

WORLD HEALTH ORGANIZATION  
ORGANISATION MONDIALE DE LA SANTE

COMMUNITY HEALTH LABORATORIES FOR HEALTH SYSTEMS RESEARCH\*

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E. Tarimo\*\*

I should like to begin by thanking the Nordic School of Public Health for asking me to speak at this important meeting. Cooperation between the School and WHO has grown in recent years and has included joint organization of several courses.

My connection with health systems research (HSR) has been mostly as a user of results rather than a research scientist. I have had several years experience in planning and managing health systems, at district, regional and central levels in the Ministry of Health of my own country, Tanzania; among other duties, I was responsible for research and represented the Ministry in several bodies, including the then East African Medical Research Council and the National Research Clearance Committee. In WHO I have participated in various developments in HSR, ranging from definitions to programme activities and monitoring. I thought I should mention my experience at the beginning, to explain any biases you may detect in my remarks.

The question is no longer whether HSR is important for improving the delivery of health care, but rather how it can be carried out effectively. My observations this morning under the theme of "Need for Community Health Laboratories" will try to respond to this question. I have organized my remarks under five headings, namely: (i) the nature of HSR; (ii) achievements and problems of some innovative HSR projects; (iii) the nature of community health laboratories; (iv) examples of HSR subjects that can be studied in the laboratories; and (v) support for community health laboratories.

#### I. THE NATURE OF HEALTH SYSTEMS RESEARCH

I.1 HSR is an instrument for change, a means of making the best use of available resources to meet health needs. It is concerned with finding solutions to problems encountered in the health systems. It may be helpful to have a visual model of HSR. Fig. 1 shows the four major components of a health system, namely:

1. Health resources
2. Health policy
3. Organization and management of resources, and
4. Provision of essential care which responds to health needs and results in improvement in health.

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# The place of Health Systems Research in the Health System

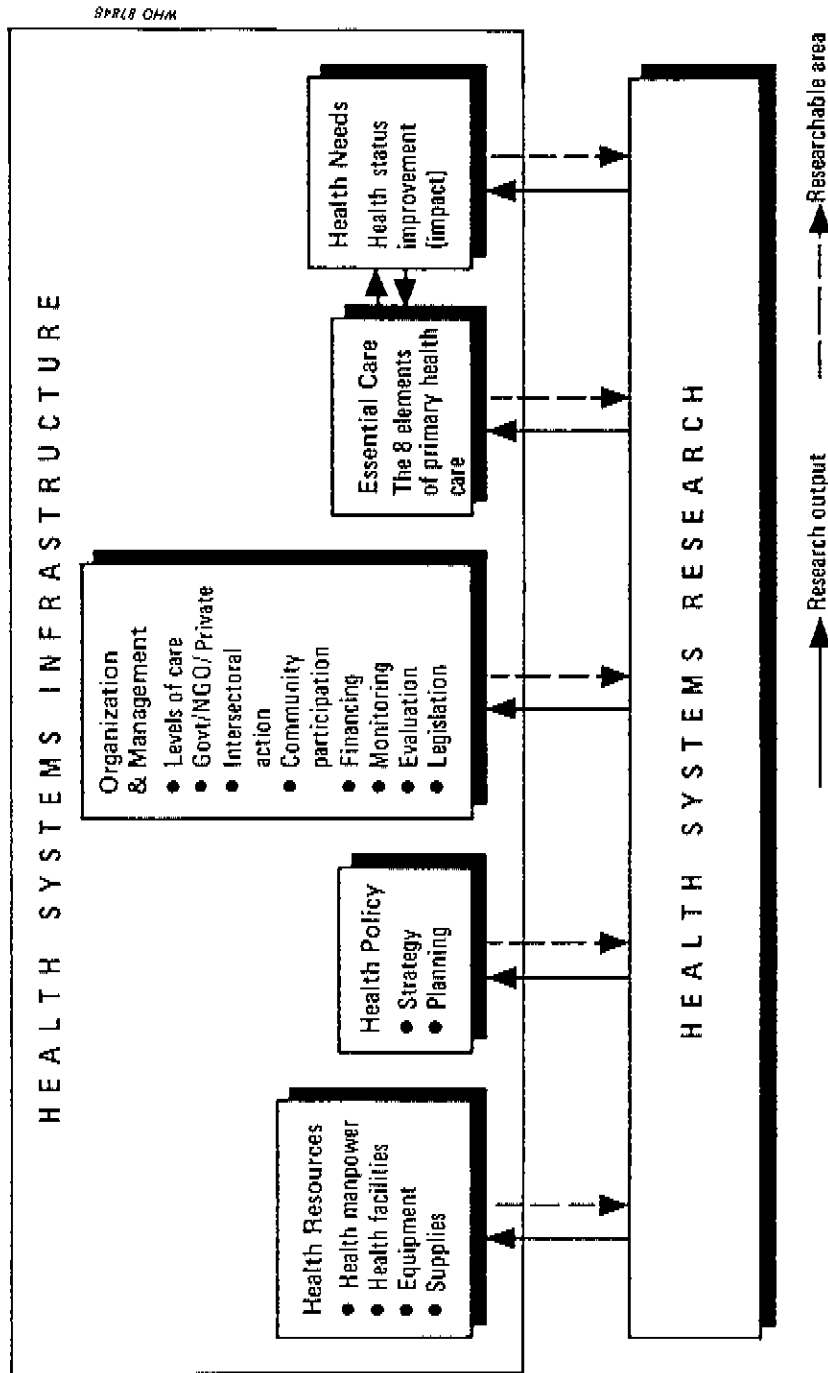


Fig. 1

I.2 A serious problem in public health is that often HSR is not incorporated into health systems, with the result that decisions are often based on intuition rather than on scientific knowledge. It is not my intention to go into the reasons, which are controversial. The researcher, especially in an academic setting, is concerned with methodological excellence, good training and publishable results. He is frustrated because decision-makers, the bureaucrats, pay little attention to his results in their effort to improve health care. For the decision-maker, however, research must be relevant and its results understandable, timely and immediately applicable. He sees the academic researcher as a theoretician who continually generates questions and whose answers, if they ever come, are vague, evasive and usually too late. The problem of the implementation gap between the researcher and the policy-maker has been documented in several places<sup>1,2,3,4</sup>.

I.3 It is said that the way to solve this problem is to bring together the decision makers and the researchers to agree on what the researcher should address. This raises the question: whose responsibility is HSR? There are two types of health systems research. The first is country-specific HSR, where the problems being addressed and the solutions are applicable to that country only. This type of research should be carried out by all types of health workers, from the community health worker at the periphery of health services in a developing country to the director of health services and professors at the central level. This type of research is everybody's business. The second type is concerned with issues and problems the answers to which may be applicable to several countries; it may be referred to as "fundamental HSR". Examples of this type include research aimed at finding: the optimum age for measles vaccination, better ways of providing care for the disabled, better ways of integrating malaria control in health services, and ways of promoting healthy behaviour and life-styles. Obviously the dividing line between the two types of HSR is not a clear one, but I submit that, taking into consideration technology and information already available to achieve the goal of health for all, at least 80% of HSR should be of the former type and only 20% of the latter. I realise that these figures may be debatable and that you may disagree with me.

I.4 As the researcher of the first type is also responsible for its practical application, the gap between the research and the implementation of findings is minimal. The question is: why has the potential of this type of research not been realized? HSR has tended to be institutionalized, in both developed and developing countries, with the researchers being extremely reluctant to make their research skills and knowledge widely available to influence attitudes, opinions and practices. Do the curricula of doctors, nurses, social scientists, economists, medical assistants, etc., contain orientation to HSR, to enable them to play their role in HSR? If not, why, and how should the situation be remedied in the near future? These are some of the questions you will be addressing later in the meeting under such agenda items as "development of HSR as a tool for decision-making in health planning and management" and "integration of HSR in training of health workers".

I.5 A point that needs to be stressed is that HSR is not a panacea for all problems encountered in the organization and management of health systems - community participation, intersectoral action, etc. The tendency to behave as if it is has cost researchers some credibility, and funding of HSR has become increasingly difficult in recent years. The call for more research is sometimes used as a delaying tactic where a policy decision is overdue but there is not the political courage to make the decision. A reasonable balance needs to be maintained between the implementation of health programmes and HSR. A few years ago I visited a HSR project on traditional birth attendants, with two components: training, and assessment of the impact of training. The training component, which was carried out by three nurse-midwives, had been stopped because of lack of funds to cover costs and follow-up supervision. However, the research and evaluation team, which had a staff of five, including an expatriate, had sufficient funds, but they said they were finding their work very difficult. They were surprised when I inquired whether they would not do better to transfer most of the funds to the implementation of the project, which would make their work easier as they would then have something to evaluate.

I.6 This brings me to the last point on the nature of HSR, the need to study several variables concurrently. Fig. 2 attempts to illustrate the dynamic nature of health systems and some of the variables involved: levels of care, PHC programme elements, functional infrastructure, and community participation and intersectoral action.

From a consideration of these variables it is obvious that several disciplines - medicine, social sciences, economics, etc. - have to be involved in HSR. Secondly, the participation of communities in the planning and carrying out of HSR is important, indeed crucial, in some studies, particularly those dealing with assessment of health needs and utilization of services.

## II. ACHIEVEMENTS AND PROBLEMS OF SOME INNOVATIVE HSR PROJECTS

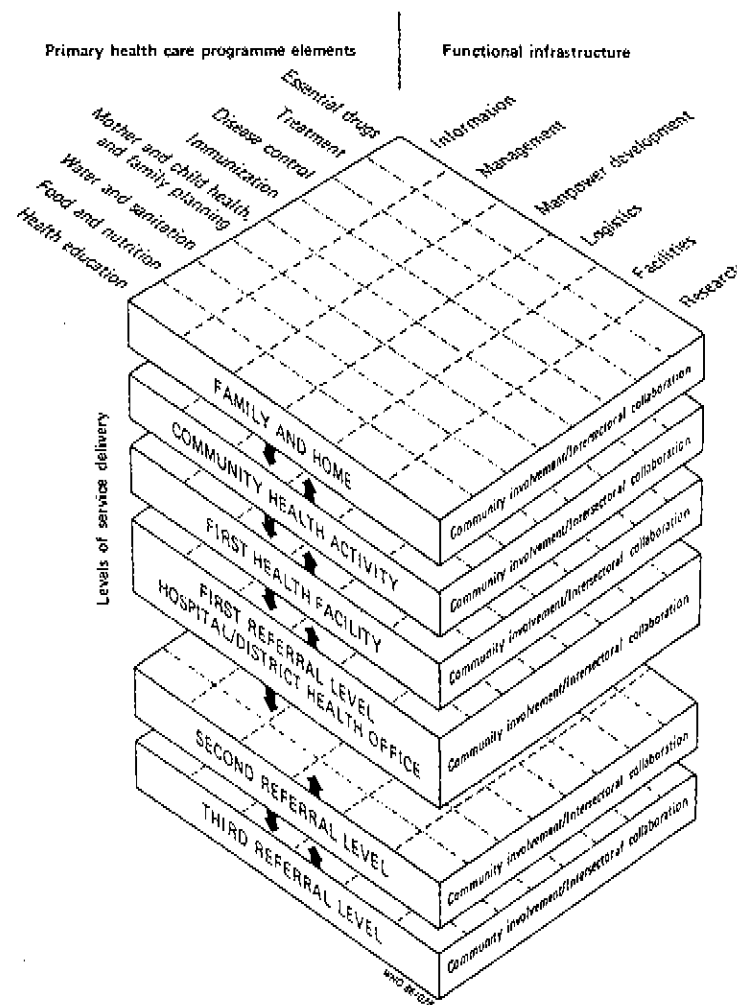
II.1 A difficult problem for the health system researcher is, therefore, how to select a 'package' of a number of health system variables that will be sufficiently large to enable an observation of important relationships to be made, and, at the same time, sufficiently small to be manageable. If, for example, a study on an element of primary health care, such as disease control (Fig 2), is planned, it is important to specify the level, expected support from other levels, role of intersectoral action, information required, linkage with other services, etc. However it may not be possible to study all these variables at the same time. A screening of the literature reveals many projects of this nature. Many have been retrospective and their results have not been very much used. Below is a summary of three prospective projects, one in Africa and two in Asia, which stand out in the literature.

II.2 The Danfa Project<sup>5</sup> in Ghana set out in 1970 to find out the most cost-effective health and family planning strategy. The project region, consisting of 300 villages and a population of 65,000, was divided into four areas (Fig. 3). In area I, comprehensive health services, including family planning and health education, were offered. In area II, family planning services (through mobile units) and health education (through four health education assistants) were provided. In area III only family planning services were provided. Area IV was the 'control' and received no new services.

The project staff included six physicians 10 nurses/midwives, 18 auxiliaries, 56 trained traditional midwives and about 60 field research assistants temporarily employed as interviewers. The project was particularly useful in that it provided and sponsored training for some Ghanaians. A Ghanaian was a co-director of the project. A lot of data, particularly demographic, were collected and had to be sent overseas for analysis, to the centre that directed the project. The high cost of the project was more than the country could afford in the near future if the project was to be replicated. There were, however, components of research and training which would not be replicated in other districts. Nevertheless, given that HSR will continue to be needed, this approach is not affordable.

The project ended in 1979 but by the end of 1975 it had already become clear that the combination of services in Area II were the most cost-effective.

Fig. 2. A conceptual model of a comprehensive health system based on the principles of primary health care\*



\* From: Hospitals and health for all. Report of a WHO Expert Committee on the Role of Hospitals at the First Referral Level. WHO Technical Report Series, No. 744, 1987.

Fig. 3. Health services provided in four project areas,  
Danfa project, Ghana, 1972-75

Area	SERVICES PROVIDED			
	Comprehensive health care programme	Health education programme	Family planning programme	Standard Ministry of Health services
I	Yes	Yes	Yes	Yes <sup>a</sup>
II	No	Yes	Yes	Yes
III	No	No	Yes	Yes
IV	No	No	No	Yes

<sup>a</sup> Equivalent.

II.3 The Narangwal Project<sup>6</sup>, in India, was begun in 1968 and ended in 1973. It set out to explore both the separate and the joint effectiveness of nutritional and medical care interventions. The 26 villages covered by the project, with a population of 35,000, were divided into six experimental and two control groups of villages, which were matched as closely as possible for compatibility. Each group of villages then received a different service package, as indicated in Fig. 4. The principal measurements made at the beginning and the end of the project, for all the areas, showed considerable difference in child growth rates and mortality. The growth rates were about the same in all areas until the age of about one-and-a-half years. Thereafter, growth was most rapid in the areas where both nutrition and medical care were provided. The rate, however, was about the same as in the villages where only nutrition care was provided. Finally, the growth rate was higher in the medical care area than in the control. The medical and nutrition care areas also showed considerable declines in infant and child mortality.

II.4 The Lamphang Health Development Project,<sup>7</sup> Thailand, 1974-1978. This project was supported by the United States Agency for International Development (USAID) through the American Public Health Association and the University of Hawaii. It covered 538 villages, with a population of 42,543.

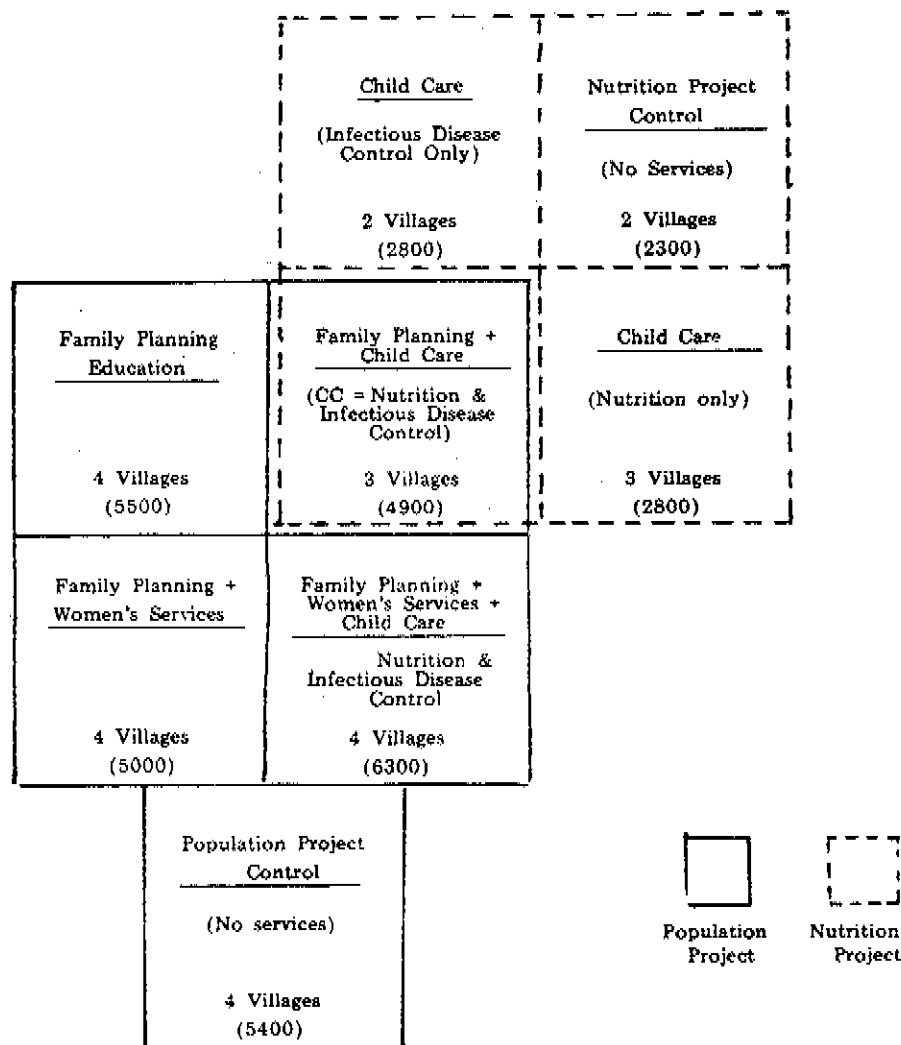
Its main aim was to develop a model integrated provincial health care system. The project's key features were:

- Strengthening of provincial health infrastructure by integrating curative and preventive services under a single health administration and establishing a department of community health in the provincial hospital.
- Development of medical auxiliaries (Wechakom).
- Deployment of health post volunteers, health communicators, and traditional birth attendants.
- Stimulating community and private sector involvement, such as druggists' clubs and associations in support of primary health care.

In 1977 the project was extended to six other districts and in 1978 to four more. The total population in the project area had risen to 681,423 by the end of 1979.

Achievements of the project included the establishment of 900 health posts, 37 health centres and 5 district hospitals. As regards manpower, 96 medical auxiliaries, 901 health-post volunteers, 5,000 health communicators and 352 traditional birth attendants were trained. About half of the villages had traditional birth attendants. All villages had health posts.

FIG. 4. Experimental design of the Narangwal project\*



(Population given is for 1972)

\* From: The Narangwal Population Study: Integrated Health and Family Planning Services. Rural Health Research Centre, Narangwal, Punjab, India

The project had about 200 local professional and supporting staff, with two to three expatriate staff. It was not closely linked with the normal ministry of health system, and therefore had to be closed down at short notice in 1974 as a result of a political decision. Its planned implementation in other parts of the country did not take place.

The project was viewed from the beginning as a Thai Project, which made nation-wide implementation of the findings more likely. The costs of the project are not included in the reports of the project and therefore it is not possible to comment on cost. It seems, however, that in this respect the project benefited from the experience of the Danfa and Narangwal projects.

### III. NATURE OF COMMUNITY HEALTH LABORATORY

III.1 I have dwelt on the three studies for two reasons: because these types of prospective study have great HSR potential, and because we should learn from their mistakes. We must avoid falling into the trap of the pilot project. Pilot projects are generally popular with donor agencies, since they can quickly produce results which can be presented to their governing boards. Governments of developing countries usually accept them because of the attached funds and implied possibilities of getting even more funds rather than conviction of their relevance to national health needs. The stated objective of pilot projects is to test new knowledge under optimal conditions. Important variables of health systems organization such as support systems from other levels are rarely encompassed. Pilot projects have turned out to be show-pieces, testing hardly any new concept.

III.2 From examining these experiences and others, we can conclude that HSR in the field should be part of a country-wide plan for improving health systems, in which all policy decisions on, say, community participation and intersectoral action, which can be based on available knowledge and information, have been taken. Small geographical areas such as districts can be selected for research and development, with or without outside support. These are the true community health laboratories. The studies carried out should take into consideration existing and anticipated realities and so would not be seriously disturbed by moderate changes in the political or economic climate.

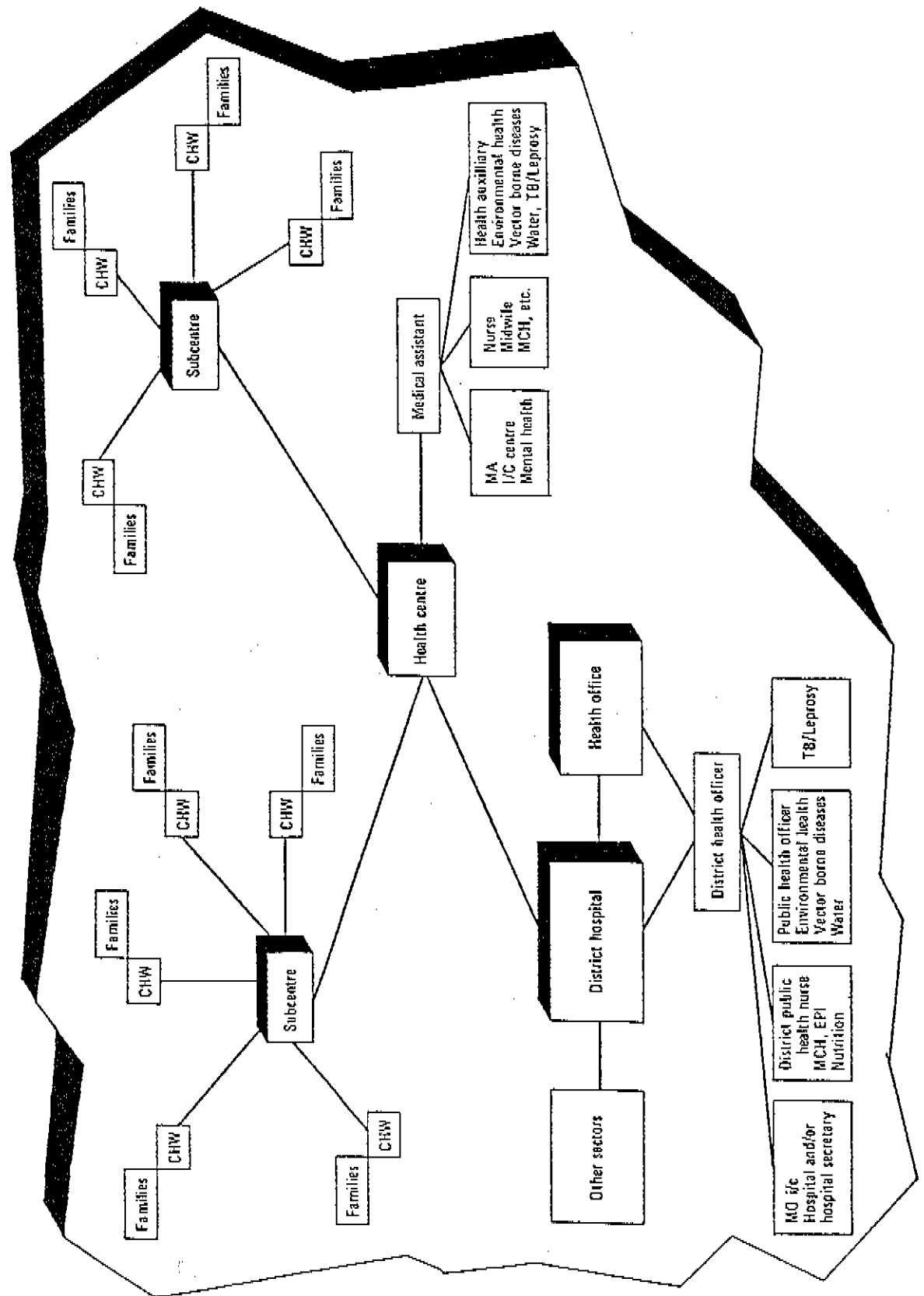
III.3 This is not a "phasing" approach where, because of financial or other reasons, activities are initially limited to selected districts. It should be pointed out that some of the innovations to be introduced in the selected districts, e.g., the comprehensive MCH clinic or deployment of community health workers, may already have been attempted with varying degrees of success in other parts of the country. But these innovations are rarely if ever subjected to rigorous experimental assessment. It is this experimental assessment, the equivalent of the randomized clinical trial, that is the main feature of the community health field laboratories. The innovations are monitored and documented, and the information obtained is used for improving the delivery of care. Without this type of laboratory, change will continue to be based on intuition.

The community health laboratory offers potential for reflecting the will and opinions of not only professionals but also, as the name implies, communities in the research effort and utilization of results. Considerable effort, which might be better directed, is currently dissipated in multiple HSR projects whose results are hardly known or used by decision-makers. The integrated approach of community health laboratories where several variables of the health system are concurrently studied should ameliorate the situation.

III.4 A few countries have chosen districts or areas where concerted research and development activities to improve the organization and management of district health systems have been started. Why has a district (area) been selected as a unit? In many countries, the district, with a population of 200,000 to 800,000, is the administrative unit at which 'interaction' between the 'bottom-up' and 'top-down' approach to planning takes place. What goes on at this unit is crucial for the success of primary health care. Figure 5 shows an example of district organizational structure.

Experience from the outcome of 32 Research and Development Projects in 20 countries in Africa<sup>8</sup> indicates that success is more likely where the geographical area is a "district" or at least corresponds to the governmental administrative unit.

Fig. 5. Example of district organizational structure



#### IV. SUBJECTS FOR HSR IN COMMUNITY HEALTH LABORATORIES

The key element of the community health laboratory is its suitability for studying selected components of the health system with a view to establishing which changes can result in various improvements in the health of people. Below are examples of major subjects of research in a district health laboratory.

##### IV.1 Pattern of coverage of district health infrastructure

The PHC infrastructure in most developing countries, particularly in Africa and Asia, is organized in three tiers. At the periphery, the community level, there is a community health worker (or equivalent) who forms the link between the organized village community and the local health services. Next are the local health units, known by different names, including dispensaries, clinics, health posts or sub-centres, and health centres. The third tier consists of the first-line hospitals that immediately serve/support the local health units. They are known by different names, including general, rural or district hospitals. The local health units as well as first-line hospitals often belong to different agencies including ministries of health, other government departments, Voluntary or non-profit health bodies and private health care providers. Many Latin American and Eastern Mediterranean countries have a two-tier organization - they do not have community health workers or their equivalent.

A systematic description of the PHC infrastructure, providing in some detail the organizational configuration, can indicate areas of duplication or areas that need strengthening or expansion. What are the major features of the structure? How is this related to other sectors? How could the structure be improved?. What is the accessibility of various population groups to health care? What are the options for organizing services to ensure maximum coverage?

##### IV.2 Levels of care.

An important aspect of the District Health Care structure, in need of research, relates to types of units between the community and the first-level hospital. Should there be health centres, sub-centres and dispensaries or only health centres? Should there be one type or several types of health centres? A health centre has been defined in the past as an institution "for the promotion of the health and welfare of the people in a given (rural) area which seeks to achieve its purpose by grouping under one roof or coordinating in some other manner, under the direction of a health officer, all the health work of the area, together with such welfare and relief organizations as may be related to the general public health work"<sup>(9)</sup>. Since then, the role of health centres has been widely differentiated. A point of some contention has been whether these centres should provide medical care as well as preventive services. In countries where there is considerable private practice, such as India, Jamaica, USA and Colombia, it is almost invariable that only preventive work is done in health centres. In others, both preventive and curative work is performed. Studies are needed to establish the role that health centres and other local health units should play in primary health care.

IV.3 Finally, studies are needed to find out what the District Health Care infrastructure of the future should be. Studies are needed to determine how to establish an infrastructure that can, as far as possible, anticipate future changes in the physical and social environment, as well as the consequent changes in health needs and demands.

#### The staffing pattern of district health units

IV.4 There are great variations in the ways in which peripheral health units are manned. For example, some countries have three auxiliary workers at a health centre, namely a medical assistant (or equivalent), an MCH aid (or midwife) and an environmental assistant, for a population of about 6000. In some other countries there is one multi-purpose auxiliary worker for 2000 people. In a few other countries, such as India and Syria, a physician is employed at the health-centre level. Personnel is the most important budget item, absorbing around 80% of the total health budget. It is, therefore, important to continually seek the right mix of PHC personnel, and better and more cost-effective ways of deploying it.

IV.5 What are the relative benefits of these patterns of staffing? What is the relative value of having physicians at health centres, compared with auxiliaries? What is the appropriate manning of first-level hospitals? Answers to these and similar questions involve systematic review and analysis of the tasks that have to be carried out and of the skills (and their grouping) that are needed to carry them out.

IV.6 The role of community health workers. Many issues and problems as to how best to deploy this category of workers remain. For example, in a number of programmes the CHW has degenerated to a first-aid worker and in others the whole programme has been seen as one of providing employment to the educated youth. Studies are needed on how the tasks to be carried out by CHWs can be based on and responsive to the needs of communities. What should be the criteria for the selection of CHWs? What are the best ways of training and retraining them? How should they be remunerated? What should their career structure be? The staffing and functioning of the PHC infrastructure is perhaps the most important area for research.

IV.7 What are the overall health manpower requirements, including that of new manpower categories?

#### Organization of services at local health units

IV.8 Research is also needed to find better ways of organizing services at the local level. For example, should antenatal, child care and family planning clinics be integrated and held on the same day? How should the programmes of malaria, tuberculosis and leprosy control be integrated with the general health services?

IV.9 How can the organization of service at health units - diagnosis, laboratory, treatment, etc., be improved?

IV.10 Efficient use of all available resources. Information is needed on the pattern of resource allocation as well as on alternative options for using resources to provide health care. Secondly, it is essential to find out ways in which various services can be coordinated. Special mention needs to be made of coordination of services provided by various agencies. A simple example is the amount of time wasted in supervision. Individuals often have to travel hundreds of kilometres to supervise units under their agency. Studies on how hospitals could provide supportive supervision to health units in their catchment area regardless of the agencies to which they belong are needed in many countries.

IV.11 One of the corner stones is coordination with other sectors. How can this be achieved?

#### Facilities and equipment

IV.12 To avoid wasting enormous sums of money, research aimed at finding cheaper ways of constructing, equipping and using health facilities is essential. Some systematic studies have been initiated in this field of concern, gathering innovative approaches (10) and national case studies of health care facilities within the context of health services system(11).

Drugs and other supplies (12)

IV.13 Studies are needed to find a rational system for making available different types of drugs to health units. The organization and functioning of medical stores is a serious problem in practically all developing countries. How can the perennial problem of shortage of drugs be tackled? How can the problem of the cold-chain and the storage of vaccines and other delicate supplies be tackled? Should the types of supplies (brands) be limited?

Records

IV.14 A lot of forms and registers, which are hardly ever used, are kept at many local health units. Data are often collected for the specific purpose of being passed to higher echelons. Research is needed for designing simple procedures for collecting information that can be used at the local level and for providing feedback to other levels of the infrastructure. To this end, what forms and registers should be kept at the various units? For instance, it is often feasible to include the registration of births and deaths.

Supervision/referral

IV.15 Studies are needed to find better methods of supportive supervision. For example, in many countries health centres are supposed to supervise sub-centres and community health workers. The distances involved, at times over 100 km, and the lack of reliable means of transport make supervision, as we know it, impossible. In such circumstances should supportive supervision be the responsibility of the district team? It would then be possible to limit the provision of the very few vehicles to the district level. Or, would it be desirable to try to emphasize the use of bicycles and other cheaper means of transport? Second to drugs, transport remains the most difficult operational problem to tackle. Should there be a limitation in types of vehicles?

IV.16 As regards referral, it is important to find out how patients and problems can be referred without delays and feedback provided. For this, and the functioning of PHC local units in general, it is important to establish linkages between the local hospital and the rest of the PHC infrastructure.

Motivation

IV.17 This is a serious problem in many developing countries. Low morale and lack of job satisfaction are widespread and are evidenced by poor performance, and may be one of the major causes of "brain-drain". How can workers be kept motivated and retained in their jobs?

Community participation (action or control)

IV.18 How can the community take responsibility for various programmes such as water, sanitation, early attendance for antenatal care, etc? How can influential people in the community, such as teachers and religious leaders, be mobilized for PHC? How can problems of representation in socially stratified communities be tackled? Unfortunately, at times, the existing mechanisms and culture are neglected and new ones are imposed from outside. Often these mechanisms involve the appointment of a treasurer who turns out 'to have a hole in his pocket', and thus community participation becomes a drain on the community.

IV.19 How can communal labour be incorporated into the government effort? One has seen communities put up buildings for health units which have remained unused for long periods because of lack of staff and supplies. Could the community effort be directed towards the construction of parts of facilities planned by the government, rather than encouraging them to put up units on their own?

IV.20 Finally, there is need of detailed studies on the process of community involvement. What ways have been most effective? What types of health personnel have been directly involved in promoting community participation? What training have they been given? What additional training is needed? What organizational changes are needed to promote community participation?

Monitoring - evaluation - impact

IV.21 The purpose of health programmes is to improve the health of the people. Research is needed on indicators for assessing progress and on the relationship between health inputs and outputs. Such information is useful for priority setting.

V. SUPPORT FOR COMMUNITY HEALTH LABORATORIES

V.1 What is the organizational base or infrastructure for community health laboratories? What is required foremost is a deliberate policy decision by the government for such a "learning-by-doing" approach. A plan of action needs to be developed as part of the overall national health plan for health for all.

Motivation and interest of the district health team, particularly the district health officer, is a crucial need for success and should be taken into consideration in deciding the location of the laboratory. Ways need to be found for maintaining motivation, which might be financial incentives, or opportunity for further training, or a combination of both.

Institutional resources to support laboratories in training, and in designing, implementing and monitoring of projects, are essential for success. Different institutes, universities, centres for social science development studies, etc., will be involved. The technical support should, therefore, be coordinated to permit maximum use of multidisciplinary skills, which are usually limited in many developing countries. Such coordination will ensure that the community health laboratory continuously obtains new ideas for its work. This multi-institutional involvement has the potential for stimulating institutes to review and improve the curricula of their training programmes for physicians, managers and researchers so as to reflect community needs. WHO has promoted and supported the establishment of such cooperation in the form of National Health Development Networks (NDHN). For many, particularly developing, countries which cannot afford duplications, such a collaborative approach is important. The NDHN will serve, among other things, as a focal point for HSR. Where there is no such network a focal point for HSR needs to be determined.

Additional support will be required in the form of short-term advisers and funds to cover costs of documentation.

Support and collaboration of non-governmental, private organizations and communities can take many forms, according to local needs.

Exchange of experiences, by means of study tours and participation in meetings, will help to increase the skills and interest of workers.

International support - bilateral or multilateral - will often be of great value. Support should be coordinated and based on local goals. HSR projects do not need to be huge operations employing analysis requiring data to be flown out of the country for processing.

Some form of network which will join together the collaborating districts will provide mutual support and provide an indication of the state of health of a country or region. Similarly a network of technical institutes in developed and developing countries would be useful.

SUMMARY AND CONCLUSIONS

To conclude, let me say that the question I started with - how should HSR be carried out - is an important one. There is genuine health systems research and spurious health systems research. Pilot projects, which are invariably carried out in parallel to the overall development of the health system, should be avoided. They usually have large resources from outside the country. The results of studies carried out under such artificial circumstances have been of limited value.

There is sufficient knowledge available on methodologies and the type of decision that have to be made to establish adequate health infrastructures in practically all countries.

Countries are increasingly adopting the community health laboratory approach, selecting an area of a country where, as part of implementation, studies are carried out on important problems. I have indicated several subjects for which research can be carried out in field laboratories. I hope that my remarks will be borne in mind in the course of your deliberations.

The problem with many meetings is that they come out with vague recommendations - countries or WHO should put more emphasis on HSR, etc. Looking at the list of participants in this meeting I would say we are fortunate to have people with extensive practical experience in HSR. One can, therefore, expect some specific suggestions from the meeting. How should the process of developing and operating community health laboratories be stimulated and supported? How can the effort of various institutes be mobilized and coordinated to support these laboratories? WHO is supporting a number of countries in establishing and strengthening their community health laboratories. How do you see this role expanding? How may such institutes as the Nordic School of Public Health and others be involved in this effort?

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