortality, especially for reducing IMR and MMR; (2) HPR problems commissioned by programme officers either inter-programme or intersectoral; (3) HPR on areas which cover a large population; (4) Areas that are threats to achieving the objectives of national health development; and (5) Production of efficient, appropriate and effective interventions with an intersectoral approach, considering future perspectives and involving a relatively short time. The following topics are suggested as priorities for HPR. However these topics are not based on the criteria developed for Indonesia, but are based on the author's judgement after studying the literature and on the author's experiences.

A. ENVIRONMENTAL/SYSTEMIC FACTORS INFLUENCING HEALTH POLICY

1. Long and Medium Term National Development Policies

The long and medium term national development policies have a very significant influence on health policy. It is important for the HPR unit to provide information based on the analysis of past and future health situations as an input for decision-makers in health programmes, to enable then to understand and use the information in the development of national development policies.

2. The New Paradigm of Public Health Action

The relationship between health and development is not a one-way process. The contribution of health to economic development is of equal importance in the analysis of this relationship. Theoretically, the impact of health on economic development works through the paths, shown in Figure 3.

a. Health status will influence labour supply for three main sectors of the economy: agriculture, industry and services (paths A and B).

b. Health will also affect consumption (expenditure) by the government, business and households (path D).

c. Paths A and B will influence the level of savings, which further affect the level of investment mentioned in path C (in agriculture, industry and services).

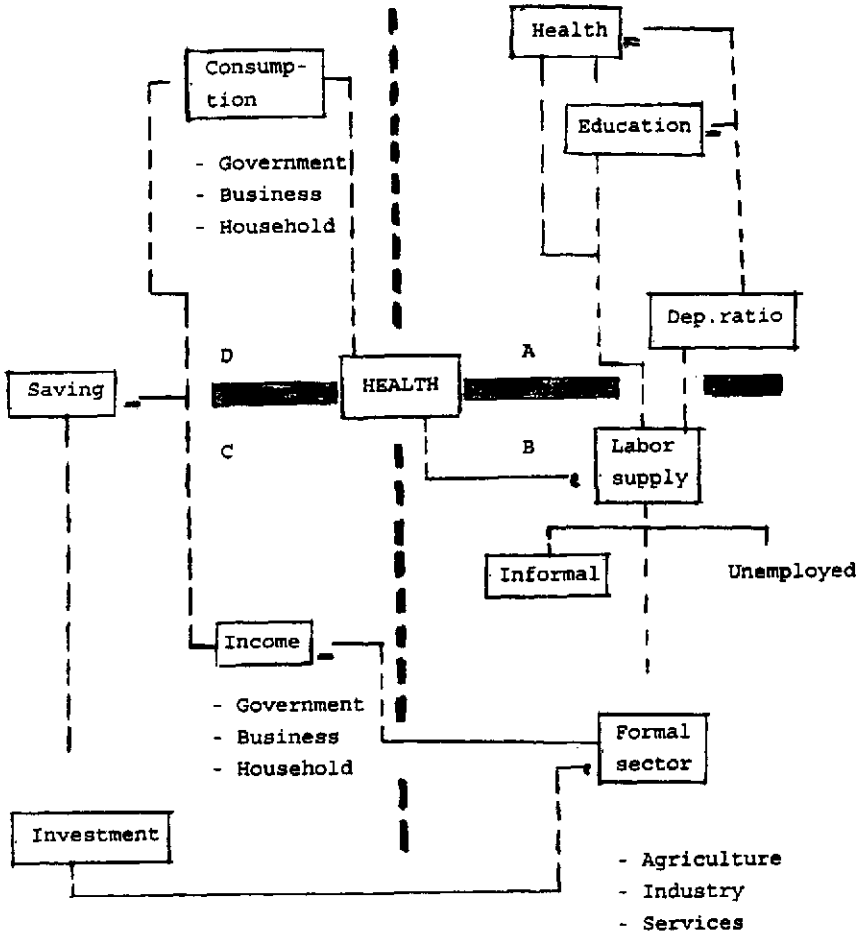
d. Health will also affect human resources development (education and health of the children).

In establishing a strategy for national development, attention must be given to the interaction, interrelation and interdependence of the above factors in order to secure the goal of national development.

In the future, the development of technology will continue to have a major impact on health services. The use of advanced technologies such as nuclear magnetic resonance imaging, lithotripters, radiotherapy equipment

and other computerized medical equipment will change the manner of diagnosis and treatment of patients.

Figure 3. The Interrelationship of Health Status and Factors May Influence Its Level, Pattern and Distribution



New developments will also change prevention and health promotion activities. Although not as dramatic as the hard technological developments, these changes will have an impact on activities to control hypertension, coronary heart disease, cancer and certain mental illnesses. In some developed countries, new preventive and promotive efforts have successfully decreased deaths due to these diseases.

Future developments will be accompanied by greater concerns for the cost and efficacy of those technological developments. There is a growing awareness that technology which is "ineffective, superfluous, inefficient or unsafe" contributes significantly to increasing the cost of health care. Technology assessments might improve the allocation of scarce resources in health, directing resource to those technologies and programmes proven safe and effective.

All of the above developments will have to be analysed to answer the health policy questions concerning:

a. who will have access to new technological developments?

b. to what degree will the decision to use new technology be decentralized?

c. what effects will new technology have on the provider-patient relationship?

d. what new ethical considerations must be addressed?

There is the need to give consideration to the interaction between development, environment, population and health - the 'health perspective'. The sustainable development concept stated by the World Commission on Environment and Development stresses the importance of equality among these four components of development. Inequality of one component will cause instability among the other components.

There are two challenges which must be addressed. The first is to develop appropriate instruments to assess the health impact of activities, that can be integrated in the analysis of environmental impact. The second is to improve the capability of the health sector to carry out monitoring, coordinating and information functions with regard to the other sectors of development.

The ability to make projections and develop health problem scenarios in the context of development remains problematic. The relationships between health and other factors beyond the health sector must be identified and understood in order to develop the future scenarios. Improvements in health information systems should be a priority to avoid inconsistencies and low quality of data. Health developmental activities should not focus only on existing problems, but should adopt a more prospective approach towards emerging problems.

Under the new paradigm of health development, equity of role and function between government, private organizations and the community must be further explored. Dependency on the government in health development will cause a distortion of development budgets for other sectors. The important issue is to differentiate the role of financing and the role of health services delivery in each of the components mentioned above.

Another concern is a consideration of the potential of community health systems; traditional/community health systems hold potentials that need to be explored and developed as warranted. All of these new paradigms need HPR in order to develop appropriate health policies for developing countries.

B ISSUES RELATED TO HEALTH STATUS

1. Conventional (Mortality & Morbidity) Health Status

Conventional health status which consists of mortality and morbidity will influence the health policy and health programmes in a country. The high IMR and MMR will necessitate an extensive and intensive programme of MCH, immunization, nutrition, environment health, communicable disease control and family planning. Although the information on mortality can be obtained from the Population Census that is usually carried out in each

decade, a National Health Household Survey needs to be carried our every three to five years in order to obtain more details on the causes of death, morbidity patterns and specific trends of mortality as well as morbidity. This community-based data is needed as continuous base line information and as an input for HPR, particularly to asses whether the persistence rate is increasing or decreasing and whether a new pattern is emerging for certain diseases. The quality of the data obtained through the National Health Household Survey is expected to improve due to the frequent experiences in conducting these surveys.

2. National and Regional Health Trend Assessment

Some countries in SEA have developed national and regional health trend assessments. These assessments show some transition and transformation of several factors influencing the health status. The factors are mainly demographic, epidemiologic, environmental and socio-economic. The transition and transformation of these factors provide some challenges which necessitate a reorienting or restructuring of health development in SEA. These challenges, of course, need to be supported by a more in depth and continuous analysis of health trend assessments. Finally the results should be formulated into health policy options which need to be presented to the decision-makers.

3. New Health Indicator

Most assessments of the relative importance of different diseases are based on how many deaths they cause. This conventional health status indicator provides some benefits through a routine statistical analysis of mortality. However, many diseases or conditions that are not fatal, are responsible for loss of healthy life - e.g., chronic depression and paralytic caused by polio. To quantify the full loss of health life, the World Bank and WHO (1993) undertook a joint exercise on the 1993 World Development Report. The quantitative measurement used in the exercise was called DALY or Disability Adjusted Life Years. Assessment of DALY in the future may prove to be a very important measurement as the results will provide information for policy formulations which may affect health policy development in SEA countries.

C. ISSUES OF ACCEPTABILITY AND AFFORDABILITY OF SERVICES

1. Issues of Equity and Quality

The concept of "Health For All by the 2000" includes a call for equity in health care. However, in addition to equity, the issue of appropriateness, efficiency, efficacy, affordability and acceptability are now being raised. These issues are usually know as the issues of quality or quality assurance. One of the functions of HPR is to solve the problem of equity on the one hand and the issue of quality on the other hand.

2. Issues of Sustainability

Thousands of health programmes and activities have been established and carried out by developing countries in order to pursue the goal Health For All by the Year 2000. Most of them use the primary health care approach which is characterized by community participation, inter-programme and inter-sectoral cooperation as well as comprehensive approaches.

However, most of those programmes are not well integrated. In other words, the sustainability of those programmes is very low. Health policies to stimulate the sustainability of those programmes are needed in order to achieve the goal of primary health care in developing countries.

D. NATURE AND PROVISION OF SERVICES

1. Public-Private Mix

Many governments, recognizing their incapacity to finance and administer comprehensive health services for whole populations, are viewing nongovernmental agencies with new interest. In the past, the roles of the private sector and other nongovernmental agencies were relatively neglected. Effective coordination of the activities of these agencies by government has often proved difficult. Regulation by government has sometimes been counterproductive, particularly when government financial regulations conflict with the way in which other organizations wish to manage their resources. Falling real wages in the public sector, increasing costs of imported goods such as pharmaceutical, vehicles, fuel and medical equipment, and a growing dependence have caused many governments to review their role and relationships with nongovernmental health agencies. Three broad areas of innovation which have been tried in countries at all levels of health development are: (a) changes in pattern of health financing; (b) changes in health care provision; and (c) changing approaches to health regulation. These will influence health policies at the national or regional levels. These changes need HPR to provide appropriate, effective and efficient health policy formulation.

2. Decentralization

Decentralization is another issue which could be solved by HPR. This issue is important in balancing the authority of national, provincial and district offers as decision-makers at each level of the bureaucracy. This is considered an important issue because decentralization is easy to discuss but difficult to implement. The difficulties are related to the issues of political power, readiness of the lower levels to accept new responsibilities, willingness to release some of the bureaucratic powers from the national level to the lower level and so on.

3. Urbanization, Poverty and Primary Health Care

The success of development in the South East Asia Region has had various impacts, one of which is urbanization. Urbanization can provide human resources in the urban areas, on the other hand it can also be a burden as it is accompanied by rising requirements such as health services, clean water, food supplies, housing, etc. In the context of socio-economic development, the population dynamics of urbanization should have a beneficial effect on urban development. Health is one of the main prerequisites for urban people to lead a productive life. Equity, quality, efficiency and community participation for health development in the urban areas, should be a serious concern to those involved in health planning in the future. Policies for health development of certain population groups in urban areas, particularly those who really need such services, should be considered as one of the main priorities for health development programmes in urban areas during the next period of development.

The issues of poverty still exist in most developing countries. Health is one of the factors that influence social development and has a serious impact on the quality of life. Poverty will result in a low health status of the community. Although the primary health care approach has been carried out for almost two decades, it appears that this approach has not been uniformly effective. This is another problem that should be addressed by HPR.

PART FOUR: CONCLUSION AND RECOMMENDATIONS

HPR or health policy analysis (HPA) is the application of scientific methods in the formulation of policy options and description of consequences or implications of each option. HPR can be used a process for problem solving which ends with policy recommendations as well as a process of evaluation or assessment of the implications of health policies.

HPR makes use of two main approaches. The first involves a retrospective analysis of policy issues which attempts to identify the circumstances, the authors, the interests, the conflicts and the outcomes, with the benefits of hindsight, to draw inferences about what happened and why, in order to gain insights which may benefit future policy development. The second approach forms part of the policy-making process itself where insight gained from retrospective analysis together with active analysis of existing policy options and their consequences are used to shape current policy considerations. Future trend assessment, vision, scenarios and strategies of national development and health status can be used to enrich the long and medium-term health development plan in order to sharpen the long-term and medium-term health development policies and objectives.

Some experiences, problems, potentials, plans for capacity-building and identification of health research priorities have been discussed in this paper. Its purpose is to serve as a basis for discussion in the SEAR meeting in April 1994 in Yogyakarta. Some recommendations which may be considered by SEA/ACHR are given below:

A. To WHO/SEARO:

1. WHO should encourage Member States to develop and carry out HPR in order to strengthen their health policy analysis and basic health planning and programme development;

2. Technical guidance should be provided and experts in HPR should be supported and assisted by WHO as and when needed;

3. Budget assistance from WHO or other donor agencies should be sought by the countries to develop HPR capabilities;

4. The experiences of other countries in conducting HPR should be shared; consideration should be given to the establishment of WHO collaborating centres in HPR in SEA.

5. WHO should arrange for internal and external training of researchers for HPR development;

6. Political commitment for the use of HPR in strengthening the planning process should be fostered by WHO;

7. WHO should provide encouragement to the Schools of Public Health and Schools of Medicine in the Region to develop HPR courses for their students in order to produce high quality health manpower who would be able to appropriately carry out the HPR.

8. WHO should involve professional health and medical organizations in promoting the use of HPR as a tool for the development of better health planning.

B. To Ministries of Health:

1. The Ministries of Health should encourage HPR in order to provide better inputs to health programmes and health plan development. They should also assist and encourage the development of HPR ability at national, provincial and district levels;

2. Expertise and guidance for HPR in health programmes should be developed as needed;

3. Ministries of Health should encourage the establishment of an integrated team consisting of researchers and relevant resource persons from appropriate sectors/institutions to conduct trend assessment on a regular basis, to provide valid and reliable data for the planning process, programme implementation, monitoring and evaluation;

4. Coordination and consolidation of health policies, planning, implementation, evaluation, and research should be promoted without delay at national, provincial and regional levels;

5. The essential areas, among others for HPR to support long-term health development period are as follows:

   - Analysis on health policies in relation to the national socio-economic development policies;
   - Analysis of epidemiological trends and factors influencing health as well as the epidemiological transition from infectious disease to non-infectious diseases;
   - Analysis of health policy expenditure and finances;
   - Analysis of health policy manpower;
   - Operational research for policy development for advanced PHC programmes;
   - HPR on biotechnology in support of health programmes;
   - Policy research in reproductive health;
   - Policy research in MCH development (IEC, integration, growth and development);
   - Policy research in occupational health;

- Policy research in hospital self-financing;

- Anthropological research regarding socio-cultural factors that influence the sustainability of community based health programmes including traditional medicine;

- Policy research on quality of life indicators;

- Surveillance of malaria, tuberculosis and other persistent communicable diseases (including epidemiological research for other high risk communicable diseases);

- Evaluation research regarding policies and implementation of 'international non-proprietary name drugs' programmes;

- Conducting National Household Surveys; and

- Cost effectiveness and disease priorities research.

7. National health research is a critical tool for addressing issues of equitable health and development. Therefore it is recommended that Ministries of Health should assess their own capabilities and operations, making careful plans for carrying out sustained, long term programmes for building research capacity and implementing the essential national health research agenda;

8. Ministries of Health should build research capacity for implementing the essential national health research. In this context, there is a need to:

- invest in long-term development of research capacity of individuals and institutions especially in neglected fields such as epidemiology, trend analysis, health policies, social policy and health systems research;

- set national priorities for research which relate to the needs of programme executives and the community and which supports sustainable development;

- accord professional recognition to good research endeavour and to establish career paths as well as institution networking to attract and retain qualified researchers;

- develop reliable and continuing links between researchers and research users as well as universities; and

- develop a HPR network among the researchers, programmers, universities, professional and non-governmental organizations.

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HEALTH POLICY RESEARCH: BASIC ISSUES IN RESEARCH AND CAPACITY BUILDING

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Prepared for
Thirty-Second Session of the Advisory Committee on Health Research
World Health Organization
Geneva, 10-14 October 1994

Outline

I. Introduction

II. Some Basic Frameworks

A. Health as a Produced Attribute

B. Spending for Health:

1. Spending for health through the economy
2. Spending for health through the health services sector

III. Health Policy Research: What Do We Need to Know to Transform Health Services Expenditures into Better Health

IV. Health Research Capacity Building: What Do We Need to Know/Do to Transform Health Research Expenditures into Better Health Policies

V. Conclusion

I Introduction

Health policy process: an interactive process of formulation, implementation and evaluation of health policies.

Health policy research is research in support of the health policy process, i.e., in support of the formulation, implementation and evaluation of health policies.

Health policies are government actions designed to improve the effectiveness, efficiency and equity of the health sector in promoting health.

Health policies could be in the form of:

(1) decisions regarding financing and delivery of specific health care

(2) setting technical standards for both public and private delivery of care

(3) regulation of private sector activities,

(4) provision of incentives to influence public and private sector performance

HEALTH IS A PRODUCED ATTRIBUTE

Health is an attribute that is produced by the individual, by the household and by the community.

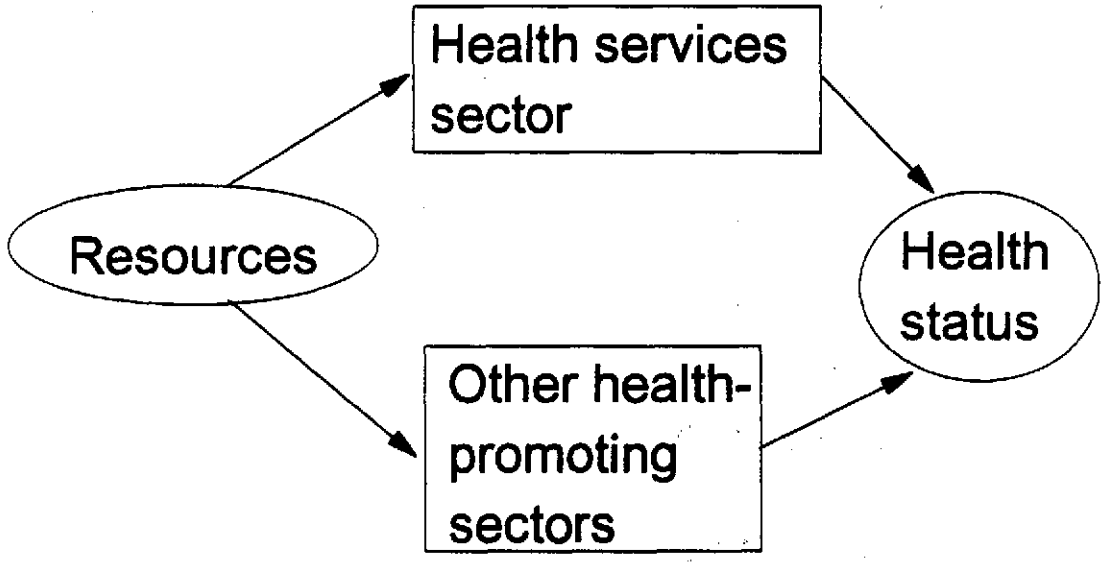
At the household level, health is produced by combining health inputs:

* health care services
* sanitation facilities/practices
* nutrients
* safety measures

and time of household members

Choices regarding health inputs and time allocation depend on income, prices, and other factors.

SPENDING FOR HEALTH THROUGH THE ECONOMY



WHAT WE NEED TO KNOW ABOUT THE HEALTH SERVICES SECTOR TO TRANSFORM HEALTH EXPENDITURES INTO BETTER HEALTH

1. **Service structure**: are we producing/spending for the services that are the most effective in improving health

2. **Service utilization**: are the services that are produced utilized efficiently

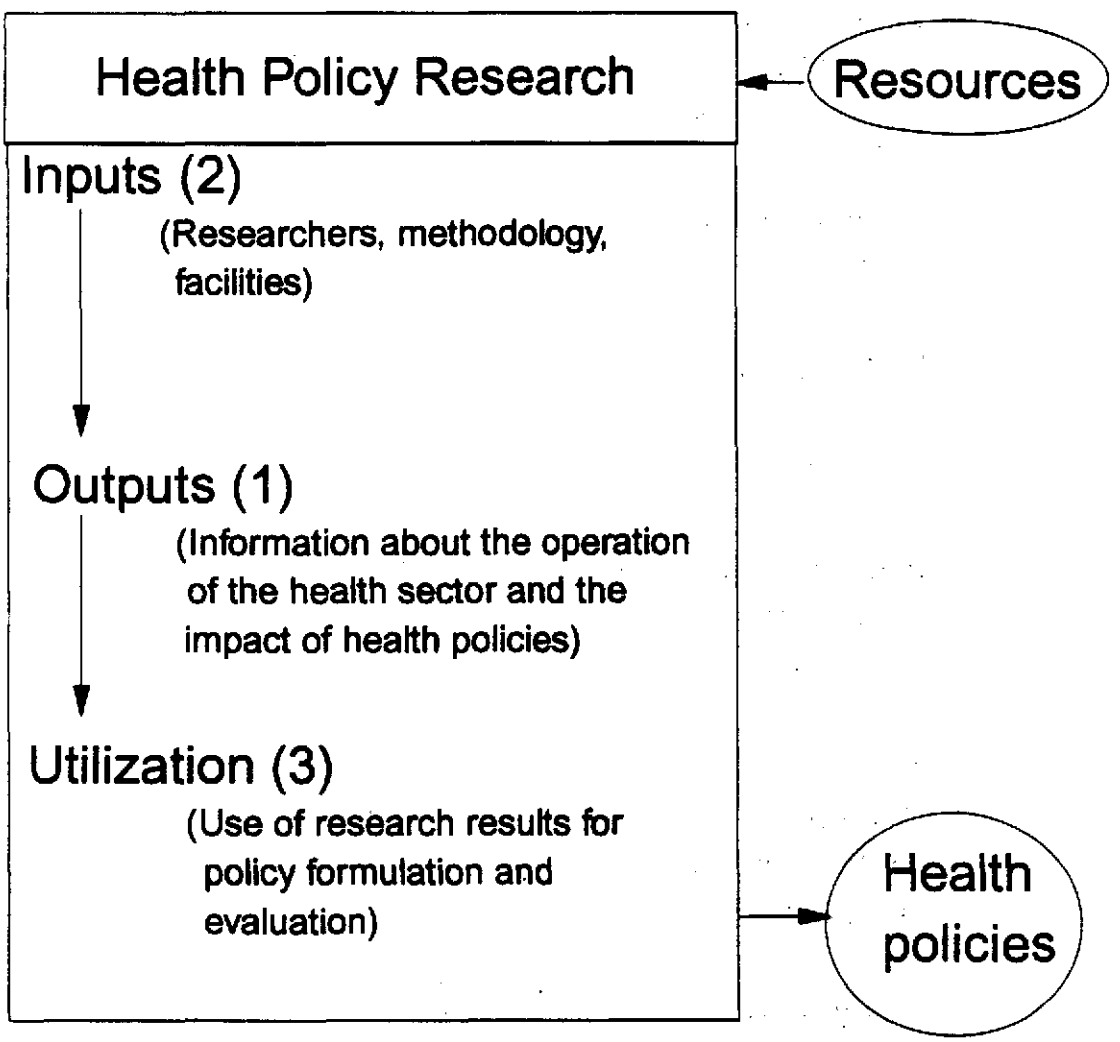
3. **Service focus**: are the services that are produced targeted on the population most in need of the services

4. **Service production**: are the services that are provided being produced in the most efficient (least-costly) manner

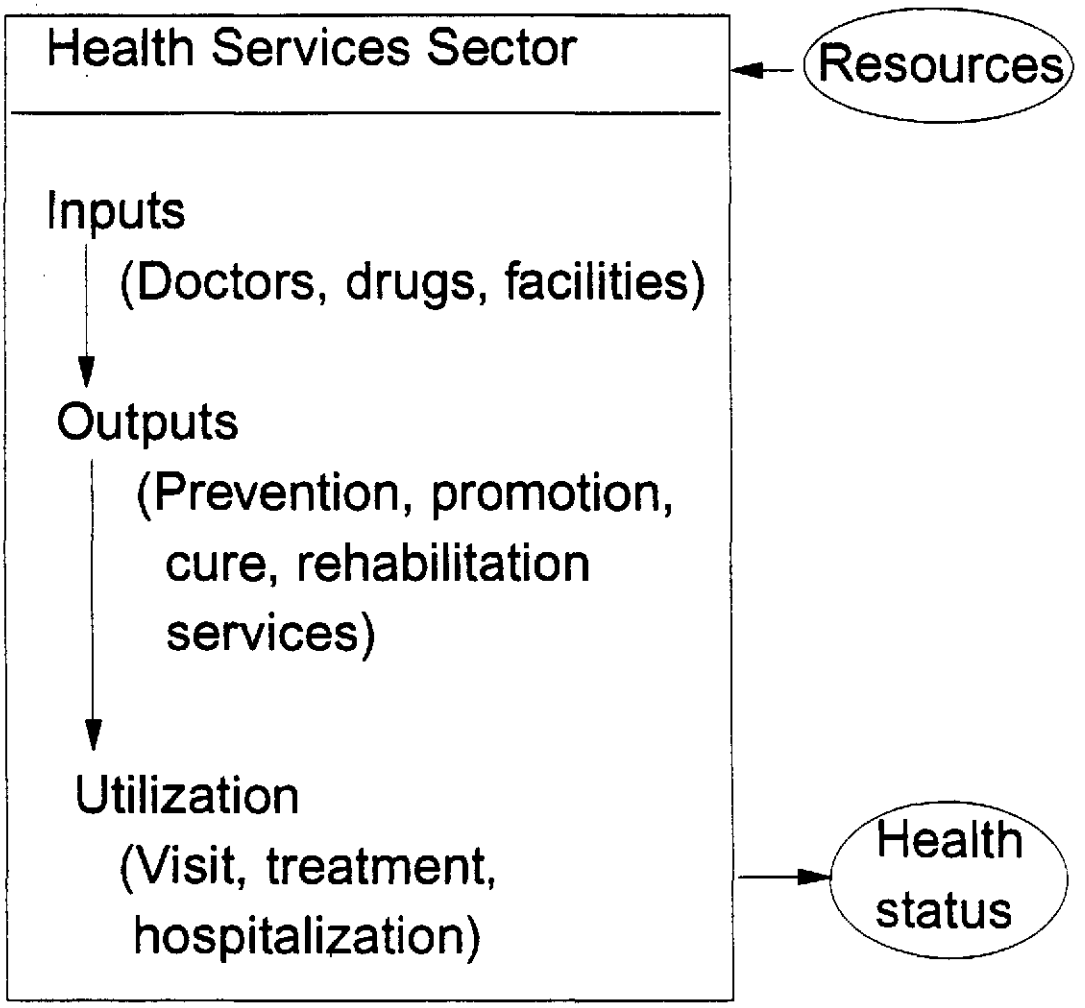
5. **Management/operations**: are the inputs managed in such a way that the potential outputs expected from a given set of inputs are actually realized

6. **Organization of delivery and financing**: what types services are best for government to produce and finance, and what types are best left for the private sector to provide and finance (public-private sector mix)

SPENDING FOR HEALTH POLICY RESEARCH TO PRODUCE BETTER HEALTH POLICIES: WHAT WE NEED TO KNOW OR DO



SPENDING FOR HEALTH THROUGH THE HEALTH SERVICES SECTOR



SPENDING FOR HEALTH THROUGH THE HEALTH SERVICES SECTOR: WHAT WE NEED TO KNOW