

Medical Alliance

MEDEX

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A TECHNOLOGY aimed at helping to solve the growing worldwide crisis in health manpower has been developed and successfully applied in the United States of America under varying geographical conditions. Medex† (these are new providers of primary health care services) is now deployed in thirty States, including remote areas of Alaska. In addition, medex are being trained to provide primary health services to some of the most remote populations in the world in the vast Pacific expanse known as Micronesia. The image of such health services being provided only by physicians is being changed in America.

MEDEX is a systematic way of increasing health services to a large number of people in a relatively short time. The concept is derived from analyses of health-manpower development in numerous countries, including the United States. Its basic elements can be applied with relatively little capital investment. It can then be continued until the desired level of medical-care accessibility is reached, with modest maintenance expenditure. MEDEX has characteristics which make it *adaptable* (as opposed to transplantable) into many areas. It uses only the human and fiscal resources available and trains health manpower according to the specific needs of a community or country. Medex are integrated into existing health systems by extending the reach of physicians, rather than by substituting for them. In the United States the recruits are former medical corpsmen and nurses; in Micronesia they are former nurses and health assistants. Individuals with or without previous health backgrounds can be trained to become physician extenders when the MEDEX concept is applied to enhance the delivery of health services in various countries.

MEDEX has developed over the four years since the demonstration programme was initiated at the University of Washington in Seattle. Since then, eight additional American medical schools (serving as regional training centres) have begun training and deploying medex into areas where health services were hard to secure. The reasons for emergence of this kind of system were partly stated last year at the First International Conference on Education in the Health Sciences. Dr Bror Rexed, head of the Swedish

health system, described some of the pressures that are bound to produce change in the "scenario of medicine of the future"—among them, increasing cost, expansion of demand for ambulatory care, and introduction of new technology.¹ Prof. Isador Gordon has pointed up the problems of trying to train only traditional categories of health professionals. In his view, present efforts to meet the global crisis in health care solely by training more physicians are likely to fail.²

It is against the background described by Rexed and Gordon that MEDEX has been developed. The programme is also a response to the call by Fendall and others to take much of the stored knowledge reaped by basic research and apply it to the staggering health needs of many nations.³ Using applied research methods, a flexible system to increase primary health services has been devised which has six basic elements, adaptable as dictated by local needs and resources.⁴ These six basic elements of MEDEX are described below.

1. Collaborative Model

To obtain as much information as possible regarding the reasons a programme will *not* work, as well as reasons why it *must* work, groups with a vested interest in seeing the health field become more efficient and responsive to social needs are brought together at the beginning. This includes professionals at the top of the medical hierarchy, whose control should not be threatened. Major professional organisations, as well as organisations only tangentially involved with the new paraprofessional, are also brought into the group. They are encouraged to work cooperatively rather than competitively towards common and urgent goals. An essential facet of the collaborative model must be a respected medical training institution (preferably a medical school or teaching hospital). This serves three major purposes. First, it ensures good teaching during the relatively short academic-training phase. Second, it gives the programme stability and permits certification of professional competence. Third, it provides the sort of credibility absolutely necessary to instil confidence in the medex's work, in the eyes of both employer/supervisor (the highly trained doctor) and consumer (the public). These collaborative elements are given the opportunity to establish programme policy, especially if medex are going to work in "supervised remote practices" at considerable distances from physicians to whom they are responsible.

2. Receptive Framework

Creation of a new health professional demands careful preparation of the milieu in which he will work, to encourage acceptance by the medical profession, by other health personnel, by patients, and by supporting systems such as hospitals, the legal profession, and insurance companies. All groups and systems affected are contacted and are prepared for the arrival of the medex. Community preparation is of paramount importance, and here the skills developed by community psychiatry are particularly useful. Overcoming cultural barriers will in many instances make the difference between success and failure. Building an acceptable image and acquiring a special identity are difficult obstacles MEDEX seems to have hurdled. The importance of these cannot be overestimated in contemporary health-manpower programmes. Legally, too, the status of the medex needs to be clearly defined. Where applicable, malpractice insurance must be made available.

3. Professional Involvement

Recognising the need for change in any endeavour is

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† MEDEX is derived from the French words. *MÉDecin* *EX*ension, meaning an extension of the physician. Two words with identical spelling but different meaning are distinguished in this paper by use of capital letters: MEDEX refers to the programme or to the concept of this new technology; medex (used both for the singular and for the plural) refers to this new paraprofessional, and is also used as a title.

the first step towards that change. Important to a successful outcome, where paraprofessionals are concerned, is leadership by professionals. If doctors act as the agents of change, innovations such as MEDEX are skewed to succeed. Because physicians are involved from the beginning of the programme they are receptive to the newcomers. Their involvement includes participation in job/task analyses to ensure that training is directed toward paraprofessional skills that will be used on the job. The physician also participates in the selection and training of the trainee whom he will ultimately hire or supervise as a medex. This personal involvement tends to make the physician more careful about selection; and he is anxious, too, that his selection decision should demonstrate good judgment. Involvement helps to stimulate medical practitioners to delegate some of their tasks, as well as train them to share responsibilities and be comfortable with the delegation. If the "effective demand" for medex is to increase, this will depend upon increasing physician involvement.

4. Competency-based Training

If the emphasis at the mid-level of the medical hierarchy is placed on development of competence to perform specific tasks, rather than on accumulation of diplomas or degrees, medex can be produced and deployed rapidly. An assessment is completed before the start of training in order to document the community's health-service needs. Then task analysis is done to determine what the trainee will be doing upon graduation. The programme also takes into account the student's previous training and experience on entry, so as to avoid wasteful and discouraging retraining. If, for example, the individual is a nurse, a former military medical corpsman, or a health assistant, much basic material can be left out of the curriculum.

From analysis of data accumulated during the needs assessment and task analysis, and by taking into account the students' entry-level skills, a curriculum emphasising the primary needs of the community is laid down which makes the training relevant to the practice setting. The academic training programme can be shortened if the trainee learns only those skills which will be required of him in his job. Training people for nonexistent jobs or jobs which underutilise them is avoided.

These steps are linked to today's identifiable needs. Preparation for meeting future needs should be in the hands of an integrated programme of continuing professional education (see the sixth element below).

5. Deployment System

In order to direct training programmes towards realistic requirements, MEDEX has a built-in system to deploy graduates into areas of need. This is accomplished in part by involving physicians in the selection, training, and employment/supervision of these new paraprofessionals. Such physicians should be selected, whenever possible, from among primary-care physicians working in or near areas of need. They should agree to assist in the training and subsequently in supervision of the new manpower. After an intensive academic (didactic) training phase in a medical school or teaching hospital, medex trainees are integrated into the office, clinic, and hospital environment quickly, by having the bulk of their remaining training (preceptorship) take place on the job, in surroundings similar to their future work situations.

This model of training means that an individual knows where and for whom he will be working before he begins his training.

6. Continuing Professional Development

For a MEDEX programme to remain relevant to a rapidly changing society, a mechanism is included to pro-

mote professional growth of the medex. Thus, in addition to filling gaps in knowledge identified by the trainee himself and his professional employer/supervisor, a planned programme of continuing education is regarded as an essential responsibility of the training institution and/or other elements of the collaborative model. It is promotion of the medex's education as a dynamic continuum that allows competent (and perhaps non-degreed) personnel to extend the capacity of physicians to meet the needs of societies.⁵⁻⁷

Each of these six elements reflects the designing-out of specific problems encountered in health-manpower programmes in various countries. Competency-based training is a considerable departure from the traditional training of health professionals.

Newer training technologies such as algorithms and video-tape packages substantially reduce the time needed to train these new professionals. A short (three-month) but intensive didactic training phase is followed by a nine-month preceptorship training phase. Building upon the previous competencies of medical corpsmen, nurses, or health assistants, competency-based training does not waste time by teaching inappropriate material. Rather, it assists individuals to acquire additional skills dictated by analysis of the jobs to be performed. For students with no previous health background, the training is longer.

The MEDEX approach is producing individuals who already are increasing physician efficiency (measured by patient visits and hours spent in practice) by 75-125%.⁸ In "supervised remote practices" medex alone may adequately handle 80% or more of the problems in an outpatient clinic.^{9,10} This is possible because these new paraprofessionals perform many of the routine, repetitive medical tasks that have hitherto been the sole domain of the physician but which do not require the sophisticated training and experience of a fully trained doctor. Medex are taught which patients require the physician's more intricate and profound diagnostic and therapeutic skills.¹¹

By far the most important elements in MEDEX as a tool for enhancing and expanding delivery of health services is the building of the receptive framework. Two usually neglected facets—community preparation and imagery of the medex—require the skills of the emerging sphere of community psychiatry. To augment the public's perception of the providers of primary health services requires the development of a new identity. Creation of an image of a competent primary-health-care professional, working within his/her limitations, requires skills in group dynamics and communications not usually considered important in health-manpower development. Further, the invention of a bisyllabic title and form of address (*Medex Jones*, *Medex Guernet*) has aided in the creation of a new and distinct nonpejorative identity which Fendall¹² and Kesic¹³ regard as essential if health-manpower development is to progress.

The MEDEX system is now being adapted to multiple socioeconomic, cultural, and geographical settings. MEDEX is being adopted by medical-care systems in highly industrialised as well as less developed settings. Taking advantage of advances in task analysis,

competency-based training, and community psychiatry, this approach to the training and deployment of physician extenders into areas of need is one of the most encouraging developments in health manpower in recent decades.

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Occasional Survey

NOTE ON THE ASSESSMENT AND CLASSIFICATION OF PROTEIN-ENERGY MALNUTRITION IN CHILDREN

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Summary

Mild or moderate malnutrition in children is usually assessed by deficit in weight-for-age. This conceals two different conditions—deficit in height-for-age (“stunting”) and deficit in weight-for-height (“wasting”). It is important that these conditions should be differentiated and assessed separately. It is concluded that the expected weight of a child of given height is independent of age and largely independent of race.

THERE have been several reports ¹⁻⁴ on the assessment and classification of mild protein-energy malnutrition—i.e., before the development of fully fledged kwashiorkor or marasmus as defined in the Wellcome classification.⁵ It is important for international comparisons that an agreed system should be established.

The most commonly used method of assessment is based on deficit in weight-for-age.⁶ However, a low weight-for-age may represent two quite distinct conditions or forms of undernutrition (table 1). Many workers ^{3,7} accept that type A, in which there is a deficit in weight-for-height, represents a fairly acute state of malnutrition: growth, as shown by height, has been reasonably satisfactory until some acute episode, infective⁸ or nutritional, supervenes. In type B, in which there is a deficit in height-for-age, undernutrition over a long period has caused a retardation in linear growth. Although the end-point, in terms of weight-for-age, may be the same, one cannot say that the physical state of these two children is the same. In practice in a great many undernourished

TABLE 1—COMPARISON OF TWO HYPOTHETICAL CHILDREN WITH THE SAME DEFICIT IN WEIGHT-FOR-AGE

—	Normal	A	B
Age (yr.)	1	1	1
Wt. (kg.)	10	7	7
Ht. (cm.)	75	75	65
% Wt./age	100	70	70
% Ht./age	100	100	87
% Wt./ht.	100	70	100

children both processes will be at work, and there is a mixture of acute and chronic, and of present and past undernutrition.

It is difficult to find names for these two types which do not cause confusion. The term “underweight” has been applied to children who are below the expected weight-for-age,⁵ and therefore cannot be used to define a deficit in weight-for-height. Perhaps “wasted” would be appropriate until a better name is suggested. The second type (type B, table 1) has been well-described as “nutritional growth failure”,⁹ but for the sake of brevity I shall call this condition “stunting”.

In a previous paper ¹ I attempted to classify children according to the severity of stunting and wasting in each case. 3 grades of deficit in height for age were distinguished: grade 1=95-87.5; grade 2=87.5-80; and grade 3 <80% of standard. I now think that a more appropriate grading is 95-90, 90-85, and <85%, since the s.d. of height-for-age is about 5%. If one allows one grade for normal and three grades of increasing deficit—mild, moderate, and severe—for wasting and stunting, the result is a 4×4 table. This shows at a glance, in a given population of children, the extent of wasting, of stunting, and of mixtures of the two.

Problems arise, however, in the methods of assessing the deficits in height and weight. The degree of stunting is determined as the actual height of the child, expressed as a percentage of the expected height at the same age. Expected heights at given ages have to be taken from some “normal”, “standard”, or “reference” population. For this purpose the so-called Harvard standards of Stuart and Stevenson ¹⁰ have been widely used. If, as seems probable, there are genetic differences in height between different populations, the Harvard standards are not universally applicable. On the other hand, if local standards are used, international comparisons are not possible. There is no solution to this difficulty. However, the dilemma may be more apparent than real if one distinguishes between the actual values obtained and the conclusions to be drawn from them. The only purpose of demarcating grades of severity—a process which is inevitably arbitrary—is to identify roughly the size of the problem on which action needs to be taken. If one is dealing with a population which is genetically small, the interpretation of the results could be adjusted—e.g., grade 1 could be regarded as normal, grade 2 as mild, &c.

WEIGHT, HEIGHT, AND AGE

There are greater difficulties over the expression of deficits in weight-for-height. In my paper,¹ I calcu-