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ABSTRACT

The state of continuing education for physicians was examined by a World Health Organization Expert Committee. The study touched on five major areas: (1) the motivation and stimulation during basic medical education and during the physicians professional career; (2) the definition of objectives, selection of instructional methods, and evaluation of educational impact as they relate to the application of modern pedagogy; (3) interprofessional education programs; (4) qualitative and quantitative organizational requirements; and (5) resource requirements in the areas of personnel deployment, training staff for continuing education programs, facilities, and funding. Recommendations suggest: (1) The development of national systems of continuing education for the health professions with clearly defined central and regional administrative authority and responsibility, and the integration of such programs with the national health care system. (2) The development of mechanisms for determining the local health needs and deficiencies of practitioners. (3) The identification and development of more realistic incentives and rewards for physicians to encourage them to engage in continuing education. (4) The development of discussion among specialists with the purpose of delineating jointly the specific objectives and processes of continuing education for the health professions. (5) The development of demonstration projects in interprofessional education. Additional recommendations are included. (MJM)

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WORLD HEALTH ORGANIZATION
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Continuing Education for Physicians

Report of a WHO Expert Committee

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**CONTINUING EDUCATION
FOR PHYSICIANS**

Report of a WHO Expert Committee

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CONTENTS

	Page
1. Introduction	5
2. Definition of the problem	5
2.1 Background	5
2.2 Conclusions of the preliminary study	7
3. Motivation and stimulation	9
3.1 During basic medical education	9
3.2 During the professional career	10
4. Application of modern pedagogy	12
4.1 Definition of objectives	13
4.2 Selection of instructional methods	15
4.3 Evaluation of educational impact	16
5. Interprofessional education programmes	19
6. Organizational requirements	21
6.1 Qualitative needs	21
6.2 Quantitative needs	22
7. Resource requirements	23
7.1 Personnel deployment	23
7.2 Training staff for continuing education programmes	24
7.3 Facilities	25
7.4 Funding	26
8. Summary and recommendations	28
Annex	31

**A WHO EXPERT COMMITTEE ON CONTINUING EDUCATION
FOR PHYSICIANS**

Geneva, 28 June-4 July 1973

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CONTINUING EDUCATION FOR PHYSICIANS

Report of a WHO Expert Committee

1. INTRODUCTION

A WHO Expert Committee on Continuing Education for Physicians met in Geneva from 28 June to 4 July 1973. Opening the meeting on behalf of the Director-General, Dr P. Dorolle, Deputy Director-General, welcomed the participants and reminded them that the topic of continuing education for physicians is one that has been a concern to the Organization for many years. Rapid development in new medical knowledge and accelerating change in methods of delivering health care have made continuing education an issue of critical importance. Professional obsolescence is inevitable unless physicians make a personal commitment to life-long learning and are provided with opportunities to fulfil that commitment. Continuing medical education is essential in every country if maximum benefit is to be obtained from the initial investment in basic education of physicians.

The specific task of the Expert Committee was to review the present situation, to draw up general guidelines for the organization and administration of continuing education, to make recommendations for the application of educational planning and the modernization of teaching methods in this field, and to suggest ways of motivating physicians to pursue their studies throughout their professional career.

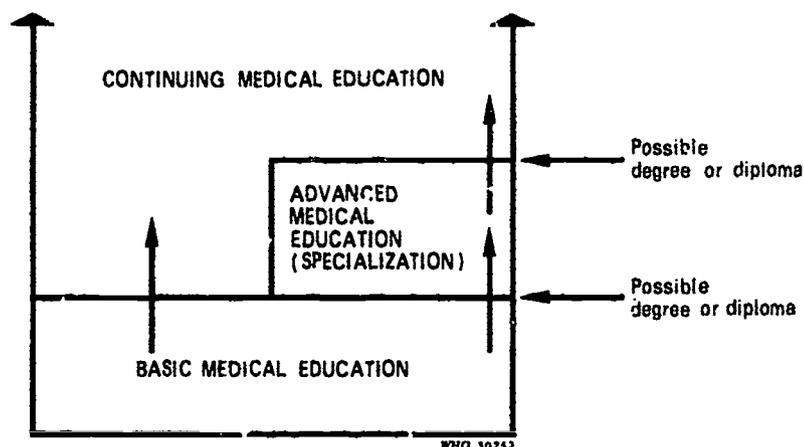
2. DEFINITION OF THE PROBLEM

2.1 Background

A group of consultants was convened by WHO in 1970 to advise on the design of a study to gather data on the present practice of continuing education in Member States. Their first task had been to define the term "continuing education" so that it was both explicit and understandable. They regarded continuing education as the training that an individual physician undertakes after the end of his basic medical education, and where applicable after the end of any additional education for a career as a generalist or a specialist—training to improve his competence as a

practitioner (not with a view to gaining a new qualifying diploma or licence). This definition was accepted by the Committee and is represented diagrammatically in Fig. 1.

FIG. 1. STAGES OF MEDICAL EDUCATION



Although continuing education may take many forms, its sole objective is to assist physicians to maintain and extend their professional competence, whatever the area of medical practice. Continuing education begins either immediately after graduation from medical school or after a formal programme of advanced training leading to specialization. Thus continuing education should be regarded as an integral part of, and in fact a subsystem of, medical education as a whole.

In some parts of the world the term postgraduate education is used as a synonym for continuing education; in other countries it may refer to any education after the completion of a basic programme, including specialty training. Recognizing these differences, the Committee decided to use the term continuing education only in the sense illustrated in the diagram; education that leads to a further qualification or to the completion of a further step in specialist training should not be included.

The concept of continuing education, which is often regarded as periodic refresher training to bring a practitioner's knowledge up to date, is too narrow and too confusing and thus the concept of continuous learning rather than the more conventional framework of continuing education should become the starting point for further planning. This continuous process has several phases involving not only the familiar formal courses, conferences, and workshops but also independent learning in a variety of settings.

The study undertaken as a result of the recommendations made by the group of consultants in 1970 was originally planned to include two stages:

(1) a questionnaire survey addressed to all Member States to provide quantitative information about continuing education activities, and qualitative information about the nature of programme planning, implementation, and evaluation, including the extent to which these efforts incorporated the basic principles of educational science; and (2) a more detailed study to be carried out by consultants visiting a selected sample of nations whose programme appeared to justify further study. Limitations of personnel and resources prevented the implementation of the phase 2 studies.

The questionnaire specifically asked who was responsible for organizing and operating continuing education programmes, and for information on the nature of the national policy on physician participation, the number of potential and actual participants in a reference year, the source of financial support for these programmes, the basis for decisions about curricula and instructional methods, and the qualifications of the staff responsible for these efforts. Countries were also asked to describe the methods used to evaluate the effectiveness of programmes and to give any additional information that might be useful.

Usable returns were received from only 61 of 132 countries and the nature of the responses indicated that some of the information might be unreliable. The most serious problem in interpreting the replies concerned the terminology, which was obviously unfamiliar to some respondents. This problem was made more difficult by the translation of the questionnaire into 4 languages.

In the absence of confirmatory evidence, the data obtained from the questionnaires give at best a rough and incomplete description of the present position of continuing education in the Member States. Despite the acknowledged shortcomings, the fact remains that these are the only comparative data available to WHO. As such, the findings are a helpful guide to further study and, while additional information is accumulated, a useful base upon which to make decisions about future programmes.

2.2 Conclusions of the preliminary study

It seems clear that programme objectives rarely take into account the needs of the health services. Often they lack the support of systematic documentation and seem to be a manifestation of the beliefs of health workers, university staff, or administrators concerning these needs. For example, any one of these groups might identify as a national health priority the early detection of a potentially curable malignant disease, a goal with which it would be difficult not to agree, while systematic study might show that the main health problem to which continuing education should be directed was the prevention or treatment of the medical consequences of road accidents.

Whatever the national priorities, or health needs it is clear that it is

necessary to do more than inform health practitioners¹ about these problems if the care they provide is to be influenced significantly. Available evidence suggests that the major deficiencies in health services occur not so much because knowledge has not been disseminated but because it is not used.

The replies to the questionnaires showed that the lecture was the most commonly used method of instruction. This method, which generally serves only a single objective (that of imparting information), must vary greatly in its effectiveness, and in selecting the methods to be used it is clear that criteria other than educational goals usually take precedence.

Finally, it was clear that in most countries there has been very little evaluation of programme effectiveness. This is perhaps one of the most serious deficiencies in educational planning. It cannot be assumed that learning (in the sense of changed performance) has occurred just because a practitioner (or anyone else) has undertaken a course of education. Such a conclusion must be based upon the evidence that evaluation provides.

The omission of such fundamental principles in planning programmes of continuing education suggests either that the questions concerning training in pedagogy were misinterpreted by the respondents or that such training as was reported has not been very successful.

It was striking to note that there was little evidence of any substantial incentive for physicians to continue their own education, except in those countries with an organized health service in which practitioners are paid employees. It would appear that both the incentives and the rewards are usually personal and without significant social implications. While it is true that internal motivation is important in ensuring effective learning, it is also true that most individuals when given the choice would select things that lead to early, overt satisfaction in preference to things that provide only the potential for later rewards.

In the face of conflicting demands on his time it is only rarely that a practitioner will engage in a systematic and substantial programme of continuing education for his own satisfaction alone.

Quite apart from the question of incentives and rewards, the study showed that very few countries have any carefully devised plan to provide practitioners with education that is both systematic and continuing. In most countries continuing education seemed to be a collection of unrelated courses offered by independent agencies. While each of these might be valuable it would be fortuitous if together they formed a comprehensive programme. In fact, there was very little evidence that those who filled in the questionnaires had any clear idea of what was offered in their country, or of the numbers of practitioners participating.

¹ The term practitioner as used in this report, refers to all physicians, whether they are generalists or specialists, directly involved in the delivery of preventive and/or curative health care as individuals or members of a group, in the community or the health centre or the hospital.

The replies suggested that most of what is now available in the name of continuing education is neither continuing nor education: it might better be called episodic instruction. If this conclusion is justified, vigorous action is called for to ensure optimal preventive and curative health care to all persons and communities whatever the age or experience of the practitioner they consult.

3. MOTIVATION AND STIMULATION

Motivation is usually regarded as a key element in efficient and effective learning and the limited motivation of many of the practitioners most in need of continuing education is a serious problem. There is no simple and universal solution to the problem of inducing physicians to make continuous learning a part of their way of life. In discussing this critical issue it may be helpful first to consider the things that may influence an individual in making a commitment to lifelong learning.

"Motivation" can be defined as the conscious or unconscious desire to achieve a goal, and "stimulation" as inducement to action. The nature of such inducements plays a profound role in the development of a learning pattern, and once that pattern is established it may be difficult to change without some new reward. Positive stimuli include helping an individual to discover the need to learn and the satisfaction that comes from fulfilling that need; making the learning experience enjoyable; ensuring recognition or approval by others (peers, superiors, etc) when learning has been achieved; encouraging the development of self-esteem through learning. Positive stimuli such as these applied early and consistently can play an important role in increasing motivation for continuous self-instruction.

Negative inducements may lead to the achievement of an immediate learning goal, but may also have the effect of inhibiting the development of personal motivation. These negative factors include such things as restricting privileges if learning is not achieved; emphasizing success at an examination rather than the value of learning; using instructional patterns that make the experience distasteful; and the influence a climate in which learning is either ignored or disapproved of by peers, or superiors.

Incentives and rewards during a physician's professional career are not in themselves sufficient, however, to ensure motivation towards continuing education. Programmes of basic medical education play an important part in establishing a pattern of lifelong learning and it is at this stage that medical schools can make a significant contribution.

3.1 During basic medical education

Most students start their medical studies highly motivated to learn, but this motivation too often appears to be eroded during the subsequent

years of study. The Committee discussed possible reasons for this phenomenon and was of the opinion that in most places medical schools were characterized by negative rather than positive inducements to learning: by rigid and demanding educational programmes that give little initial satisfaction since the content is seemingly unrelated to career goals and since passive rather than active instructional methods are used; and by an institutional climate dominated by examinations in which the rewards go to those most successful in concealing their ignorance rather than to those who reveal it as a step in furthering their own progress.

It seems clear that any solution to the long-term problem of continuing education must begin during the early years of basic education. Despite frequent reports that students are not sufficiently motivated, it seems that in most cases the main problem lies not with students but with the teachers, who must modify their curricula and teaching methods in a manner that will provide positive inducements to learning. The means of accomplishing this should include a greater emphasis upon, and reward for, independent study; reduction in the amount of formal instruction and less dependence upon the lecture method; more opportunities to use alternative methods of learning; greater encouragement of students to identify significant health problems and to seek solutions through personal study in the library, the laboratory or in the field; modification of examination systems to provide frequent opportunities for non-judgemental testing to determine what has been learned and what has yet to be learned; and less emphasis upon examinations to certify that the required minimum has been achieved.

3.2 During the professional career

While the problem of continuing education for physicians cannot be solved without significant alteration in the patterns of basic medical education, there remains the pressing issue of arranging continuing education for the practitioners who were trained in an educational system that was not designed to establish an individual commitment to continued lifelong learning. It remains, therefore, to identify the inducements, both positive and negative, that may be useful during a practitioner's professional career.

One of the inducements that has been widely discussed is the establishment of an obligatory requirement to participate in continuing education for specified periods in order to maintain a legal right to practice, to continue membership in a professional association, to gain professional advancement or higher salary, for example. The Committee, however, rejected the use of this type of inducement as there is no evidence that participation in educational programmes can be equated with learning, and also because the different needs of individuals and the different speeds at which they can

learn make it impracticable to specify any fixed time requirement to achieve a given level of performance. There should, however, be an obligatory requirement to demonstrate periodically that professional competence is being maintained. An obligation to demonstrate competence shifts the emphasis from documentation of participation to documentation of learning, and allows each physician to decide the way in which the goal is to be achieved. The difficult question of how to assess competence will be discussed later in this report (section 4.3).

The most familiar opportunities for physicians to continue their own education are the lectures, conferences, workshops, and clinical activities provided by a variety of agencies including universities, professional societies, and governments. This is not the place to discuss how these and other possible programme activities should be organized but two aspects related to motivation and stimulation need further consideration here.

The first aspect concerns the time required to pursue educational programmes. Many physicians point out that their first obligation is to provide medical care and that the ever present demands of patients constitute the principal impediment to their own continuing education. In fact, it is true that most physicians do carry a heavy load, and work long hours and it is unrealistic to expect many of them to add continuing education to that load. This problem may be solved more easily in those countries with a national health service and in which physicians are paid employees, and time for continuing education can be built into the normal work programme, than in those countries where practitioners work independently. In both these systems the national authorities must make provision for continuing education; unless time can be made available, continued learning will be difficult for many and virtually impossible for some.

The second aspect concerns the less familiar aids to continuing self-instruction. Audiovisual aids designed for independent study, and courses of instruction by correspondence are becoming more readily available and are being increasingly employed but they are most commonly addressed to the same kinds of educational objective as the more formal courses and conferences. Such methods, in a sense, represent educational therapy that has not been preceded by diagnosis of educational requirements and are rarely accompanied by the kind of follow-up that allows a determination of whether the therapy has been effective. More use must be made of the newer tools for determining requirements and for monitoring progress.

The self-testing devices that have attracted particular attention during the last 5 years provide opportunities for the individual practitioner to assess privately his own competence and thus to discover his own deficiencies. These devices allow not only a self-assessment of knowledge, but also make possible a personal analysis of basic professional skill and clinical problem solving capacity. While most take the form of a private "test"

unrelated to daily practice, the " Practice Self-Audit " ¹ and the systematic analysis of medical records using practice standards developed nationally, regionally, or locally provide additional tools for self-testing.

The purpose of such procedures is to draw attention to the realities of an individual practitioner's work, to enable him to assess his educational needs and, by means of continuous evaluation, his progress. These methods provide positive rather than negative inducements to learning.

Opportunities for continuing learning are more likely to be used if the rewards include something more than personal satisfaction and heightened self-esteem. If society is to derive benefit from any increased professional competence that results from continuing education then it also has a role to play in providing incentives and rewards. The most tangible rewards are, of course, monetary rewards and in some countries these may be appropriate. Other methods worthy of consideration include : (1) public acknowledgement of new achievement ; and (2) giving practitioners academic rank and teaching responsibilities based on professional performance rather than research. Whatever the reward system it should be based upon performance, not merely upon evidence of participation in some presumably worthwhile educational programme.

4. APPLICATION OF MODERN PEDAGOGY

Although the problem of continuing medical education is of growing concern to the profession and to the public at large, there is little evidence that the principles of contemporary education are widely applied in this field. One of the most important reasons for this may be that many of those who are responsible for continuing education seem to plan and implement the programmes on the basis of the worst features of elementary and secondary education, instead of employing the most effective forms of adult learning. Secondary schooling is generally organized around teachers who (1) determine what shall be taught, (2) prescribe the means of instruction, (3) determine the duration of that instruction, and (4) make quantitative judgements about the degree of student achievement : it is a programme of courses, hours, marks, etc., in which the student role is primarily that of doing what he is told. Higher education, including that for professionals, has followed a similar pattern so that the completion of the required number of years of study in carefully organized curricula represents the standard pathway toward qualification. In each instance students endure the experience, although they may not enjoy it, because there is no alternative pathway toward the goal that they seek.

Most adults, however, when left to themselves, follow a very different pattern for learning. They do not seek activities organized for purposes

¹ Hamaty, D., West Virginia State Medical Association, unpublished information.

others have determined, but use procedures that serve their own purposes ; they do not unquestioningly accept an instructional method someone else has selected, but test several methods until they find one that matches both their purpose and their learning style ; they are not bound by a period of learning set by others, but continue to study as long as it serves their needs ; and they are not concerned about the quantitative judgements made by others, but about the qualitative judgement they make of their own performance. Adults seek independent learning not dependent instruction, something that is personally meaningful, not merely institutionally required.

The organization of continuing education is usually similar to that of secondary and higher education, being composed of courses, seminars, and conferences dealing with topics selected by, and to be completed in a period determined by, some supervisory body. In this system, however, there is no requirement for attendance at an institution and many practitioners ignore or reject the courses in whose development they have played no part, and whose instructional format may not match their personal preference or their other professional obligations.

Continuing education would benefit significantly from the application of modern educational theory. It is recommended that a systematic approach be adopted by all those responsible for such programmes. The process should begin with a thorough consideration and utilization of modern pedagogy, demanding careful derivation and specification of programme objectives. It follows that the learning activities selected should be clearly consistent with these goals. Finally, all educational programmes must include evaluation to indicate whether the original objectives have been achieved.

4.1 Definition of objectives

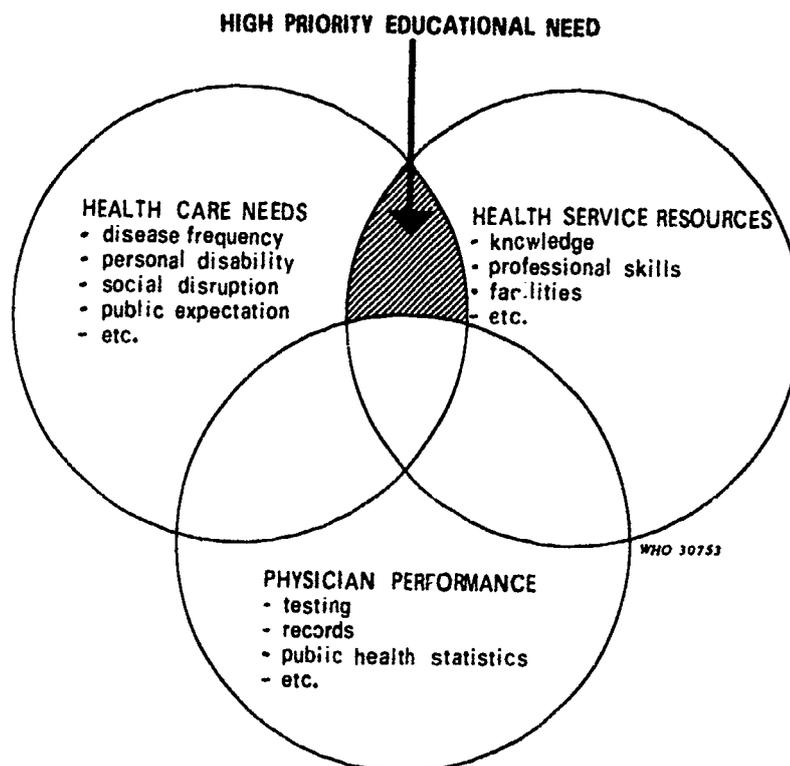
Since the ultimate purpose of continuing education is to improve the quality of preventive and curative care given by physicians, the definition of objectives for any such programme should emerge from a systematic study of existing health care patterns and needs. Such information can be derived from national public health statistics, or by regional, local, or individual identification of the health problems most frequently encountered. The act of identifying these needs is in itself the first stage of systematic continuing education for individual physicians.

Inevitably more needs will be identified than can be dealt with and therefore some mechanism is required for establishing priorities among the many potentially useful alternatives to which continuing education could be directed. One such method is illustrated in the accompanying Venn diagram (Fig. 2).

The development of such a list of priorities employs criteria such as disease frequency, personal disability, and social disruption (e.g., duration

and cost of illness) (see Fig. 2). The underlying assumption is that those things that are more frequent, more disabling, or more disruptive deserve greater attention than those that are less so. However, health need alone is not enough to determine educational priorities. If no resources (e.g., information, facilities, or techniques) exist to meet that need then additional

FIG. 2. DEVELOPMENT OF PRIORITIES IN CONTINUING EDUCATION



The shaded area represents health care needs that are not being adequately dealt with by practitioners despite the existence of suitable health service resources.

education is unlikely to alter the nature of the medical service than can be directed to it. Finally, in determining priorities, it is necessary to include some assessment of physician performance. If resources are already being optimally employed to meet a documented need then further education will give little improvement in patient care. The highest educational priority should be given to areas of high need for which available resources are not being used to the best advantage.

Such a systematic approach often requires a new attitude towards the nature and purpose of continuing education on the part of both those who provide it and those who participate in it. It also demands full cooperation between those providing education for the health professions and those

providing the health services, as it implies that continuing medical education should reflect national health priorities and should be consistent with national health plans. If attention is focused upon major health problems whose resolution would benefit large segments of society less time will be devoted to scattered attacks upon smaller problems of less importance to society as a whole, although these may often be of more immediate concern to special interest groups. It would not mean complete elimination of such programmes but does suggest that the same methodology used to identify areas of greatest need must also be employed to determine educational priorities in those more limited programme efforts.

However the educational objectives of any continuing education activity are derived they should always be formulated to meet the technical requirements for clarity and precision proposed by Mayer¹ and by Gronlund.²

4.2 Selection of instructional methods

Considering the extremely varied goals of continuing medical education, and the increasing array of instructional methods now available, the Committee was surprised by the impression, now supported by the study data, that so many programmes rely almost entirely on a single instructional technique, the lecture, the primary objective of which is to transmit information. It is also a method that requires little involvement of the learners, and fosters dependence upon teachers rather than the independent self-instruction that has been repeatedly identified as the most important kind of continuing education.

It is because of wide recognition of the inadequacies in the traditional lecture approach that many educators have welcomed the advent of an increasingly rich educational technology that makes it possible, at the very least, for an individual to adapt the rate at which he studies, and at its best can involve him in an active process of problem-solving. Unfortunately, however, these methods have not always lived up to their promise and in many ways a lecture given on videotape is no better than a live lecture.

Although these new devices may be exciting and challenging another disadvantage is that they often require a substantial investment in equipment and the instructional materials may not be readily available. Slides, audiotapes, and videotapes are not made to a universal technical standard and may be incompatible with some equipment.

Instructional methods should be selected primarily on the basis of their appropriateness to educational objectives, the more complex and costly

¹ Mayer, R. F. (1962) *Preparing instructional objectives*, Palo Alto, Calif., Fearon, 59 pp.

² Gronlund, N. E. (1970) *Stating behavioural objectives for classroom instruction*, London, Macmillan, 58 pp.

methods being employed only when simpler and less expensive methods have been found unsatisfactory or inefficient in achieving a given objective. Books, journals, and other printed materials are still useful and can often be produced at a far lower cost, and can be used with greater flexibility, than many of the newer devices.

The selection of methods should also be influenced by the nature of the audience to which continuing education is addressed—an audience of mature and experienced adults who are free to accept or reject what they are offered.

Educational psychologists have noted¹ that individuals become more independent as they mature and learn more readily from their own experiences. Learning patterns are more influenced by the developmental tasks of their roles in society and by the immediacy of application of knowledge, and become increasingly problem centred.

For these reasons, it is particularly important that practitioners should be involved in the selection of instructional methods for programmes aimed at practical problems they face and in whose identification they have participated. The methods should provide opportunities for them to become actively involved in the process of learning rather than being passive recipients of the learning of others. One valuable method that meets these requirements, but is still not sufficiently employed in continuing education, is the process of self-evaluation. This can help practitioners discover what they need to learn as well as the progress they have made after a programme of further study. While self-evaluation is usually thought of in terms of tests of knowledge, such developments as the medical self-audit also provide a mechanism for looking systematically at individual performance in the consulting room, clinic, or hospital ward.

The Committee recommended that greater emphasis should be placed on the development of such tools for personal educational diagnosis in continuing education, even at the expense of curtailed investment in the further development of the more elaborate instructional methods.

4.3 Evaluation of educational impact

Although evaluation of continuing education programmes is generally regarded as essential it is clear that such evaluation is at present generally inadequate. While acknowledging the present limitations of evaluation methods, and the psychological impediments to more extensive use of evaluation techniques, it is clearly important that continuing assessment should become an integral element of all continuing education activities. Consideration of the problem of evaluation gives rise to the

¹ Knowles, M. (1970) *Modern practice of adult education*, New York, Association Press.

following questions concerning decisions about evaluation tactics and strategies.

4.3.1 *What should be evaluated?*

The different aspects of evaluation can be grouped under the headings of educational process and educational product.

Evaluation of the *educational process* requires investigation of (1) the way in which programme objectives were derived and specified; (2) the relevance of such objectives to health care needs; (3) the appropriateness of the programmes and instructional methods, and of the evaluation procedures, to the objectives defined; (4) the skill with which the instructional methods were employed by the teachers; (5) the extent to which evaluation data were employed to improve the programme; and (6) the evaluation process itself.

Evaluation of the *educational product* involves primarily an assessment of whether the objectives of the programme were achieved. Since the general aim of continuing education is to improve the quality of preventive and curative health care, through maintaining or improving professional competence, it is not sufficient simply to determine whether participants acquired new knowledge. The far more difficult but ultimately essential task is to determine the extent to which the educational process influences the preventive and curative care they provide.

4.3.2 *When should evaluation be done?*

When continuing education takes the form of a course, conference, or workshop, information about the educational process can be obtained during or at the conclusion of the programme. The assessment of the educational product in terms of the acquisition of information or new professional skills may also be assessed when the programme ends. The more critical evaluation of the educational product, however, must be carried out over a longer period: the determination of whether what was learned has been retained and is being used to solve the priority problems of preventive and curative health care. It has been stressed above that continuing education activities should include self-instruction programmes¹ and that in such systems self-evaluation should be a continuous process.

4.3.3 *How should the evaluation be done?*

A wide range of techniques is now available² and the task is to select those most appropriate to the specific educational objectives: no single

¹ These techniques are further discussed in: *Development of educational programmes for the health professions*. World Health Organization, Geneva (*Wld Hlth Org. Publ. Pap.*, 1973, No. 52, 103 pp.).

² Charvat, J. et al. (1968) *A review of the nature and uses of examinations in medical education*. World Health Organization, Geneva (*Wld Hlth Org. Publ. Hlth Pap.*, 1968, No. 36, 40 pp.).

method can be regarded as the best method for all situations. For the evaluation of the educational process simple check lists and rating scales that provide a systematic method of accumulating information on the elements of programme planning and implementation can be employed. In a similar way the reaction of participants to the programme may be determined both at the conclusion of the programme and at a later date when information about the way in which the knowledge acquired has been used in practice may also be provided.

The assessment of the educational product is usually limited to measuring the information acquired, but this is an incomplete evaluation of the purpose of most continuing education. The difficulty in assessing the more complex behavioural outcomes has discouraged attempts to do so, and has led some to the conclusion that it cannot be done. Recent experience with improved evaluation techniques—including particularly the simulation procedures that are now available or being developed¹—suggests that this discouragement is unjustified. Without minimizing the difficulty of investigating professional skills, attitudes, and habitual performance there is good reason to believe that much more can be done with the assistance of professional staff experienced in the field of educational tests and measurement.

When the objective of the programme is to influence morbidity, or mortality, or the course of a particular disease public health statistics or individual medical records are equally important for the evaluation of group or individual performances. For example, data from one study, collected before and after a continuing education programme, showed a significant increase in the frequency with which appropriate criteria for the use of antibiotics were employed (30%→60%), an increase in the frequency of abnormalities in removed appendices (55%→81%), and a decrease in complications after hysterectomy (25→%13%) (C. H. McGuire, unpublished data).

When experienced personnel are in short supply it is best to begin by evaluating the simple things and to develop methods for the more complex features as resources increase. The importance of evaluation in continuing education programmes is so great, however, that responsible authorities should make every effort to find the resources for thorough assessment of the varied goals of these efforts.

4.3.4 *Who should carry out the evaluation?*

This has usually been done by the teachers who planned and carried out the programme of continuing education and they must continue to play a part in both process and product assessment. One of the principal elements of successful life-long learning, however, is a commitment to

¹ Charvat, J. et al (1968) *loc cit.*

dispassionate self-evaluation and thus participants should be expected to take part in selecting the means of evaluation as well as the development of performance criteria against which achievement can be judged whether by the individual himself or by his peers or teachers.

Personal evaluation carried out by the individual learner is most important in continuing education since the opportunity for self-assessment is always present, and the feedback can be immediate. Responsible authorities should make a particular effort to direct the attention of physicians to the devices that have been developed to assist them in assessing their own educational deficiencies as well as their achievement.

4.3.5 What use should be made of the evaluation data?

The principal use of evaluation data in continuing education should be to facilitate further learning, not simply to make judgements about whether some arbitrary standard has been achieved. Just as information accumulated about the educational process should be useful to programme planners in making future efforts more successful, so should individual performance data be employed to assist practitioners in delivering better preventive and curative health care. If the evaluation of the individual is regarded as judgemental, and if administrative decisions about the right to practise stem from it, then practitioners will understandably resist all efforts to evaluate their performance. If, on the other hand, it is made clear that the principal purpose of evaluation is to assist them in improving their performance then that resistance will begin to fade. As most physicians have been educated in a system in which they have been rewarded for concealing deficiencies rather than revealing them, any significant change in attitude will require careful encouragement. For this reason, among others, the Committee concluded that further support should be given to the development, with practitioners, of self-assessment methods that are practical, economical, and readily available.

5. INTERPROFESSIONAL EDUCATION PROGRAMMES

This section is concerned with educational activities provided for mixed teams of health care workers as distinct from those directed toward particular professions on their own. Interprofessional education should not replace programmes for individual health professions, but should offer a new opportunity for members of health care teams to learn together how to solve problems in which all have a common interest. The overall educational plan for interprofessional programmes should be to integrate professional skills to ensure the provision of effective and comprehensive health care.

One general goal of such programmes is to give each member of the health team a better understanding of his role, and of his relation to other

members of the team, in tackling a particular task. Two concepts should guide such an educational effort: recognition of the skills deployed by each member of the team; and (2) application of these skills to the specified objective and across the whole spectrum of health care. An illustration of the role of different health workers in the different phases of a health programme for the diagnosis and treatment of hypertension (Table 1), and the different educational objectives to be achieved (Table 2) are included in the Annex. The same procedures should be used in planning programmes for interprofessional education as for the individual professional groups. It is essential that representatives of all the professions involved should participate in the initial planning stage. The setting of goals by one profession for another would defeat one of the important principles of this type of learning experience.

Interprofessional education programmes should lead to improvements in the team approach, better appreciation of the unique role of the physician in the prevention and diagnosis of disease and the initiation of treatment, and of the role of other health workers in continuing supervision, health care, and counselling. The improved understanding should lead to better use of the physician's time and a more satisfying role for other health workers. Interprofessional continuing education can complement the physician's instructional role with patients and families by helping all members of the health care team to understand what is expected of them. It can also lead indirectly to wider public appreciation and acceptance of preventive health measures.

Several different kinds of educational method can be used, including community health problem solving. Team reviews of case histories, role playing, and simulation exercises are all methods that can be very effective in teaching and in bringing about attitudinal change. The point to be emphasized is that interdisciplinary continuing education must be an active process, not simply an opportunity for health workers to sit and listen to each other talk. The curriculum should be designed to meet the desired educational objectives and these objectives should be determined by the nature of the tasks to be performed and by the competence of those who are to perform them.

There are several problems to be overcome in the field of inter-professional continuing education. First, the members of the different health professions must recognize the value of working together to define and solve the health care delivery problems.

Secondly, the team approach to health care should be emphasized during the basic education of each of the health professions, so that each member of the health team may begin his or her career with an understanding of the roles of the other team members. At present many conservative forces exist within each educational and health service delivery system that discourage interprofessional educational efforts.

Thirdly, there is a need to establish a common language or a common frame of reference so that interprofessional discussion can be meaningful. One way to achieve this is to orient continuing education programmes towards problem solving by all members of the health team.

Fourthly, individual Member States and existing professional organizations and societies should be encouraged to foster interprofessional educational programmes for demonstration purposes. At present each professional group is concerned that collaborative efforts will detract from its professional identity. Every effort must be made to foster the idea that improvements in health care can be achieved more effectively when different health workers learn together.

6. ORGANIZATIONAL REQUIREMENTS

The present population of physicians in the world is estimated to be about 2.5 million. This number probably includes many who are still engaged in advanced training; those who are engaged in research and administration and other tasks not directly related to delivery of preventive and curative care; and those who are no longer actively practising. The vast majority, however, are practitioners, either generalists or specialists, and many are practising without access to continuing education. From the foregoing discussion it is clear that the unsystematic and episodic efforts that have characterized most continuing education activities in the past will no longer meet the needs of these physicians if they are to fulfil the expectations of society.

6.1 Qualitative needs

Although it is unlikely that the same organizational arrangement for continuing education will be appropriate and acceptable in all countries, the creation of an organization to link the health services delivery system, the educational system of the health professions, and the profession itself is indispensable. The health services system must be involved because it carries responsibility for planning as well as delivering the preventive and curative health care whose improvement is the main purpose of continuing education. The educational system of the health professions must be involved since continuing education is merely one phase of the learning process for which this system is responsible. The profession must be involved since it is essential that the learners should help identify the educational objectives, select the instructional devices, and assess the effect of the programme on ultimate performance.

The organizational arrangement must be more than a nominal affiliation of these groups. It must also do more than coordinate their independent activities, although coordination will be an important function. It must,

in fact, be an agency that has both responsibility and authority for planning and the allocation of educational resources.

In some countries this may be best accomplished through separate institutes that represent both the Ministry of Health and the Ministry of Education. In the Soviet Union,¹ for example, an elaborate system of special institutes provides a wide range of postgraduate programmes including both advanced education for specialization and continuing education for maintaining professional competence. Operating under the Ministry of Health, it has the full support of the medical profession. While this system has functioned successfully in this setting, the separation of such institutes from the universities, which are responsible for other sectors of medical education may not, in other countries, be in the best interests of a comprehensive and systematic plan.

Alternatively the agency might take the form of a national commission that derives its authority and responsibility from the government with the consent, cooperation and involvement of the other component groups noted earlier. In other countries it may be organized through a national health service that not only provides comprehensive health care but also has a duty to advise the government on the allocation of resources. This pattern has been followed in the United Kingdom where there is a national advisory group and also regional organizations with direct responsibility for operating programmes of continuing education under a regional Dean (who is a member of the University Medical School); these organizations comprise a regional education committee, and a number of regional hospitals, the facilities being provided by regional postgraduate medical education centres. This provides another model of a mechanism for involving all interested parties in a working system that by its nature must be responsive to national health needs and priorities.

6.2 Quantitative needs

Although the Committee was unanimous regarding the need for an integrated organization to provide continuing learning opportunities, there was no consensus on the quantitative requirements for developing these opportunities. For reasons described above, proposals for a fixed time requirement for continuing education or for the development of a reward system based upon time devoted to continuing education were rejected. The demonstration of professional competence was felt to be more important than demonstration of attendance at any educational activity. A quantitative estimate of resources required, based upon instructional time, would thus be unjustified. In those countries that have already made some provision for continuing education (e.g., France, Israel, the USSR, and the United Kingdom, the time spent amounts to 2-4 weeks a year or

¹ See *Wld Hlth Org. Publ. Hlth. Pap.*, 1970, No. 39, 52 pp.

about 5-10% of the total working period. This may be too much for some physicians and too little for others, but it gives an idea of the order of magnitude that may be required.

The recommendation that competence, rather than time, should be the criterion for continuing education leads to a dilemma in deciding how that competence should be assessed and at what intervals. On the one hand society has a right to expect that the competence of physicians will be re-assessed and recertified periodically ; on the other hand it is recognized that the potentially punitive nature of a recertification procedure, particularly when the tools of assessment have significant limitations, works against the establishment of the positive motivation for continuing self-education. The challenge that faces medical educators is to create a mechanism that encourages personal responsibility for maintaining competence, yet can assure society that this responsibility has been fulfilled.

One of the most promising contributions to the solution of this problem is the type of continuous self-assessment described earlier. This may be carried out by individual physicians and groups. When self-assessment is carried out effectively, under the guidance of skilled personnel, practitioners are assisted in finding ways to correct identified deficiencies. Considerable progress is now being made in some countries by professional groups in analysing the tasks that physicians must be able to carry out, in identifying the performance standards they must meet, and in developing the performance assessment devices that can be used as part of such a continuous learning programme.

The question that remains unsolved is whether there is now a need for some external recertifying mechanism, carried out after fixed although arbitrary periods, and continued until a system of self-evaluation, more consistent with the principle of personal responsibility for life-long learning, can be established and proved effective. Ultimately society will demand evidence of professional competence, not merely an assurance that it is being achieved. Since a single system cannot at present be recommended, all continuing education authorities should make self-assessment a main component of their programmes, and use every possible incentive to encourage all physicians to participate in periodic evaluation of their own professional competence. Such an assessment should then form the basis of their subsequent continuing education efforts.

7. RESOURCE REQUIREMENTS

7.1 Personnel deployment

The shortage of medical teachers is generally recognized. The problem is more acute in developing nations but a shortage exists even in many highly industrialized societies. Since at present many of these nations

have only rudimentary programmes of continuing education for physicians the introduction of additional activities can only make the position worse.

In some countries the personnel responsible for continuing education are drawn from the staff of special institutes that conduct a broad range of postgraduate education programmes. Although such institutes have made important contributions in the field of continuing education this arrangement may not be the most efficient way to use scarce personnel and, by separating the later stages from the basic programmes, may detract from the important concept of continuity of medical education. Acceptance of the need for continuing education is the primary aim of education and must be established during the period of basic education if not before. Countries in which separate institutes for continuing education have not already been established should integrate these activities, and the staff involved, with basic medical education in the universities or in future university centres for health sciences.

7.2 Training staff for continuing education programmes

The apparent inefficiency in the use of scarce personnel does not stem only from faults in organization. Medical school staff are usually well prepared in medicine and clinical science but few have had any introduction to, far less an adequate experience with, the techniques of education. Deplorable as this may be among those charged with the basic education of physicians, it is even more serious in programmes of continuing education where there is no requirement for physicians to participate and individual choice may be exercised. Unless those responsible for programme planning and implementation recognize and employ sound principles of adult education within the framework of a broad education plan that relates to the health care system, their efforts will be not only inefficient but ineffective.

The World Health Organization has recognized the importance of this general problem and has set in motion a teacher training programme¹ that has already led to the establishment of regional training centres. The objective of this programme is to establish national centres in all Member States that wish to have them by the end of this decade. Although these centres are not specifically charged with training teachers for continuing education it is certainly within their field of competence.

Staff responsible for the continuing education of practitioners should acquire particular skills in the employment of such educational strategies and tactics as: focusing the attention of individuals and groups on the performance goals of education rather than simply on the accumulation of knowledge; encouraging self-education; reducing impediments to free

¹ WHO Study Group on the Training and Preparation of Teachers for Schools of Medicine and of Allied Health Sciences (1973) *Wld Hlth Org. techn. Rep. Ser.*, No. 521.

communication among learners; involving individuals in the analysis of their own educational needs and in planning the ways in which they will fulfil them; providing feedback to individuals and groups in order to further their learning.

If a choice must be made, it is probably even more important for the leaders of continuing education programmes to be highly qualified in the educational process than in the subject matter. It is recommended, however, that all the scientific and clinical experts who make important contributions to continuing education should also gain some skill in the educational process, for the educational task at this level is really to encourage physicians to pursue their own learning rather than to teach them. Acceptance of this attitude also increases very significantly the number of people who may serve in this educational role. In fact, it would seem particularly important to provide physicians themselves, and members of the other health professions, with enough understanding of this learning process to enable all of them to contribute to the continuing education of the team in their day to day work. Physicians are ideally placed to play an important role in the continuing education of those health workers with whom they are in constant contact, and to do this effectively they must know how to guide and support and, by creative leadership, motivate and organize the health team.

Although the established teacher training centres represent an important resource, they are insufficient to satisfy the staff needs for continuing education activities. Every encouragement should be given to Member States to develop the resources required to provide satisfactory training in education for those charged with the planning and execution of continuing education programmes.

7.3 Facilities

While learning can take place in any setting, the provision of minimal supporting facilities will give encouragement even though it will not ensure success. In this report it has been emphasized repeatedly that continuing education should occur primarily in the setting in which health services are being delivered. The educational potential of that setting may be increased in the following ways.

7.3.1 Physical arrangements

Although this section deals with requirements in terms of physical facilities it is emphasized that the development or expansion of continuing education need not wait until special buildings have been provided. It will, however, make programme planning easier, and will ultimately make programme implementation more efficient, if a suitable building is made available to house some of the important supporting resources. Since most health

institutions, whether they are medical schools, community health centres, or teaching hospitals are already filled to capacity, additional accommodation may have to be found or built. In some places room may be found in professional society buildings, in others the university may be able to offer accommodation or a department of health might be able to help.

Ideally, such a Centre for continuing education should be close to the place where most physicians work, and should include private study and seminar rooms, a lecture theatre with no obvious formal barrier between teachers and learners, space for the display of educational material, and some modest refreshment facilities. In most Member States positive inducements are needed to bring physicians together to participate in continuing education and many of them can only participate by forfeiting leisure time. A continuing education centre can become the meeting place for physicians from different areas of practice and other health workers, and a common meeting room is an asset if that type of learning that takes place through informal contact with others is to be encouraged. It should also be emphasized again that such an ideal represents merely something to be strived for, not a basic requirement for the initiation or even the elaboration of substantial continuing education effort.

7.3.2 *Libraries*

It is inconceivable that a programme of continuing self-education can be carried out without access to a collection of basic textbooks and periodicals. A suitable library will certainly be found in a medical school or may be established in the premises of a local medical society, or in the kind of continuing education centre described above. A bibliographic reference service will also be useful if the collection of books and journals is of limited size.

Whatever its setting, the library should not be merely a repository for printed materials. It should include a collection of audiotapes, sound-slide and programmed instruction materials, self-assessment devices, and other aids to independent learning.

7.4 **Funding**

Whatever the nature of continuing education, the organization that provides it, or the setting in which it takes place, the need for appropriate funding is inescapable. There may be differing views of what expenditure is appropriate but the Committee was able to agree on an order of magnitude: the amount currently budgeted in any country to support a single year (of a 4-6 year programme) of basic medical education, or 10% of existing expenditures for undergraduate medical education. This sum should be regarded as an increment to the present appropriation, and should not be made available by redistribution of the current expenditure.

7.4.1 *Sources of funds*

In many countries the government is the major if not the sole source of money for continuing education. The money may be expended directly through special institutes, granted to universities or other agencies to be used for this purpose, or assigned to a national health service to support activities in this field. It seems appropriate that all governments should to some extent participate in the support of continuing education for physicians since the whole population can be expected to benefit from this investment. The precise funding mechanism will, however, vary in different countries.

Other potential sources of support should not be overlooked, however, particularly other agencies interested in the health services or in health personnel education. For example, in many countries some trade unions have sick funds and may even operate substantial health care programmes. They might be persuaded to contribute to the costs of continuing education for physicians if they are convinced that such education will increase the quality or decrease the cost of health care. In some countries philanthropic organizations are also concerned with the health services and health education and are particularly interested in new approaches to continuing education of the health service team.

Industry is another potential source of funds, for the health of workers is a significant element in industrial costs. The pharmaceutical industry has already made contributions to continuing education in many parts of the world, but those concerned with continuing education cannot escape an underlying concern about the potential conflict of interest here. It is essential to maintain the support of these organizations, but the Committee strongly urges Member States to seek ways to arrange for the expenditure of these funds through some neutral agency in accordance with an overall national plan rather than independently by industry itself.

Finally, the profession itself is a source of funds. In some countries it is reasonable to make individual tuition charges for continuing education programmes and procedures; in many countries professional associations are able to offer continuing education to their members paid for by the membership fees. The profession may also contribute, through medical societies, physical facilities or other resources to support continuing education programmes. While the specific mechanism may be different in each country, it seems reasonable to suggest that physicians should make some investment in their own continuing education.

7.4.2 *Priorities and decision making*

Whatever the source, it is predictable that the amount of financial support will be insufficient and in many countries the discrepancy between resources and needs will be very great. Under these circumstances the

establishment of priorities is essential if limited funds are to be expended wisely.

Although the requirements will differ in different countries it might be useful to outline some guiding principles on priorities. In general, it would seem wise to invest first in the development of personnel to plan, implement, and evaluate the continuing education programme so that these activities are based on health needs and on sound educational principles. Next in priority are the aids to independent learning that can make the process more efficient, more effective, and more matched to individual needs and learning requirements. Particularly important are the self-assessment devices that have been referred to repeatedly throughout this report. Finally, some physical resources must be provided. These are noted last not because they are unimportant, but because learning can take place without special accommodation. The development of such facilities is intended to ensure that the process will be more convenient and comfortable.

Such decisions on priorities should be made by the kind of national agency recommended in section 6.1 in order to avoid the uncoordinated continuing education programmes that today result from independent decisions by autonomous groups all eager to do what is right, but without consultation or coordination. The situation is unlikely to improve until the kind of national agency recommended earlier has been established and vested with authority for planning and resource allocation. Although such agencies may be organized differently in different countries it is essential that they should bring together and foster cooperation between the health service delivery system, the educational system for the health profession, and the profession itself.

8. SUMMARY AND RECOMMENDATIONS

1. The continuing education of physicians, as well as of other members of the health team, is a matter of growing importance if the health services that society has a right to expect are to be of the highest quality, generally accessible, efficiently organized, and economically delivered. Increased public familiarity with the achievements and potential of science and technology has been accompanied by a growing public determination to influence health service organization and systems of higher education. Thus it is predictable that unless vigorous action is taken within the profession to maintain and extend the competence of practitioners, external controls will be applied to ensure that this is achieved.

2. Although some countries have made significant progress in organizing a system of continuing education for physicians, and all countries have

acknowledged the importance of doing so, the present efforts in this field are often unsystematic, poorly supported, little influenced by contemporary educational science, episodic, focused more on transmitting new information than on improving competence, and are only incidentally related to health needs and national health priorities.

3. Only recently have university medical faculties begun to make an important contribution to continuing education for physicians. Universities throughout the world seem to be accepting an increasing role in social affairs, and are using the community as well as the classroom as a setting for learning. The "open university" idea and the general increase of university concern for continuing education gives promise of growing support for continuing education for physicians.

4. Those responsible for planning continuing education for physicians have been discouraged by the apparent lack of interest and motivation among physicians for continuing education. Practitioners often counter this accusation by claiming that isolation or heavy patient loads make it virtually impossible to participate in the kind of continuing education most commonly offered. Whatever the reasons it is obvious that further attention must be given to incentives and to rewards for life-long learning to avoid the imposition of punitive measures. This problem must first be tackled during the period of basic medical education by changing the curricular structure and the educational methods so that new generations of physicians are encouraged to develop an increased sense of responsibility for, and skill in accomplishing, independent life-long learning.

5. There are also perceptible changes within the profession itself towards a growing commitment to continuing education. The increasing trend towards grouping of medical practice and the growing organization of multiprofessional health service teams are important influences, since such organizational arrangements combat professional isolation, encourage continuing internal group assessment of the preventive and curative services being offered, the discovery of deficiencies becoming a powerful motive for continuing education.

6. These social, professional, and organizational forces may create a climate that is more receptive to continuing education, but they will not automatically ensure that it occurs. The planning, organization, and operation of such educational programmes is the responsibility of each Member State according to the local needs and resources. However, the most promising way of organizing continuing education appears to be by institutionalization and integration into national health services (both being planned, financed, and evaluated together). The World Health Organization can provide guidance and assistance on request to Member States undertaking this important work.

The Expert Committee specifically recommends that the World Health Organization should encourage and support the following activities :

1. The development of national systems of continuing education for the health professions with clearly defined central and regional administrative responsibility and authority, and the integration of such programmes with the national health care system.

2. The development of mechanisms for determining the local health needs and the deficiencies of practitioners in order to provide the basic data required for establishing priorities in the planning of continuing education programmes.

3. The identification and development of more realistic incentives and rewards for physicians to encourage them to engage in continuing education.

4. The development of discussion among specialists in health services, biomedical and social sciences, and professional education, with the purpose of delineating jointly the specific objectives and the processes of continuing education for the health professions.

5. The development of demonstration projects in interprofessional education.

6. The training of a corps of specialists in continuing education for the health professions who can provide national and local leadership for programmes in this field.

7. The further involvement of universities and medical schools in continuing education activities.

8. The development of practical and economical self-evaluation methods to assess the elements of professional competence.

9. The further development of materials for self-instruction that aim at increasing competence in managing (rather than merely understanding) the main health problems in Member States.

10. The development of the idea that the primary purpose of continuing education is to assist in the maintenance and improvement of competence in delivering preventive and curative health care not merely to impart knowledge and to spread information.

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Annex

TABLE 1. ALLOCATION OF TASKS IN THE THREE PHASES OF A HYPERTENSION PROGRAMME ¹

Function	Physician	Public health nurse	Trained community volunteer	Nutritionist
Screening				
Organizes screening programmes	X	X	X	
Educates persons in the meaning of screening	X	X	X	
Helps plan screening programme for community	X	X	X	
Evaluation				
Orders specific laboratory, X-ray, ECG, and other tests	X	X		
Completes patients' records	X	X		X
Analyses data and makes diagnosis	X			
Treatment				
Provides treatment in accordance with specific patient plan	X	X		X
Maintains records of therapeutic regimen	X	X		X
Uses consultation and referral as necessary	X	X		

¹ Both Table 1 and Table 2 are taken from a preliminary report prepared by a task force on professional education for the United States National Hypertension Programme, under the auspices of the United States Public Health Service.

TABLE 2. AN ILLUSTRATION OF THE ROLES, KNOWLEDGE, AND ATTITUDES EXPECTED OF HEALTH WORKERS IN 5 PHASES OF AN 8-PHASE HYPERTENSION PROGRAMME

Roles	Knowledge	Attitude
<p>1. Screening</p> <p>(a) Undertakes screening for hypertension according to skill and responsibility.</p> <p>(b) Uses means of detection as appropriate.</p>	<p>(a) Knows criteria for screening for hypertension.</p>	<p>(a) Actively supports a full-scale screening programme.</p>
<p>2. Disease evaluation</p> <p>(a) Performs diagnostic tasks according to skill and responsibility.</p> <p>(b) Continues evaluation until a diagnosis is made.</p>	<p>(a) Understands guidelines for hypertension evaluation at various levels.</p> <p>(b) Knows diagnostic criteria for several kinds of hypertension.</p>	<p>(a) Believes that diagnosis and evaluation must consider cost-effectiveness of various procedures.</p>
<p>3. Treatment</p> <p>(a) Ensures treatment in accordance with a specific plan for the individual patient.</p> <p>(b) Delivers treatment in accordance with level of skill and responsibility.</p>	<p>(a) Knows various treatment regimes and when they should be applied.</p>	<p>(a) Believes that active intervention is beneficial in effecting course of disease.</p>
<p>4. Monitoring and following the patient</p> <p>(a) Maintains a continuing record of patient progress.</p> <p>(b) Communicates regularly with patient and acts on any new information received.</p>	<p>(a) Understands mechanism of action of different forms of treatment.</p> <p>(b) Aware of limitations of treatment and possible side effects.</p>	<p>(a) Believes that physicians' assistants etc., can adequately monitor and follow hypertension patients.</p>
<p>5. Recognition of new problems</p> <p>(a) Identifies deviations from expected outcome of patient care.</p> <p>(b) Correctly diagnoses deviations as either clinical, psychological, or social.</p>	<p>(a) Knows side effects of treatment.</p> <p>(b) Understands normal course of treated as well as untreated hypertension patients.</p> <p>(c) Knowledge of epidemiological patterns in hypertension.</p>	<p>(a) Believes that treatment of hypertension involves periodic evaluation and re-evaluation of effectiveness.</p>

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