Health Care: Fund Shortage Impedes Training of Medical Aides

In the mind of the patient the health care team remains, as it always has been, the physician, the dentist, and the nurse. These are the three workers whose function he understands and whom he is most likely to see. But as a result of the increasing complexity of medical care and the skyrocketing demand for it, the health care team has changed dramatically. Whereas in 1900 one out of every three health workers was a physician, now it is less than one in ten.

Most noticeable has been the growth of nursing. In 1900, there was about one nurse for every doctor; now there are six—two registered nurses and four others. But equally important, though far less noticed, is the explosive growth of other health occupations, generally called allied health professions, most of which did not even exist in 1900.

The allied health professions range from the highly skilled dietician or physical therapist to the histologic technician, a high school graduate with 1 year of further training who freezes, cuts, mounts, and stains portions of body tissues for microscopic examination in the medical laboratory. With 650,000 workers in 125 job categories in 1967, these professions constitute the newest and fastest-growing segment of the health team.

Physicians' Work

Though all these fields have been lumped together by historical accident, there are, in fact, two kinds of jobs: those involving largely technical work away from the patient, and those involving primary care—that is, doing part of the job normally performed by the physician.

This second group, now very small, could become a substantial weapon in the effort to deal with the nation's severe shortage of physicians and nurses (estimated at 50,000 and 200,000, respectively). In far less time and at far less expense than it takes to educate a physician, these professionals could be relieving physicians of the more routine medical chores that dominate their days.

But the federal government's commitment to exploring this potential has been limited at best. It is difficult to figure out how to make more efficient use of allied health professionals in primary care when there is such a shortage of these workers at all levels of training. The Public Health Service estimates a deficit in 1967 of 50,000 persons at the baccalaureate level or higher and 60,000 below that level for the medically allied fields alone, plus many more in the dental and environmental fields. Educational institutions—junior colleges, colleges, medical schools, and now the schools of allied health professions that have taken over from hospitals the work of educating these professionals—are squeezed for funds, and all face problems not unlike those of the medical schools.

More money will not eradicate all the complicated problems in the allied health fields. Increasing manpower depends in part on making these occupations more attractive—particularly in terms of career opportunity. Job mobility must be increased and attrition of workers reduced. In addition, a whole set of knotty problems attends the development of each new kind of health professional: licensing requirements, jurisdictional rivalries, legal responsibilities in malpractice suits, and so forth. Nonetheless, the single biggest difficulty in the field remains the shortage of money; and the best solution, almost everyone agrees, is more money.

The federal government's enthusiasm can be measured by the history of the Allied Health Professions Personnel Training Act of 1966, legislation which defined "allied health professions" into existence as a subgroup of all health manpower. (Nursing was excluded because it already had its own legislation.)

Dr. Joseph Hamburg, president of the Association of Schools of Allied Health Professions (ASAHP), recently summed up the first 4 years of the act before the Senate Subcommittee on Health. "The hopes and aspirations of allied health institutions were raised by the enactment of the allied health legislation in 1966. Obviously, there has been great disappointment since that time in the minimal funding that this legislation has received."

Because of cuts recommended by the Bureau of the Budget, appropriations for the 3 Johnson years were less than half of the $78 million authorized. In the first year of the Nixon Administration, less than a third of the $39.5 million authorized was requested in the budget for fiscal 1970. One of the areas of the act—special improvement grants to institutions—has received no funds at all.

Most disappointing has been the funding of the vital area of construction of teaching facilities—classrooms and laboratories. In the Johnson years, $25.5 million was authorized for construction and only $4.8 million appropriated, far below the proportion for the whole act. Although Robert Finch, then Secretary of Health, Education, and Welfare (HEW), recommended to the President in a 1969 report that "Funds to assist in construction, therefore, should be available for immediate and future space requirements," the Nixon 1970 budget included not a penny for construction, and that's what Congress gave him.

Construction Priority

The schools, meanwhile, consider construction their most pressing need. It accounted for two-thirds of all stated needs of 23 member institutions polled by the ASAHP. "One school at a state university is conducting classes in vacated hotel rooms," Dr. Hamburg reported to the subcommittee. "Another school at a private university is in a building 110 years old."

As if the allied health act hasn't been hobbling enough, the administration this year offered a legislative proposal that seemed intent on crippling it. HEW proposed a 1-year extension of the act, which expires next 1 July, with the unspecified authorization of "such funds as necessary." Dr. Roger Egeberg, assistant secretary of HEW for health and scientific affairs, explained that a 1-year extension would "make the act coterminous with other health manpower authorizations"—namely the Health Professions Educational Assistance Act and the Nurse Training Act—all of which, he said, are under study at HEW. The unspecified authorization would "prevent unrealistic expectations" while "enabling us to move as rapidly as the economy will allow" toward solving manpower problems.

Not surprisingly, representatives of

almost every health association in the nation (except the occupational therapists) opposed the administration bill because it would create uncertainty that would hamper recruitment of both students and faculty. House and Senate committees both rejected it. Representative Paul Rogers' (D–Fla.) bill calls for an extension of 3 years and Senator Ralph Yarborough's (D–Tex.) for 5 years, both with specific, increased authorizations.

Neither of the committee-approved bills has yet appeared on the floor, but some people in the health field are speculating that the final legislation will embody a 3-year extension.

Next to money, the most important challenge facing the allied health professions is making these health occupations more attractive to potential recruits. As a rule, allied health occupations—and nursing too—pay less, require less attractive hours, and offer fewer opportunities for advancement than other occupations with the same educational requirements. The salary differential is much less grave than it used to be, especially for the more highly trained, but it remains a problem.

"You have to be a real dedicated missionary," Kenneth Skaggs, director of service projects of the Association of Junior Colleges, told *Science*, "to get an associate degree and start in an allied health field at $4800 when, with the same degree in computer programming, you can earn $12,000 to $14,000."

Lack of Students

In medical technology, a specialty normally requiring a bachelor's degree, the mean annual starting salary is reported to be $7000 and the mean for experienced medical technologists rises to $9000. Skaggs said the majority of health educational programs in the junior colleges "are not serving to their capacity. We still do not have enough students."

Figures of the American Medical Association (AMA) comparing enrollment in allied health programs with capacity as stated by the schools seem to bear out Skaggs' view that there is generally a shortage of enrolled students. But government officials disagree. A spokesman for the Division of Allied Health Manpower in the National Institutes of Health told *Science* that the division detects no shortage of students willing to enroll in these fields. Deputy Assistant Secretary Zapp said that "only in certain geographical regions is there a shortage of people willing to go into the allied health fields. But getting students who will stay in is a problem at any subprofessional level. The attrition rate is considerable."

Attrition is partly a result of the high percentage of women in the fields, which is in turn due to low salaries. Women often leave the field to raise families and, 10 or 20 years later, they

Military Trainees: A Pool of Medical Talent

Between 30,000 and 35,000 medically trained and experienced allied health personnel leave the armed forces each year. On the basis of a study of men leaving the Army Medical Department, Colonel James Young concluded last year that many of these men enter the civilian labor market amenable to recruitment for civilian health careers; yet utilization of these men is minimal.

"These men not only leave the military service favorably disposed to their military health occupations, but, for the most part, they also leave service without having made career decisions," Young reported. "Evidence also indicates that 22 percent of those not working or being educated for health careers tried to get employment in health fields." In Young's large sample, 12.5 percent are employed full time or part time in health occupations—but the percentage was twice as high for the better-trained men, whose Army medical duties required 10 or more weeks of military training.

Two of Young's results lead inevitably to the conclusion that the inflexibility of the civilian health occupations is a prime cause of the small number of transfers from military to civilian health jobs:

1) "Some 53 to 64 percent of those with less than 2 years of college indicate they would attend civilian health educational programs if they could receive advanced standing for their military paramedical education and experience."

2) The transfer from military to civilian health jobs "occurs most frequently for those whose military occupational specialty has virtually an identical civilian counterpart and whose military education and experience is recognized by a professional association which certifies or registers personnel with that specialty."

In an effort to increase the flow of trained personnel from military to civilian health jobs, the departments of Defense (DOD) and HEW have set up a program called MEDIHC—Military Experience Directed into Health Careers. A successor to the unsuccessful Project Remed, MEDIHC is a program without funds which is attempting to identify, counsel, and then place in a job, school, or both, interested military medical personnel about to return to civilian life. DOD is responsible for seeking out the health worker at least 90 days before separation and ascertaining his interest. If interested, he fills out a card, which is forwarded to the responsible agency in the state where he intends to reside, and the state attempts to place him. HEW is responsible for finding organizations willing to serve as MEDIHC coordinators without federal funds.

Last February, MEDIHC got a start in Texas. Now it is operational in 26 states, and Alice Frazer, HEW national coordinator for the program, says it will be in 34 states next month. As of 31 May, 392 cards had been received, the great majority of them requesting both a job and further education, but no figures are available yet on how well MEDIHC is doing in placing them.

Miss Frazer told *Science* that the problem of certifying these transfers from the military is "not as severe as it used to be, and it's getting better." For example, she said, the American Occupational Therapy Association recently decided that Army-trained graduates are eligible for the examination for occupational therapy assistant. But accreditation does not guarantee anyone a job. The director of the AMA's department of allied medical professions and services, Ralph Kuhli, told *Science*, "It's still true that a guy who didn't graduate from high school may do 4 years in the Navy Medical Corps and then not get hired in civilian life. The people who do the hiring are the administrators."—J.K.

NEWS IN BRIEF

• **AIR POLLUTION TOP TEN**: Preliminary air pollution rankings recently released by the National Pollution Control Administration show Steubenville, Ohio, as the dirtiest city, and New York City air as the most fouled with corrosive sulfur oxides. The top ten in particulate pollution (dirt, smoke, and soot) for 1970 are: Steubenville; Charleston, West Va.; Scranton, Pa.; Niagara Frontier, N.Y.; Bakersfield, Calif., and Syracuse, N.Y. (tie); Johnstown, Pa.; Louisville, Ky.; Milwaukee, Wis.; and Pittsburgh, Pa. The top ten in sulfur oxide levels were: New York City; Chicago; Huntington, West Va.; Philadelphia; Pittsburgh; Cleveland and St. Louis (tie); Washington, D.C.; Detroit; and Providence, R.I.

• **MENTOR PROGRAM**: The American Mathematical Society (AMS) has begun a tutoring program to aid graduate students who are in the Army, in jail, or doing alternative service. The Mentor Program currently includes about 200 students and 75 mentors. The program began last fall, and participation is being solicited from mathematicians and other professional societies. Information can be obtained from AMS at P.O. Box 6248, Providence, Rhode Island 02904.

• **CANADA CURBS DETERGENTS**: Canada has banned the manufacture of laundry detergents containing more than 20 percent phosphates. Phosphates, used in detergents to increase cleaning power, were recently found to be the key factor in the growth of algae in the Great Lakes by the International Joint Commission, a U.S.-Canadian scientific body, which urged cooperation in cleaning up the Great Lakes and the St. Lawrence River.

• **WHALES**: Several species of whales may be removed from the Interior Department's list of endangered species because a few companies which process whale oil want to continue trade with foreign exporters of whale products. The Endangered Species Act bans the importation of species or their products on the list beginning next year. According to an Interior Department official, the whale oil companies agree that the very scarcest whales (right, blue, humpback, and bowhead) ought to be kept on the list; but they want to remove the smaller varieties, the sperm, finback, and sei whales, which have been harvested heavily by Russia and Japan since the larger species became rare during the last few decades. The whales could be removed from the list at any time.

• **VIRGIN ISLANDS TEKTITE PROGRAM**: The Virgin Islands Government is planning marine science programs for its Tektite facility, an underwater laboratory-living habitat, and invites scientists to submit research proposals for 1971 to: Ian Koblick, Special Assistant for Undersea Programs, P.O. Box 599, Charlotte Amalie, St. Thomas, U.S. Virgin Islands 00801.

• **EASTERN EUROPEAN EXCHANGES**: The National Academy of Sciences (NAS) is soliciting applications from American scientists who wish to visit the Soviet Union, Bulgaria, Czechoslovakia, Poland, Romania, or Yugoslavia during the 1971–72 academic year. Applications and information about length of visits, payment of expenses, and qualifications may be obtained from the NAS, Office of the Foreign Secretary, Washington, D.C.

• **MSG**: A report, prepared by a committee of the NAS-NRC, on the food additive monosodium glutamate (MSG) indicates that no evidence was found "of hazard from the reasonable use of MSG in foods for older children and adults except for those who are individually sensitive to the substance." The report, released by the Food and Drug Administration, also indicated that since MSG was not found to benefit infants it should not be added to baby foods.

• **FUEL ADDITIVES**: The Department of Health, Education, and Welfare (HEW) has announced regulations pertaining to the registration of fuel additives. The first fuel designated under the regulations is motor gasoline; manufacturers have 90 days following the effective date of the regulations to notify HEW of fuel additives, purpose of the additives, and characteristics and effects of each additive. The National Air Pollution Control Administration may request further information about the concentrations of the additives, their compositions, and their toxicity.

find it difficult to return because of changes in the technology. One organization, the National Committee for Careers in Medical Technology, has started a program of refresher training to help solve this problem.

In addition to low salaries, allied health fields are unattractive because of poor occupational mobility, both vertically and horizontally. "In far too many instances, a closed door in a health job has meant a permanent loss to the health manpower pool," wrote J. Warren Perry, dean of the School of Health Related Professions, State University of New York at Buffalo, in the *Journal of the American Medical Association* last October. Rigid educational requirements, set down by the ever-increasing number of professional organizations, are largely to blame. There is almost no proficiency or equivalency testing to permit the granting of academic credit for knowledge or experience obtained in related health fields. For example, a woman with 5 years experience as a laboratory assistant who wishes to become a medical technologist must start at the beginning to meet the requirements of 3 years of liberal arts college followed by a year in an approved clinical program—following the same program as students who have had no health experience at all. This problem is exacerbated by the fact that professional organizations, which jointly with the AMA set recommended standards for certification, are often quite jealous of their jurisdictions, insofar as they can perceive them in a group of fields where occupations overlap each other. One group of medical technologists, for example, has long been feuding with the American Society of Clinical Pathologists about whether the clinical pathologists' organization, which originally developed the medical technology occupation, should continue to exercise control over the now well-established profession. This dispute, the most serious but not the only one, may have to be resolved in court.

Despite these obstacles, there is now a sprinkling of action aimed at improving career mobility in the allied health field—and the federal government is interested in helping out.

The National Committee for Careers in Medical Technology has received a federal grant to study and make recommendations in the area of equivalency and proficiency testing. And the ASAHP is currently negotiating with a government agency about a grant to

study core curriculum in health fields, from high school onward. The concept of a core curriculum—a set of courses common to all health professionals—is frequently talked about as one way of increasing occupational mobility, especially laterally. If the first-year program were identical for nutritionists and physical therapists, for example, it would require less additional education to switch from one to the other. A core curriculum would also increase the ability of various members of the health team to work together. The concept has been discussed for years, but a recent study by Robert Hawkins of the State University of New York at Stony Brook indicates that most schools that say they have a core curriculum really do not.

The failure of the allied health professions to attract enough talented personnel and to place them flexibly in jobs or educational programs commensurate with their experience is nowhere better illustrated than in the case of men leaving the armed forces medical departments. Studies indicate that many of these men would have liked to stay in health fields, but few do. The federal government—in a program without funds—is now trying to do something about it (see Box).

While the health professions are beginning to turn to the military medical departments for trained personnel, an ad hoc committee of the National Research Council (NRC) recommended last year that they might regard the armed forces medical departments as something of a model for utilization of allied personnel. "The committee believes that the educational techniques used for military corpsmen (medics), as well as the ways in which their skills are used, are worthy of consideration for the allied health professions in civilian life."

The committee felt that, in general, institutional and outpatient care provided by the military is as skillful as that in civilian institutions. The military has about 5 percent of the nation's population as potential customers and about 5 percent of the nation's health resources. But physicians, dentists, and registered nurses account for only 21 percent of the military medical personnel on active duty, compared with 31 percent for the nation as a whole in 1967.

These figures adduced by the NRC committee should not be taken too literally. The military, of course, can do certain things with its health person-

Suit Asks Photocopying Royalties

The first suit against the federal government for alleged copyright infringement as a result of the photocopying of scientific journal material is scheduled to go to trial on 9 September. Defendants in the case are the National Library of Medicine (NLM) and the library that serves the National Institutes of Health (NIH) intramural program.

The suit was filed 2 years ago (*Science*, 21 June 1968) by Williams & Wilkins Co. of Baltimore, a major publisher of medical and scientific books and journals. One of Williams & Wilkins' officers says that in bringing suit the firm "is not trying to stop photocopying, but to gain reimbursement for loss of sales."

The question of whether or not royalties should be paid for photocopies of scientific material has gained force in the decade or so since the use of Xerox and other photocopying processes has become virtually a reflex action among American scientists.

A change in the law in 1960 authorized suits against the government for copyright infringement, but observers say the issue was not taken into court, in part at least, because Congress appeared to be moving toward extensive revision of copyright law. The filing of the present suit was influenced by the fact that, although a Presidential commission is now studying the matter, there is no early prospect of legislative relief.

The case is being heard in the U.S. Court of Claims in the District of Columbia before a commissioner who will make a report on which a panel of judges will base a decision. Whatever the outcome, it is expected that the decision will be appealed to the Supreme Court. Attorneys for Williams & Wilkins decline to indicate the line of argument they will follow in court, but observers feel that the copyright owners must demonstrate damage to be successful in the case.

Objection to Journal Copying

The suit objects only to the copying of journal material, which, rather than books or monographs, is said to account for the greatest volume of copying. The target of the suit is not the "casual user" who makes a single copy of an article for his own use, but organizations that offer copying services involving formal records and numerous employees.

The situations at NLM and NIH differ, since NLM provides photocopies only under its interlibrary loan program while the NIH library serves scientists on the NIH Bethesda campus. Both libraries, however, impose similar restrictions on copying practices. NLM officials say that their rules forbid the copying of an entire work (a whole monograph, for example) or more than one article from an issue of a journal for one recipient. They also say they draw the line at copying material from current issues of journals that are widely available.

Williams & Wilkins officials say they resorted to the suit only after their efforts to discuss royalties had been consistently rebuffed by federal library officials. (A royalty of 2 cents a page is said to have been proposed.)

Federal officials say that administering a royalty system would drastically increase the cost of photocopying, which NLM now absorbs, and they question the propriety of a government agency's collecting royalties to benefit a commercial enterprise for the dissemination of scientific information which, in many cases, has been gained with federal research support.

The issue has complexities that have defeated congressional attempts at reform for at least a decade. What the courts must deal with is the dilemma created by technological advances in photocopying which make it harder than ever to ensure achievement of the dual purpose of the law—to protect the copyright holder and to promote science and the useful arts.—JOHN WALSH

Greenberg Resumes News Editorship

Daniel S. Greenberg has returned to Washington after 2 years of reporting on science affairs from Europe and will resume his duties as news editor. John Walsh will become foreign editor, based in Washington, with responsibility for developing international coverage in the News and Comment section.

nel that the civilian sector cannot—it can move workers around to where they are needed and can assure itself that exactly the desired number of each kind of worker will be trained. Nonetheless, it seems possible that a health care system with more allied health professionals and fewer doctors, dentists, and registered nurses, if well designed, could be a partial solution to the nation's health manpower shortage.

This solution, if it is to be achieved, will depend partly on a restructuring of the health care delivery system and partly on the development of new kinds of allied health occupations.

The greatest portion of the growth in the employment of allied health professionals has been in the hospital setting. To some extent, this is a natural result of the functions of the hospital: surgery, tissue identification, and elaborate diagostic procedures require many helping hands. But hospitals also employ more allied health professionals because they are cooperative practice situations, better able to make efficient use of ancillary personnel than the doctor working alone. As cooperative practice becomes a more prevalent mode of care outside of the hospital—a slow but inexorable trend—an increased role becomes possible for the allied health professional.

One model for the private practice of the future was furnished recently by the Allegheny County Medical Society in Pennsylvania. The Society established a "group" practice consisting of one physician, an office nurse, public health nurse, social worker, technician, and secretary. The practice handled 2500 persons in a low-income area of Pittsburgh and was reported to be successful. Nonphysicians had more than the usual responsibility, and patient acceptance was high.

The Allegheny experiment made use of at least one professional, a social worker, not normally associated with the health team. But the greatest potential for a more significant role for the allied health professional may lie in the development of new kinds of these professionals—generalists whose education and training would place them between the nurse and the physician on the spectrum of workers. One such job, the physician's assistant, already exists on a small scale, and more schools are beginning to offer training for it. The first program for physicians' assistants began at Duke University in 1965. The Duke curriculum is 2 years, and there are 29 graduates already working in private practices and hospital settings. A survey conducted by officials of the program indicates that these physicians' assistants increase the productivity of the physician 30 to 50 percent. Among his functions—depending on the supervising physician—may be taking detailed patient histories, doing extensive physical examinations, collecting specimen data, applying and removing casts, suturing superficial wounds, and changing dressings.

Several schools, including Duke, are also developing 4-year baccalaureate programs for physicians' associates who would have still greater responsibilities. One economist, Henry Greenfield, has suggested that we need a whole continuum of medical degrees—bachelors, masters, and doctors of medicine—to make the most efficient use of manpower.

While the Administration continues its niggardly approach toward all health programs, it will remain an academic question whether to promote this kind of manpower or that one. But as long as physicians, in whose training the taxpayer invests tens of thousands of dollars, say that one-half to three-quarters of their time is spent in routine burdens, it is clear that something more is called for than just seeking to increase their numbers.

—JOEL KRAMER

Joel Kramer is a former Science *news intern, now doing free-lance work in the Washington area.*

Smithsonian: Natural History Is Undernourished, Panel Finds

To most people the Smithsonian Institution is the national museum, and a museum is commonly thought of simply as a place for the display and safekeeping of antiquities, objects of art, works of science and technology, or specimens of natural history. The Smithsonian was conceived from the outset, however, as an institution that would be deeply engaged in research—a function of the Smithsonian that has, in fact, increased substantially over the past decade. On the other hand, the Smithsonian also has devoted substantial attention and resources in recent years to broadening its educational activities, by such means as innovations in the display of exhibits, more tours for school children, the holding of folk festivals, and the launching of *Smithsonian*, its new magazine. In sum, the Smithsonian is a far more complex and diversified organization than most people, including most members of Congress, realize.

As such, the institution, which looks to Congress for nearly two-thirds of its $55-million budget, could be well served by a sympathetic committee of congressional overseers able to help interpret and explain the Smithsonian's manifold activities to the House and Senate. Now it appears that precisely such a role has been assumed by an obscure subcommittee of the House Committee on Administration. This body, known as the Subcommittee on Library and Memorials, recently completed 7 days of hearings on the Smith-