SPECIAL COMMUNICATIONS

Health Care Training of the Physician Assistant: A Proposed Cardiopulmonary Program

William F. Miller, M.D., F.C.C.P.*

World population at the turn of the century was about 1.5 billion; it has doubled in the last 60 years, and at the present rate will reach more than 7 billion by the end of the century.¹ We have also seen an explosion in technologic and scientific knowledge; yet, the number of medical school graduates each year per million population in the United States has remained essentially the same for the last 40 years. Even if a 50 percent increase in enrollment were possible next year, we would not see a substantially larger manpower pool until the year 2000.²

Contributing factors to the widening gap are: an affluent society that demands better and more sophisticated health care, the recognition of health care as a right for all citizens, government legislation for health programs, and burgeoning health insurance plans. The increasing trend of the overworked primary physician who elects to leave his field and returns for training in a less demanding specialty compounds the problem.

Drastic innovations must be made if anything effective is to be accomplished from the standpoint of increased numbers of physicians. The whole approach to training may have to be changed, including return to a two-year premed course, a shortened curriculum, internship absorbed into the last year of medical school, a requirement for acceptance by specialty boards of a two to three-year period of general practice—or perhaps an alternate route of total specialization that begins early and eliminates much time now spent in general training. The often touted advice to build more medical schools fails to place into proper perspective the almost impossible task of training and acquisition of sufficient faculty for the new facilities.

PULMONARY PHYSICIAN SHORTAGE

The problem of shortage of pulmonary physicians per se is especially acute in light of the astounding increase in pulmonary diseases as a health problem. Reflecting the shortage is the evidence that except for pediatrics, at last count, there were more vacancies for medical school faculty positions in this field than in any other section of the medical faculty.

With respect to physician specialty training in pulmonary diseases, there does not appear to be any lack of training programs, although financial support is less than ideal. The major difficulty has been in the availability of well-qualified candidates for such training programs. Virtually all of the existing training programs have vacancies or are filling positions with less than ideal candidates.

An added impediment to meeting the need for adequate medical school faculty in pulmonary diseases is the overwhelming demand for trained pulmonary physicians by private medical facilities that need physicians to direct their clinical pulmonary laboratories and respiratory therapy departments and who are in a position to offer extremely lucrative salaries and other benefits not available through medical schools. At the same time they offer opportunities for research and teaching that are often the most attractive features of medical school affiliation.

PHYSICIAN ASSISTANT APPROACH

The medical manpower problem is not one of numbers alone, but of maldistribution of service and inefficiency in utilizing existing manpower. The training of a new group, the “physician assistant” is one of the most widely proposed solutions. This is seen as a realistic, economically effective means of

*Professor of Medicine, University of Texas Southwestern Medical School at Dallas and Cardiopulmonary Institute, Methodist Hospital, Dallas.

This article is published simultaneously in Respiratory Care. Reprint requests: Dr. Miller, Methodist Hospital, PO Box 3009, Dallas 75222

732

CHEST, VOL. 62, NO. 6, DECEMBER, 1972
increasing health care in all areas by a person who can perform, under supervision, many tasks which do not demand the physician's full depth of knowledge and judgment, but which are not tasks traditionally delegated to paramedical personnel. The American Medical Association Board of Trustees and Council on Health Manpower has defined the physician assistant as "a skilled person qualified by academic and practical training to provide patient services under the supervision and direction of a licensed physician who is responsible for the performance of that assistant." 

The candidate for such a position must be a mature, stable individual who possesses intelligence, unquestioned integrity, the ability to communicate with patients, physicians, and other members of the health team, the capacity for meeting emergencies calmly, a dedication to ethical principles, and a strong motivation to personal service. As has been aptly put, he needs "the quality of allowing irrational people (the ill) to make irrational demands on him and meeting these demands without resentment." 

Data on the progress of the physician assistant programs are by no means in agreement. The Department of Health, Education and Welfare in a 1971 publication estimated 80 physician assistant programs in various stages of development. Figures released in the American Journal of Public Health in 1970 showed an estimate of over 200 such programs as reported at a public hearing before the New York Legislature. Whatever the actual figure, there is no dispute that the concept which began at Duke University in 1965 under the direction of Dr. Eugene Stead has made astonishing progress.

Few programs are alike. They vary in length from 18 weeks (cardiovascular technician at Washington, D.C. Hospital Center) to four years. Entrance requirements range from high school equivalency to a baccalaureate degree in science, and credit for completion varies from a certificate to a master's degree (anesthesia technology at Emory University School of Medicine, Atlanta). To date, there is inadequate experience for comparative studies of the products of the different programs.

**Terminology**

Programs for three types of physician assistants are recognized. **Type A**: assistants to the primary care physician, usually a generalist; **Type B**: assistants for a specialist; and **Type C**, less independent assistants or aides to the primary and/or specialty physician. Type A is distinguished by his ability to integrate and interpret findings on the basis of general medical knowledge and to exercise a degree of independent judgment. Type B is limited in skill to one clinical specialty, but the degree of skill in that field is generally beyond that of type A, and probably beyond that of physicians not engaged in the specialty. Type C performs a variety of tasks over the whole range of medical care, as does type A, but is limited by education and clinical experience to a lesser degree of independent action. Thus, the respiratory therapist or therapy technician would function as a type B or type C physician assistant, although he is not usually recognized as such.

No uniform terminology has emerged to describe the new health occupation, and semantic difficulties are inherent in the variety of titles already proposed: physician associate, physician assistant, clinical associate, clinical technologist or clinical technician, community health medic, medical specialty assistant, and MEDEX. The AMA Council on Health Manpower has expressed concern over the use of the term "physician associate," and its recommendation that this term be used only to denote another physician was adopted by the House of Delegates of the AMA in 1971.

In spite of organized medicine's opposition to the term, a well-organized group, restricted to type A assistants alone, and originally from the Duke University Medical School Physician Assistants program, apparently is flourishing under the title, "American Academy of Physicians' Associates." They are certified, registered, and accredited by the American Registry of Physicians' Associates, Inc. (ARPA) with quite high standards reviewed annually and with strict continuing educational requirements (150 clock hours of postgraduate study every three years).

**Position Statements**

The position statements which have already been issued by the AMA Committee on Emerging Manpower, the Board of Medicine of the National Academy of Sciences, the Association of American Medical Colleges, the American Society of Internal Medicine, and the American Academy of Pediatrics agree on some issues, disagree on others, and reflect common uncertainties on still others. They recognize three levels of function, as mentioned earlier, and three levels of supervision are referred to: over the shoulder, on the premises, and remote and monitoring. All agree that the physician must retain the ultimate responsibility for the assistant who, under no circumstances, supplants the physician's role in diagnosing and planning therapy. They recognize the need for more precise tests of com-
petence to determine the optimal length of training. They also agree that advanced credit should be allowed for demonstrated competence. The desirability of a better term than "physician assistant" is reflected with the term MEDEX* considered by some the most original and apt. They reach no agreement on the length or content of the training program or what the ultimate form of licensure should be.

LEGAL CONSIDERATIONS

Individual states have traditionally provided the legal framework for delivery of health care and should continue to do so. Two regulatory mechanisms have been enacted or are being considered in a number of states: licensure and exceptions to the state's medical practice act. The licensure route appears to be too restrictive in defining and limiting the activities and functions of the assistant at a time when his potential contribution has not as yet been determined. However, some states have taken this route. The Child Health Associate Law passed by Colorado in 1969 has been called "an excellent model of what should not be done." The exceptions route gives the assistant legal status by authorizing the physician to delegate supervised tasks to his assistant. A basic system of registration should be developed to qualify personnel without imposing rigid definitions. Along this line, the Oklahoma statute is considered one of the best. It states, "Nothing in this article shall be construed as to prohibit service rendered by a physician's trained assistant, a registered nurse, or a licensed practical nurse if such service be rendered under the direct supervision and control of a licensed physician."

A joint AMA-AHA statement provides guidelines for hospitals and medical staffs which delineates the rules and regulations governing physician assistants and the responsibilities of the medical staff utilizing them.

ACCEPTANCE

There appears to be high acceptance of the physician assistant by both physicians (particularly those who have used assistants) and by patients who have received their care. In a survey of 3,425 internists, the American Society of Internal Medicine found that the internists believed many elements of their practice could and should be delegated to an allied health worker. Estimates of a physician's time saved by an assistant are high, most often stated as about 75 percent of what the physician does could be done by a well-trained assistant.

Some hospitals still remain wary until a more definitive medicolegal position is established. Among the nursing "hierarchy" some resistance is voiced, but there is more acceptance than resistance among nurses who have actually worked with the physician assistant.

When the decision has been made to utilize a physician assistant, need for a good public relations program is seen to assure the best possible acceptance. Relative functions need to be worked out among hospital administrators, nurses, and other health professionals. It is suggested that the assistant be introduced and identified by role to all patients for whom he may provide services and that the physician not delegate any patient-care functions to such an assistant when a patient indicates an unwillingness to have anyone except the physician perform the function. Dr. Harvey Estes of the Department of Community Health Sciences at Duke University School of Medicine feels that before the assistant begins working, a plan for professional and public education should be instigated via newspaper, civic club meetings, hospital board, and person-to-person contact.

FEDERAL SUPPORT

The Federal Government supports many of the physician assistant programs through at least eight agencies in behalf of three principal sources: (1) Health Sciences and Mental Health Association, primarily located in the National Center for Health Service Research and Development, but also in the Regional Medical Program Services, Indian Health Service and Federal Health Programs Service; (2) National Institutes of Health, Bureau of Health Manpower Education; and (3) the Office of Economic Opportunity and the Manpower Administration of the Department of Labor. A consolidation of support through one central agency would appear to be a more efficient method of funding.

The following relevant legislation has been either enacted or is pending: Senate Bill S.3586, Health Training Improvement Act of 1970—Yarborough et al.; Senate Bill S.2753, Veterans in Allied Health Professions and Occupations Act of 1969—Javits and Prouty; and Allied Health Professions Personnel Training Act of 1966 (Public Law 89-751).

A CARDIOPULMONARY PHYSICIAN ASSISTANT TRAINING PROGRAM

In 1970, plans were undertaken at the University of Texas Southwestern Medical School at Dallas to design a physician assistant program that would produce an individual who could meet the needs of

CHEST, VOL. 62, NO. 6, DECEMBER, 1972

*MEDEX is a word derived from the French phrase medicine extension, or extension of the physician.
community medical centers for technical specialists in the field of heart and lung diseases and who, depending on the character of his postgraduate training, could perform either as a generalist or specialist in the cardiopulmonary field. As such, it was deemed advisable that he possess the skills of a registered respiratory therapist, registered cardiopulmonary technologist, and the cardiopulmonary resuscitation skills of intensive care nurses.

Tasks within the scope of an assistant to a pulmonary physician include: performing history and physical examinations, writing routine orders as directed by the physician, giving patient instruction in preventive care and use of prescribed treatment and drugs, making rounds at hospital and in the home. In the case of the cardiopulmonary physician assistant, additional specific tasks related to his particular role would be added, and could include any of the technical procedures often executed only by physicians, but not requiring diagnostic judgment or therapeutic decisions.

The curriculum provides for balanced training in three areas of cardiopulmonary science.

1. **Cardiac Technology** involves taking and interpreting, in a preliminary way, electrocardiograms, vectorcardiograms and phonocardiograms, performing cardiopulmonary resuscitation, defibrillation, administering emergency drugs and procedures to patients in acute cardiopulmonary failure. It also includes use of pressure transducers, multichannel recording equipment, routine type of intravascular catheterization procedures, dye solution techniques, pump oxygenators and computer techniques.

2. **Pulmonary Technology** involves performing and interpreting, in a preliminary way, conventional pulmonary function tests including spirometry, flow volume studies, body plethysmography and other studies used for evaluation of pulmonary mechanics and gas exchange. Arterial cannulation will be performed, as well as arterial blood collection, expired air collection, analysis of blood and air. Use of routine vascular catheterization, pressure transducers, flow meters, multichannel electronic records and computer systems is part of this training.

3. **Respiratory Therapy** involves use of all respiratory therapy procedures including aerosol generators, ventilators, and gas administration equipment, as well as proficiency in tracheal intubation. Repair, testing and modification of equipment as well as patient education in chronic respiratory care are additional necessary skills.

The program is designed to take individuals with a minimum of 90 semester hours in biologic or physical sciences and provide them with one academic year and two summer sessions of training in the clinical-hospital setting culminating in a Bachelor of Science degree in Health Care Sciences and a certificate of proficiency as a physician assistant in cardiopulmonary science. Specific course prerequisites include: general anatomy and physiology, 160 clock hours (4 credits); chemistry, 192 clock hours (8 credits); physics, 192 clock hours (8 credits); microbiology, 96 clock hours (4 credits); pathology, 48 clock hours (3 credits); psychology, 48 clock hours (3 credits); and mathematics, 96 clock hours (6 credits). These basic science prerequisites, if not completed previously, may be taken as electives. A sample curriculum outline is shown in Table 1.

Graduates of the program will be able to function in large medical centers as specialists in their area of choice and will be able to function as generalists in the field of cardiopulmonary science in smaller community health centers.

The program is expected to recruit students from among several groups of people: (1) pre-health care students who have not settled on an allied health profession; (2) biologic and physical science majors who may find the allied health area, and specifically the program, appealing; (3) allied health workers who wish to expand their competencies beyond the present roles (ie, nurses, respiratory therapists, cardiopulmonary technologists, voca-

### Table 1—Curriculum Outline

<table>
<thead>
<tr>
<th>Hours per Week</th>
<th>Lecture</th>
<th>Lab</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Summer Session (8 weeks)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiopulmonary technical science I</td>
<td>10</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Cardiopulmonary anatomy/physiology</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Biomedical instrumentation</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td><strong>Fall Semester (16 weeks)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiopulmonary technical science II</td>
<td>5</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Cardiopulmonary clinical science I</td>
<td>3</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Medical science I and II</td>
<td>5</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td><strong>Spring Semester (16 weeks)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiopulmonary clinical science II</td>
<td>9</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Management</td>
<td>3</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Medical seminar</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Cardiopulmonary technical science III</td>
<td>4</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td><strong>Second Summer Session (8 weeks)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiopulmonary clinical science III</td>
<td>20</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Cardiopulmonary technical science IV</td>
<td>5</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>45</td>
<td>86</td>
<td>49</td>
</tr>
</tbody>
</table>
For a variety of technical, administrative and financial reasons, this program has not been implemented. In spite of the obvious need for this kind of manpower in order to improve the quality of medical care for patients with cardiopulmonary problems in all communities, there is still a strong conservative undercurrent of resistance to the acceptance of this solution.

Hopefully, the future will bring a more realistic attitude in those who could facilitate prompt implementation of such programs.

ACKNOWLEDGMENT: Generous editorial assistance was provided by Mrs. Louise Nelson in the preparation of this manuscript.

REFERENCES
7. Report of the Ad Hoc Panel on New Members, Physician's Health Team, Board of Medicine, National Academy of Sciences, 1970

OTHER SUGGESTED SOURCE MATERIAL


Health Related Programs, Northern Illinois University, June 1971.

Coronary Heart Disease

The story of what is the most important of all cardiac disorders, coronary artery disease, may be said to begin in 1768 with Heberden's vivid picture of what he called "angina pectoris" from the sensation of strangling in the chest. In Heberden's account, and he described a number of cases, the heart is mentioned but once, and then as not affected by the anginal attack; no indication has been found that he associated the pain with the heart. To Jenner and Parry (Syncope Anginose, 1799) belongs the distinction of first attributing the chest pain to disease of the coronary arteries. Parry also glimpsed a causal relation between myocardial ischemia and the anginal attacks. Allen Burns (Diseases of the Heart, 1809) produced pain in the leg by obstructing the circulation and suggested that this might also be the mechanism causing the pain in the heart. The same line was followed (1927-1932) by Thomas Lewis when he demonstrated that sharp pain was induced by exercising muscle deprived of its normal blood supply.