

MEDEX: A NEW APPROACH TO THE GLOBAL HEALTH MANPOWER PROBLEM¹

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A systematic method for rapid expansion of health services has been developed and successfully applied in parts of the United States of America and Micronesia. It has recently been shown that the basic elements of the system can satisfy the particular needs of both developing and developed communities. This article is devoted to describing the theory and practice of this MEDEX system.

Introduction: The Problem

How to make health services available and accessible is a problem that confronts highly industrialized countries as well as developing nations. Although such nations may differ greatly, they have many points in common with respect to the availability of appropriate health care services.

There is a shortage of health manpower in most countries of the world. What is frequently overlooked, however, is that in some cases an unbalanced distribution of physicians makes this shortage statistically relative rather than real. Nevertheless, in developing countries the shortage is genuine, no matter how it is described. For example, Indonesia has approximately one doctor for every 27,560 people—while in the United States of America there is approximately one doctor for every 650 individuals (1). Yet both of these countries have a serious shortage of available and accessible health care services for particular geographic areas and population groups. In general, these problems most often affect rural areas and poor sectors of the population.

Many nonindustrialized nations have modeled their health care delivery systems after those found in developed countries. This is often unfortunate, for in many cases the pace-setting developed countries which in-

formally or formally establish the standards are characterized by:

- 1) a relative abundance of physicians, but a relative shortage of available and accessible health care services for many parts of their populations;
- 2) a strong economic base for health services;
- 3) acceptance of the idea that only a physician can give medical care, which leads to no medical care where there is no physician; and
- 4) inappropriate and ineffective utilization of available health manpower.

Most physicians and nurses tend to congregate around cities; few settle in rural locations, nor are many found in poor sections of metropolitan areas. As a result, the urban poor and rural dwellers have limited access to health care. Training more physicians is unlikely to have much effect on this pattern of maldistribution.

At the same time, both developing and developed countries tend to have a large proportion of health professionals who are not well suited for providing primary medical care and preventive services because they are overtrained. In many instances these professionals are relatively unproductive because they struggle to limit their practice to their specialty—which often has low priority in terms of the community's health care needs. They also tend to be especially strongly drawn to the more sophisticated, comfortable surroundings of the city, with its medical centers and large paying-patient population.

Another aspect of the problem is that more

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technology has been developed than the health field can use practically at this time. Basic research has increased medical knowledge far beyond the technical and economic limits of practical application (2). However, a great deal of applied research is needed to bring available medical knowledge to bear on patients' needs (3). Utilizing new data and technology for this purpose is more difficult and challenging than comfortably continuing to copy traditional medical methodology whose probable failures in the 1970's and beyond are just now becoming apparent.

It is also evident that human and financial resources, as well as the will of governments, to significantly increase the supply of physicians, nurses, etc., is inadequate at present; and there appears to be no relief in sight. The gravity of this situation will undoubtedly increase. In his book *World Health Manpower Shortage: 1970-2000*, Professor Isador Gordon points up the problems of trying to train only traditional types of health professionals, stating that present efforts to meet the global health care crisis solely by training more physicians are likely to fail (4).

Moreover, it is becoming increasingly clear that the availability of health care services is inextricably linked to the development of programs that will train appropriate health manpower and deploy it in areas of need. This makes it important to recognize that while a prime objective in health manpower development is to produce an increasing supply of specific types of manpower (physicians, nurses, etc.), it is also critically important to increase the provision of primary or basic health services. One way to achieve this is to raise the productivity of physicians already in practice, while simultaneously increasing the number being prepared by medical schools.

In short, there is a world-wide problem of disequilibrium between people needing health services and the health manpower available—and between knowledge available and care delivered. There is no question that we must continue to train physicians and other established health professionals. However, circum-

stances are developing as a result of health care inadequacies which demand that we look for other ways to increase the supply of health services provided to the populations of many countries. Recognizing that there are problems in developing new health manpower programs, parapsychian³ programs offer one of the reasonable steps that can be taken now to begin meeting some of the social and political realities of this global dilemma.

Past Efforts

Some health manpower programs that train parapsychians have produced what could be termed substitutes for physicians. However, it is extremely difficult to integrate such parapsychians into traditional health system structures without threatening physicians who are in control of medical care. Because of this problem these programs have had very little chance of effectively and permanently altering existing structures or significantly improving the delivery of medical services.

Because they were substitutes and not teammates, paraprofessionals trained in many of these programs often lacked physician supervision. Without supervision, professional stimulation, and the opportunity for continuing medical education, the quality of care delivered tended to decrease—even though a generally high level of care may have been provided initially. The usual course of these programs was thus to regress to the point of dissipation and abandonment because they had not been integrated into the health system.

Other health manpower programs lack the ability to place and maintain appropriate health manpower in areas where it is urgently needed.

³The term *parapsychian* is used in this paper to describe specially trained individuals who are capable of performing selected medical tasks which traditionally have been performed only by physicians. Parapsychians extend the ability of physicians to provide health care services; they are called by various names in different countries (medical assistants, feldshers, physician's assistants, nurse practitioners, medex, etc.).

Some existing programs do attempt to place personnel in outlying districts that have clinical facilities. However, for the most part health manpower is becoming more concentrated in urban environments rather than less so.

Programs to train new manpower generally disregard the need to develop a professional identity and an image that inspire professional pride in the parapsychician and confidence in the patient (5). Indeed, many health manpower programs produce personnel who seem characterized by programmed inferiority. For example, sometimes titles are used which the World Health Organization has stated are demeaning (6), because health system planners persist in using such terms as "assistant" and "aide," which only serve to establish an inferior position in a hierarchical order. New titles are being devised and used successfully in a few countries.

In the past, program managers have also generally failed to prepare communities and professional groups for receiving and using the new kinds of manpower being prepared; and there has been little effort to involve either the professional or lay community in developing new health delivery methods. Thus, in some instances the community has totally rejected the new kinds of manpower introduced.

Many programs for increasing health manpower cling so tightly to traditional patterns that they ignore technological advances in health or in other fields which can facilitate training and deployment of new kinds of health support personnel. As a result, advances in communications, transportation, and training are frequently not utilized, even though they could improve traditional training programs and make contemporary systems more appropriate to today's health needs.

At the same time, many programs developing new kinds of health manpower cannot be reproduced outside their area of origin. Their reputation for producing high-quality manpower is thus not reinforced, since such reinforcement generally requires that a program prove itself under varying circumstances in a number of different geographic locations.

Requisites for a New Approach

In the developing world (which includes most countries) there is a growing need for a new approach to health care delivery services, as well as for rapid upgrading of these services' present capacity. Many countries have found that manipulation of organizational structures and financing mechanisms does not answer the one critical question which usually remains: Who is going to deliver the services?

Most nations are unable to allocate sufficient funds for health development because other developmental needs assume higher priority. If we suppose that the primary objective of health professionals is to deliver quality services, then we must devote our closest attention to the manpower providing the service. In a large number of countries the urgent requirement is for a system that will train and deploy *appropriate* health manpower to areas of need. The agencies responsible must thus establish an order of priorities by means of a suitable system of health planning.

To meet the needs of diverse locales, a successful manpower development system must be adaptable to multiple settings and local medical care resources. Also, it must be controlled by a responsible medical establishment—which can be a medical training institution, a medical association or national medical council, a government, or a combination of these.

The system should not increase the workload of present practitioners, but rather should enlarge the area and population served by the country's practicing physicians. The emphasis should be on primary care. General practice medicine should thus become more attractive for physicians as a result of the new manpower technology introduced.

A new health manpower system should also demonstrate that it really is making medical care more accessible and available. It should train personnel to meet the needs of specific communities and then send them to those communities. It could also ally itself with other programs working to increase the productivity and efficiency of practicing physicians.

Paraphysicians trained to perform selected jobs or routine general physician tasks are the personnel required in most settings. When such paraphysicians are used, they must be under some form of supervision by practicing physicians, though the supervision may be remote; some special incentives may be needed to assure that physicians will assume this additional supervisory responsibility.

By linking paraphysicians with physicians, ties can be established which will integrate the former into existing health care delivery structures. In this way necessary quality controls, which are the concern of those evaluating such innovations, can be built in. If evaluation of the initial demonstration program does not show an improvement in the quality of health services being provided for the defined population, the program should then be liquidated.

Analysis of the work performed while delivering medical care provides the foundation for training programs based on levels of competence rather than on prolonged degree-oriented educational undertakings. A competency-based program first evaluates the skills possessed by an individual. It then devises a course of training which augments or improves these skills, enabling the person to perform a defined task. A degree-oriented education program, on the other hand, does not consider skills already possessed, nor is it usually concerned with defining tasks in an operational setting.

If this type of competency-based training is coupled with assurance of job placement on completion of training, then health personnel can be selectively trained according to a locality's specific needs. However, it should only be deployed after both the trainee and the community have been prepared for his assumption of medical duties. This will help avoid an international version of what Ivan Berg has called the "great training robbery" (7), a "robbery" encouraged by frequently inappropriate preparation of professionals in health care and other fields. This latter sort of preparation, which may take place either inside or outside the trainee's country, is often irrele-

vant and ultimately discouraging for the person involved. It is also unlikely that a local worker who has been overtrained or inappropriately trained to meet local needs can be effectively utilized—or that he will remain on the scene, even though he may be highly motivated and patriotic.

A Theoretical Solution

It is evident that health delivery systems can be improved by training and introducing new kinds of health personnel. The present distribution of personnel resembles an hourglass, with highly-trained professionals in short supply at the top and numerous non-professionals at the bottom. The narrowed middle of the hourglass—the area of the paraprofessional—is essentially devoid of personnel able to do the many tasks of the skilled physician that do not require a physician's sophisticated training and experience. Such personnel, working with the physician or operating as his extension agent in a supervised remote practice, are needed and can be fruitfully employed in parts of the world that are hard-pressed to provide adequate health services.

It has been shown that paraphysicians can provide a health system with significant amounts of primary and preventive health care. Developing and utilizing paraprofessional health manpower for primary medical care is thus one of the steps that can be taken to significantly improve the health care delivery systems of many nations (8, 9, 10). However, doing this on a scale that makes a significant contribution to health requires an overall or "total systems" approach to planning, implementation, and operation of a manpower program.

The following basic elements of a theoretical model are offered as one approach to solving some of the problems discussed here:

1) *The Organizational Framework; A Collaborative Model*

To learn as much as possible about why a program will *not* work, as well as why it *must*

work, groups with a vested interest in seeing the health field become more efficient and responsive to the needs of society should be brought together at the beginning; this includes professionals at the top of the hourglass, whose control of the field should not be threatened, as well as major professional organizations and organizations only tangentially involved with the new paraprofessional. All these groups should be encouraged to work cooperatively rather than competitively toward the urgent goals which are of common concern.

An essential feature of this program should be the support and active collaboration of a respected medical training institution, preferably a medical school or teaching hospital. This serves three major functions: it provides quality academic instruction during a relatively short training period; it adds stability to the program and certifies its professional competence; and it provides the paraphysician with the credibility that is vitally needed to win the confidence of his employer/supervisor (the highly-trained doctor) and the people being served.

These collaborative elements, both vested interests and training institutions, should be given the opportunity to establish program policy, especially if paraphysicians are going to work in supervised remote practices at a considerable distance from the physicians responsible for them.

2) *The Receptive Framework*

Creation of a new health professional also demands careful preparation of the social milieu, so as to encourage acceptance by the medical profession, other health personnel, and patients, as well as by supporting groups such as hospital administrators, the legal profession, and (where applicable) insurance companies.

All groups affected by the innovation should be contacted and prepared to receive the paraphysician. In this regard community preparation is a paramount consideration. The skills developed by community psychiatry are thus particularly useful in helping to develop the necessary receptive framework. In many

cases overcoming cultural barriers will determine the difference between success and failure.

Legal questions must be dealt with and resolved, so as to create a definitive legal status for the paraphysician. Where applicable, mal-practice insurance must be made available.

Seemingly arcane, perhaps a bit hucksterish, and thus neglected, is the matter of "imagery." Nonetheless, it is critical in assuring acceptance of paraphysicians. Successful imagery entails knowing how different social images are perceived, understanding how the media affect these images, and developing and guiding the desired image in the proper direction. All of this requires skill in the field of communications. Specialists in the communications process, such as community psychiatrists, can fruitfully bring their insights to bear on the task of breaking down barriers to medical change, the ultimate problem opposing successful employment of the paraprofessional.

3) *Professional Involvement*

Recognizing the need for change within one's own field of endeavor is the first step toward that change. It is therefore important that professionals take the lead in developing paraprofessionals. If doctors act as agents of change, innovations such as paraphysician programs have a much greater chance to succeed.

Furthermore, the new paraphysician will be much better received if physicians are involved in the program from the beginning. Their involvement should include participation in job analysis aimed at assuring that training is directed toward development of paraprofessional skills that will be used in practice. The physician should also participate actively in the selection and training of the person whom he will ultimately hire or supervise as a paraphysician. This personal involvement will cause the physician to be quite prudent in helping to make the selection, and he will thereafter have keen interest in proving that he showed good judgment in making his choice.

Such involvement will also help stimulate

medical practitioners to delegate some of their tasks, to share some of their responsibilities and to feel comfortable about doing so. Increasing the "effective demand" for paraprofessionals will thereafter depend upon increasing physician involvement.

4) *Competency-Based Training*

If emphasis at the mid-level of the hourglass is placed on development of competence to perform specific tasks, rather than on accumulation of diplomas or degrees, development and deployment of the paraprofessional can be achieved rapidly.

An assessment of the health service needs of the community to be served should be completed before training is begun, in order to specifically document these needs. This should be followed by task analysis to determine what the trainee will be doing upon graduation.

The program must also consider the student's existing skills, based on prior training and experience, in order to avoid wasteful and discouraging retraining for skills already possessed. For example, if the trainee is a nurse, a former military medical corpsman, or a health assistant, much basic material may be omitted from the curriculum without loss.

By synthesizing data accumulated during the needs assessment and task analysis, and by taking into account the students' entry-level skills, a precise curriculum emphasizing the primary needs of the community can be developed. This will increase the relevance of the training given, and will make it more useful in practice. Furthermore, the academic training program 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 underutilize them is avoided by placing emphasis upon appropriate training. This approach to curriculum development and training encourages emphasis on pragmatic clinical experience which meets today's identifiable needs.

5) *Deployment System*

To direct educational programs toward realistic requirements, the theoretical model suggested should have a built-in plan for sending graduates to geographic areas where they are needed. This can be done through the previously mentioned involvement of physicians in the selection, training, employment, and supervision of these new professionals.

Physicians who are to be involved in the development process should be selected, whenever possible, from among primary-care physicians working in or near areas of need. These physicians should agree to assist in the training and subsequently to supervise the new manpower. After an intensive academic training phase in a medical school or teaching hospital, paraprofessional trainees should be integrated into the office, clinic, and hospital environment quickly, by having the bulk of their remaining training take place on the job, in surroundings simulating their future work situations. This training model, combined with the initial arrangement of future job opportunities, leads the individual to identify with a specific type of service in a particular geographic area before training begins.

6) *Continuing Professional Development*

If a program is to remain viable and relevant in a rapidly changing society, a mechanism must be included to promote professional growth of the paraprofessional. This means that besides having the professional supervisor fill in knowledge gaps identified by himself and his trainee, a program of continuing education should be an essential responsibility of the training institution or other elements of the collaborative model. It is this continual promotion of the paraprofessional's education, as much as anything else, that will allow competent (and perhaps non-degree) personnel to extend the physician's capacity to meet the needs of today's world.

A Working Model

In order for this theoretical model to be applicable, two basic conditions must exist; that is, there must be a need for paraprofessionals and there must be health professionals who want to do something about that need.

MEDEX⁴ is the name of a manpower program designed specifically to meet the need for a new approach. This new program is now operating in urban, suburban, and rural communities of the United States and the Pacific basin. To date, the greatest emphasis has been placed on rural health services.

The word "medex" is short, with two quickly pronounced syllables—one hard, one soft, just like "doctor." It is appropriately used as a title when this paraprofessional is addressed by patients or other professionals. In settings where medex are working for physicians, the medex title is synonymous with a certain level of performance under the supervision of a physician. The use of a blue jacket instead of the physician's white one has helped establish a distinct identity for medex in the university training phase as well as in the setting of private practice.

The original MEDEX demonstration program began in 1969 at the University of Washington in Seattle. This model has since been reproduced at eight other medical schools across the United States. At present, medex personnel trained by these nine regional training centers are practicing medicine in thirty states of the United States, including Alaska—where a medex may be up to 500 miles away from his supervising physician. In addition, the MEDEX system has been adapted to the health needs of Micronesia's vast Pacific expanse. As a result, medex are participating in supervised remote practices serving this region, and there-

by caring for some of the most isolated population groups in the world.

The ideas behind the MEDEX program are not entirely new. In fact, MEDEX is simply a systematic and flexible model for health manpower development which uses available knowledge, resources, and interest to solve a serious problem. However, the basic elements of the program (consisting of the collaborative model, receptive framework, deployment system, competency-based training program, practitioner involvement, and continuing education) have provided new perspectives on health care as well as a technique for strengthening the delivery of health services. This technique can be used not only to train nurses, former military corpsmen, and health assistants as medex, but can also be used for training new types of health workers who may or may not have had previous medical training. In other words, it is now possible to adapt the MEDEX program's techniques for training and deploying health personnel to the needs and resources found in a wide range of different geographic regions.

Important Characteristics

The following are important features of the MEDEX program:

- 1) It can readily be adapted to a wide variety of socioeconomic, cultural, and geographic situations.
- 2) In each case it is tailored to meet specific needs determined by task analysis, so as to assure that the manpower trained is relevant to the area in which it is used. Accordingly, the program's structure can be adapted to fit a country's particular needs.
- 3) Available human and fiscal resources are used as follows:

(a) Trainees are drawn from manpower pools of nurses, former military medical corpsmen, other health-trained individuals, and individuals with no previous medical background.

(b) Practicing physicians do most of the training on location, following intensive instruction of the trainee at a medical school or teaching hospital.

⁴MEDEX is derived from the French words *MED*icin *EX*tension, meaning an extension of the physician. Two words with identical spelling but different meanings are distinguished in this paper by use of capital letters. "MEDEX"—all capital letters—refers to the program. The word "medex" (used for both singular and plural) refers to this new professional, and is also used as a professional title; i.e., Medex John Doe.

(c) Depending on locale and disease prevalences, a medex can generally handle between 50 and 90 per cent of the routine diagnostic and therapeutic problems encountered by the physician; however, his salary can be set at a level which represents a significant saving for the country (8, 11, 12).

4) In many developing countries a MEDEX program for remote areas could somewhat resemble prevailing non-physician health care systems; but in reality there may be a substantial improvement in the quality of care delivered. The main reasons for this are involvement of local physicians in training and subsequent supervision, continual support by a medical school or similar institution, primary emphasis on assuring the competence of medex to perform their tasks, and a commitment to continuing medex education.

5) The MEDEX program can fit into the existing medical care system and can be controlled by organized medicine or government through the physicians who are responsible for its supervision.

6) MEDEX can be phased out if a country finds it has trained enough physicians, in much the same way as the U.S.S.R. has begun phasing out feldshers.

MEDEX programs to date have taken advantage of the training and experience of nurses and former military medical corpsmen, and have adapted it to the civilian medical care setting in the United States. In addition, nurses and health assistants are being trained as medex in Micronesia.

The physicians supervising medex say these skilled paraprofessionals are demonstrating an ability to significantly increase the productivity and accessibility of the physician while maintaining or improving the quality of medical care provided to patients. Initial evaluation studies conducted during on-the-job training of the first MEDEX class indicate that physicians who have a medex working directly with them are able to see 50 per cent more patients than when they were without the services of this paraprofessional (8). In supervised remote practices it is predicted that medex alone could adequately

handle 80 per cent or more of the patient load for an outpatient clinic (11, 12).

The basic elements of the MEDEX technology have been shown practical under varying conditions. The role of organized medicine (in the form of state medical associations), through its important contributions to the collaborative MEDEX model and to the activities of the university schools of medicine and practicing physicians, has shown that the groups most interested in patient care can enhance their abilities to provide medical services by supporting cooperative efforts such as MEDEX. This cooperation by the medical associations has led to additional significant contributions by nursing, hospital, and pharmaceutical associations.

Acting together, components of this collaborative model have produced the receptive framework required for medex. This framework has included professional and nonprofessional acceptance and a legal basis for the MEDEX program. The necessary legal structure has been or is being developed in a number of states, and has been developed in Micronesia; malpractice coverage for medex has been obtained without difficulty in the United States. Another concern, the matter of payment for services by third-party health insurance companies, has posed few problems.

In general, it appears that potential difficulties such as these can best be minimized by having the leaders of an operating program—as opposed to a program in the planning stage—request needed changes within a collaborative framework. It is thus suggested that variations be made in the operating model in order to promote optimum development and deployment of appropriate paraprofessional personnel.

No advance studies were performed to assess how people felt about receiving medex care, since program planners felt that positive images of medex and their services could best be created by careful community preparation for their arrival, reinforced by their actual arrival and ensuing practice. Enhanced by the real social need for the services provided, the resulting images have been overwhelmingly

positive and have resulted in almost universal patient acceptance.

This experience contrasts markedly with the negative findings of studies assessing community receptivity toward paraprofessionals before the community had any practical experience on which to base its opinions (13). These findings, however, ignore the potential for careful preparation of the public by community psychiatrists and other professionals, and thus fail to reflect the true possibilities for health manpower innovation.

Problems of professional identity, status, and mobility were anticipated in the development of MEDEX (14). Although a medex is a type of "physician's assistant," we have avoided calling him this because the phrase does not reflect his training, skills, or competence. In fact, the term "assistant" is pejorative and conjures up an image of inferior health service. A functional definition derived from the Washington State MEDEX program would indicate that a medex is a health professional who can take histories, perform physical examinations, apply and remove casts, diagnose and treat specific diseases according to standard orders and routines, suture lacerations, make nursing home visits, assist at surgery, etc. (15); some medex carry out their duties in supervised remote practices at varying distances from their supervising physician.

It should be noted that the tasks these medex are performing under supervision are not precise or perplexing ones requiring broad theoretical training and preliminary practice. Rather, they are tasks that do not require the physician's extensive educational background and sophisticated decision-making abilities—but ones that were nonetheless being performed by him.

At the same time, however, the MEDEX concept provides a new image, a category of health personnel which has not existed before, and gives an opportunity for health administrators to make necessary changes in the health system that would not be possible using the traditional categories of health professionals.

The Training Program

The MEDEX approach emphasizes training based on levels of competence, as opposed to degree-oriented training, in the belief that scarce resources should be directed toward pragmatic solutions in times of crisis. To train for a job on the basis of an actual task analysis, rather than on a theoretical or ideal basis, makes rapid and highly relevant training programs possible. It also provides a flow of individuals who are immediately appropriate and capable of giving a competent performance in a professional field. Competence in ameliorating hypertension and in treating the pneumonia/diarrhea complex is much more important in the actual provision of primary or first-contact health care in hard-to-reach areas than is extensive but non-applicable knowledge of philosophy and the theory of disease mechanisms. The latter have been and will remain the domain of the fully educated physician, to whom the more serious cases will be referred. It should again be emphasized that in communities with good access to health care, a system of care involving paraprofessionals with physicians may take on different dimensions.

The length and content of the curriculum used by the participating medical school or teaching hospital was initially designed to instruct former medical corpsmen. Since then, this curriculum has been appropriately altered to fit the different types and levels of competence of other individuals, who may or may not have had previous health training.

The training of graduate nurses and health assistants in Micronesia, for example, offered an opportunity to observe how the curriculum could be adapted. In this case the approximately three-month university or teaching hospital didactic training phase emphasized areas in which the medex trainees had the least amount of prior experience. The areas covered included pediatrics, chronic diseases, and the psychodynamics of health care, in addition to the heavily stressed subjects of history-taking and physical examinations.

New training techniques have been em-

ployed to train medex at various medical schools. Video-tape packaging systems and algorithms (branching, decision-making flow charts) for training and monitoring are examples of technological advances used to train this new type of health manpower. These and other new techniques, coupled with traditional medical teaching methods, are now being adapted for use in areas with few academic medical resources.

The didactic training phase is followed by on-the-job training. This consists of a 9-12 month preceptorship with the physician who will ultimately employ or supervise the trainee. By having the bulk of the training occur in this manner, the vested interest of the physician will ensure much better training than if the medex were to be one of several trainees of uncertain destination rotating through his office. Further, by making the courses of academic preparation relatively short, minimal additional responsibilities are placed on already overburdened training institutions, and the emphasis on clinical rather than academic training is maintained. The preceptorship training also provides immediate assistance to the physician, and this assistance continually increases as the training proceeds.

As previously noted, the academic training program is very short and concentrates primarily on basic skills. This basic training is augmented by seminars and workshops, which are held periodically during the ensuing preceptorship. As a result, there is a continuing education process which augments basic training and promotes continued professional development. This allows identified gaps in knowledge to be bridged, and also provides the opportunity needed for long-term monitoring. After the twelve-month training program ends, classes continue to be held periodically under the guidance of medical associations, the government, or other organizations.

The MEDEX concept encourages practitioner involvement, not only to assure placement of medex, but also to relate the training received during the didactic training phase to the specific tasks the medex will perform in

practice. The physicians who agreed to train and supervise medex helped develop a list of tasks they wanted the paraphysician to perform, and physicians' interviews of candidates were the crucial criteria in final selection of the trainees. Besides involving university faculty, this approach thus utilizes a large, almost untapped source of medical education: the practicing physician.

In the United States, physicians agree in advance to employ a medex after he or she is trained. If there is a need for manpower remote from the physician, he agrees to supervise the medex. This joint experience of training and working together provides emotional and professional support for the medex. If the medex is working in a remote setting (as in some parts of Alaska or in Micronesia's MEDEX program), the physician's continued supervision provides support, and encourages stability and permanence. In this way the initial deployment of the trainee fixes the area of work, which can therefore be predetermined in most cases.

The MEDEX program is concerned with supervising these paraphysicians, because lack of supervision has caused the demise of a number of similar programs. The relative investments of time, money, and human resources favor the MEDEX approach, as compared to lengthy preparation of professionals who are often inappropriate for the communities they are to serve.

By selecting as preceptors physicians in or near areas of need, the program has created a deployment system which directs assistance to areas where it is needed most. Thus MEDEX employs a technique which takes account of maldistributions of health manpower and which can do something constructive about them.

In sum, a MEDEX program can be implemented with relatively little capital investment. If successful, it can be continued with a modest maintenance expenditure until the desired level of access to quality medical care is reached. It has adaptive characteristics, uses only available resources, and trains manpower for the specific needs of the community or country involved.

SUMMARY

This article attempts to stimulate change in the delivery of health care, change which can only be accomplished by concerted efforts directed at meeting today's staggering needs. It is also designed to spread information about a newly developed method which has succeeded in improving the quality and quantity of medical care provided to populations receiving inadequate care or none at all. This method, known as MEDEX, is aimed at helping to solve the growing world-wide crisis in health manpower. It has been developed and successfully applied in the United States of America under varying geographic conditions and is now operational in thirty states, including remote areas of Alaska. In addition, medex are being trained in

the Pacific to provide primary health services in Micronesia.

Adaptation of the MEDEX program's basic elements to multiple socioeconomic, cultural, and geographic settings is now underway. Taking advantage of recent advances in task analysis, competency-based training, and community psychiatry, the approach is designed to provide appropriate instruction for paraprofessionals and to deploy them into areas where they are needed. Because it has succeeded in achieving these goals while remaining adaptable to a wide range of conditions, the method appears to be one of the most encouraging recent developments in the health manpower field.

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