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Government, Medical Research, and Education

National health needs demand reappraisal of support for biomedical research and education.

Alexander Leaf

All are aware of the rapid expansion of biomedical knowledge in the past 20 years and the changes that this has produced in medicine. Few would deny that this was made possible by generous governmental support of the biomedical sciences, largely through project-related research grants. The success of this support for research, on the one hand, and the need for more and better medical care in the country, on the other hand, have resulted in progressive annual increases in the governmental contribution. Today the very magnitude of the support for research has brought it into competition with other demands on the tax dollar: expanded military needs, Medicare and Medicaid, antipoverty programs and urban renewal, to name a few. It is therefore timely to pause and consider whether the government's support is being utilized to best advantage in stimulating the productivity of the biomedical sciences and in meeting the health needs of our country.

Federal legislation has made comprehensive medical care the birthright of all United States citizens. We may expect to see increasing inadequacies in the ability of present systems to deliver the health services promised by this legislation. Many have foreseen a number of bottlenecks which are certain to impede the best-laid plans and intentions of policy-makers:

1) A shortage of qualified physicians and ancillary health personnel is apparent. Some 20 percent of all physicians being licensed to practice in this country are graduates from medical schools of foreign countries, which can ill afford to export this costly product. The shortage of nurses is so acute that many existing medical care facilities have had to reduce their operations. We have hardly begun to define the ancillary medical personnel necessary to extend the arm of the physician in caring for the health needs of the community; even less has been done to organize their training.

2) The distribution of health services and physicians in the community bears little relation to the distribution of health needs of the country. High-quality medical care tends to be concentrated around university-affiliated medical centers, while away from such centers the quality of care often lags considerably.

3) Insufficient understanding of the causes of major illnesses limits the ability of the medical profession to prescribe effective cures or prevention.

Since our medical schools and universities train our physicians and other medical personnel, since most of the research in the health sciences is performed in their laboratories, and since their affiliated teaching hospitals set standards of excellence for medical care in the community, these national health problems are closely related to the activities of our universities, their medical schools, and affiliated teaching hospitals. Because of the expense of research, education, and patient care, we may expect governmental support to assume an increasing share in the costs of our national health programs. An important question today is, therefore, how can we use and support our educational and research resources to best serve our national health needs?

Support of Basic and Applied Research

The practice of medicine is clearly the application of knowledge toward practical ends. There is no clear dividing line between applied and basic research; basic research is aimed at increasing understanding, and applied research at utilizing this understanding to solve specific practical problems. The latter cannot long proceed without advances in the former. We are dealing with a continuum of understanding. Emphasis only on basic research would be a denial of the social value of knowledge. Emphasis only on applied research in medicine would quickly exhaust the present level of understanding and yield only inadequate solutions to major health problems.

At a time when the health needs of our entire nation are being rationally considered, it seems reasonable to expect a larger contribution by our biomedical scientists toward the solution

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of practical problems. If this emphasis on practical accomplishment results in curtailment of support for basic research, however, then we shall lose the margin of increased understanding upon which tomorrow's applications must depend. Basic research is an investment in tomorrow's practical successes. Our understanding of life processes is yet so meager that we can ill afford to slacken our efforts to increase understanding, especially now that its practical application has become a national goal.

We believe that our universities with their medical schools and affiliated teaching hospitals must remain the major centers for both basic and applied research. Here the high concentration and juxtaposition of scientists and scholars in many fields makes possible interdisciplinary ventures. Here the tradition of objective, free inquiry permits the security and freedom essential for innovation. Here the process of education allows science to renew itself in the fresh minds of its students. Education is at its best when associated with good research.

The planning, development, and execution of national health programs requires the collaboration of academic personnel and government at many stages. The collaboration of the social sciences is needed to help assess the health needs of our country. Then government, as the instrument of social expression, should determine the areas for major thrust in applied research. Scientists, aware of available levels of technology and understanding, must be consulted regarding the feasibility of a concerted attack on a given problem at a given time. Public support must then fund those laboratories best able to accomplish the selected mission. Finally, when the results of the investigations are available, government should provide for their implementation to benefit all. The universities with their affiliated medical teaching centers must be involved in each phase from assessment of need to implementation of results. Thus patterns of effective, increased communication between governmental agencies and the academic community must be urgently sought.

Support of Research and Education

The functions of the university are to increase understanding and to pass on this understanding to new generations (*1*). These two functions, research and education, are inseparable. Even if research may succeed without responsibility for education, we can ill afford, at a time of shortages of scientists and physicians, to exempt top scientists from their obligation to replenish their kind. Without close association with research, education quickly becomes a sterile exercise for both teacher and student; the critical senses and spirit of inquiry rapidly atrophy. For these reasons balanced support of both functions is essential.

Education in our medical schools could be vastly improved under a policy which provides comparable support for all its functions. Present policy has made support of faculty almost entirely dependent upon research accomplishment, and so formal teaching, and, in our university hospitals, patient care, have seemed less important in the eyes of students and junior staff. Support of research alone has made us lopsided; teaching must be supported as adequately in order to achieve comparable status. Although these functions of the medical school and affiliated teaching hospitals must have public support, the academic community must retain the traditional responsibility for the internal distribution of such support.

We strongly urge that medical schools and their affiliated teaching hospitals be granted support which does not distinguish between the research and educational activities of their faculties. With the urgency to train more physicians and allied health services personnel, the need for support of education in our medical schools and teaching hospitals is especially pressing.

Responsible Accounting

Such support given to responsible institutions must, of course, be duly accounted for. The same accounting methods, however, which may be successfully applied by the Bureau of the Budget to other governmental agencies may not serve any useful or honest purpose when applied to the support of educational and research institutions. Intellectual activity, the major academic commodity, unfortunately does not lend itself to any simple quantitative account. Universities have traditionally developed their own set of values which they have translated into remuneration to faculty according to prevailing support for their institutions and the academic market. The universities now need to take the lead in recommending new procedures of accounting which will satisfy Congress and yet preserve academic freedom. This is not a plea for favored treatment; it is a plea for realistic and effective accounting.

"Effort reporting" is an example of how inappropriate certain accounting methods, which apparently function in some departments of government, can be when applied to the academic community. The average professor in our medical schools today is engaged in two or three research projects which often may not be clearly separable. In addition, he teaches and bears some administrative responsibilities. In the clinical departments he provides for patient care. The proportion of his time spent in any activity changes from day to day with the working day varying from 8 to 20 hours, and the working week from 5 to 7 days. With the best intentions there is no way of accurately subdividing his time and effort between his several commitments. His effort report can only be a farce, and to insist that he vouch for its validity is only to breed dishonesty, anxiety, and frustration. Surely there must be some better way to hold our grantee institutions and scientists accountable. By not subdividing their activities but supporting their total contributions to research, education, and patient care, any need for this senseless, expensive, and time-consuming activity would cease.

The Service Obligation of the Medical School

Today the highest quality of patient care is found in our university-affiliated teaching hospitals. The combination of research and teaching brings to the bedside the latest and best techniques of patient care. Not far from these centers of excellence the quality of patient care may lag considerably. Aside from offering occasional postgraduate refresher courses for practicing physicians, most medical schools have not assumed responsibility for the continuing education of their graduates or of neighboring practitioners. Admittedly, this isolationism of the teaching centers is regrettable and needs correction. To assume, however, that the disparities of medical care can be abolished by insisting that university medical centers assume major responsibility for the delivery of health services to our country will overcommit the serv-

ice role of our educational institutions. They can even less afford to be unbalanced by excessive demands on their services than by undue pressures for research or teaching. Their obligation should be to remain centers of excellence in patient care but to experiment with limited areas or populations to learn how to improve the distribution of high quality medical care to larger segments of our nation. Such studies are within the role of the medical school and teaching hospital and would provide information of great importance to planning agencies. Wholesale commitment of university facilities to provide medical services, however, would destroy the university.

Project Support and Institutional Support

The support of individual research projects based solely upon their scientific merit, as judged by a panel of peers, has been outstandingly successful as administered by the National Institutes of Health and the National Science Foundation. It has constituted the major vehicle for funding the research which has resulted in an explosion of knowledge in the life sciences. We believe that its successes should assure its continuation as a major device for funding research in the future. Where directed, mission-oriented research is feasible, contractual arrangements may be used as the funding method. However, even with contracts, care should be taken to preserve flexibility in the approach and procedure adopted by the investigator. Research progresses in fits and starts. Each correct solution opens doors to new vistas. Only the investigator can pick the successful route. Rarely can the whole trip be mapped by contract officers; only the goals can be clearly stated. With freedom for intellectual activity of the investigator assured, the contract should prove an effective means of funding applied research if care is taken to preserve a harmonious balance between generating new understanding and the application of this understanding.

Regardless of the manner in which research is funded, serious difficulties will persist in our medical schools and affiliated teaching hospitals if support is not concomitantly forthcoming for their other roles. Such support could take the form of institutional grants which are sufficiently adaptable to permit support of research, teaching, and, where directly pertinent to these, patient care. Alternatively, separate grants might be made in direct support of education provided that this does not demand separate accounting of faculty effort between these two inseparable roles. This would insure that all important functions flourish together. It would provide institutions more flexibility in their operations and staffing. It would circumvent the need for impractical and unrealistic accounting procedures such as "effort reporting." It would provide an effective and honest way to improve regional distribution of support; funds could be actually provided for development of new centers of excellence without posing any threat to the system of support based on quality of the research proposal alone.

Institutional support should supplement, not replace, support of individual research projects. The latter assures that meritorious research will be aided anywhere and protects the research establishment from possible local administrative tyranny. The supplementary institutional support might be made according to a formula providing funds proportional to the number of students or trainees enrolled.

We believe that expenditures made for education and research in our nonprofit medical schools and affiliated teaching hospitals are made in the common interest. In this light the rationale of such cumbersome and restrictive devices as "cost sharing" does not seem clear to us. Surely no one but the nation as a whole profits from the results of biomedical research in our universities. In an era when most government granting agencies do not pay to these institutions the full costs of conducting biomedical research, to insist upon an added contribution from private sources for the support of research projects will only drain away precious educational dollars from other imperative needs of our academic centers. This practice can only serve further to distort the balanced functions of our educational institutions. Pake (*2*) has clearly and forcefully described the financial crisis in our private universities created by lagging federal research support. Thus, even the private funds of our educational institutions become committed by such government policies and the last resource which permits flexibility and innovation in the university is dissipated. Such destructive restrictions aimed at our medical schools and their affiliated teaching hospitals seem particularly inappropriate when other governmental agencies grant contracts to private business and industrial corporations for research and development which provide full reimbursements for indirect costs.

At present "cost sharing" is demanded with research grants but not with research contracts from our federal health agencies. This practice further widens the false chasm between basic and applied research. It ignores the fact that basic understanding of life processes is as essential to practical solutions as the final applied manipulation of this knowledge. It supports the inevitably costlier policy of ignoring the fundamental in favor of "solving" our numerous health problems immediately.

Our universities and their medical schools and affiliated teaching hospitals are great national assets. We believe direct institutional support to be compatible with protection of the public interest, since the future of the country depends upon the science and technology bred in our universities. It behooves a wise government, therefore, to nourish them carefully in order that they flourish and produce abundantly for our national needs. Injudicious restrictive or stifling measures imposed upon them may lead to barren years ahead.

Support of Education and Research in Proportion to Health Costs

Social legislation of the past year has made the government responsible for the health costs of a large portion of our population. As the bill for health services mounts beyond expectations, as it probably will, there is real danger that funds earmarked for education and research will be swallowed by the costs for services. This has happened in other countries and has proved self-defeating. It results in fewer or less well trained health personnel just when the need for more services is increasing. It halts research, both applied and basic, just when better understanding and better techniques of treatment are most urgently needed.

To avoid this situation we think that support for education and research should be set at some reasonable percentage of the annual national expendi-

ture for health services. This will provide for expansion or contraction of personnel and facilities as needed. It will assure a continued improvement in the quality of health services. This will make it possible for the new legislation to achieve its avowed goal of bringing to all citizens the blessings which it has made their birthright.

Contract Research by Private Corporations

It seems likely that certain developments in bioengineering or studies on the distribution of medical care, which by their nature are multidisciplinary, might best be undertaken outside the organizational framework of the university. Development of artificial organs, which require collaboration of the medical scientist, the engineer, and the materials expert of industry, is an example. We feel strongly that the organization, staffing, and operation of such developmental laboratories should be accomplished through the universities. Only the universities have the personnel today necessary to make such enterprises flourish. To let their professional and scientific staffs be hired away by private developmental organizations, flush with funds from governmental contracts, would be most disruptive. As an alternative to bringing private industrial practices into competition with the educational institutions for staff, their prime possession, we suggest corporations set up by universities in the image of the Lincoln Laboratories of M.I.T., or the Associated Universities operation of Brookhaven National Laboratories. We would strongly urge that an educational role be assumed by such large developmental laboratories since they provide unique opportunities for the student to see the fresh fields which lie between the established, cultivated disciplines. We think such organizations would complement our medical schools and their affiliated teaching hospitals.

In conclusion, we support the judicious statements made by Secretary of Health, Education, and Welfare, John W. Gardner, regarding governmental support, the universities, and biomedical research (*3*). We think it timely to reassess their interdependency, to reaffirm practices which have proven fruitful, and to strengthen others which will lead most quickly, and sustain for years to come, an abundant flow of practical benefits to the health needs of our nation.

References and Notes

1. It is appreciated that, as the major repository of understanding, the university is being called upon increasingly by government to apply its expertise to the solution of pressing social problems. This function is especially apparent in the professional schools of the university and it is in fact this trend with respect to medicine that prompted this statement.
2. G. Pake, *Science* **157**, 517 (1967).
3. J. W. Gardner, *ibid.* **153**, 1601 (1966).
4. This statement was prepared initially as a focus for discussion by a group of Boston educators and scientists: from M.I.T., Drs. James R. Killian, Jr., Jerome B. Wiesner, and Jerrold R. Zacharias; Dr. Robert W. Wilkins from Boston University; Dr. Samuel Proger from Tufts University; Drs. Robert H. Ebert, Maxwell Finland, Howard H. Hiatt, George W. Thorn, and myself from Harvard Medical School. The statement has been considerably revised during further discussions with Drs. Jerome Gross, Kurt J. Isselbacher, John H. Knowles, W. G. Austen, and Mr. David C. Crockett from the Massachusetts General Hospital. In its present form it has been accepted as a policy statement by the Committee on Research of the Massachusetts General Hospital.

NEWS AND COMMENT

"Pot" and Politics: How They "Busted" Stony Brook

Stony Brook, N.Y. In the early hours of 16 January, 73 cars, carrying 198 policemen, unobtrusively took up positions near several dormitories and off-campus student residences of the State University of New York at Stony Brook. With watches synchronized and radios silenced in accord with a 107-page tactical plan titled "Operation Stony Brook," the police waited until 5 a.m. At that time, and without prior notice to university officials, they entered the buildings, presented arrest and search warrants, and took into custody on drug charges approximately 35 college-age persons, a little over half of whom were enrolled at Stony Brook.

All the prisoners were handcuffed and immediately taken to jail, where they were booked and held until friends, family, and school authorities had provided for bail bonds, which ranged from $1000 to $5000. In the hours following the raid, which came during the university's examination week, several others surrendered themselves or were apprehended. Among them was a student who was summoned out of an examination room, handcuffed, and taken away. The total number of arrests eventually reached 47. Of those arrested, 38 were charged with selling or possessing marijuana or other drugs, in secret felony indictments that a grand jury had handed down during the previous week. Each indictment was based on alleged sales of drugs by the defendants to police undercover agents who had been circulating on campus during the previous few months. The remainder of those arrested were apprehended at the scene on various drug charges.

In the course of these raids, the police said, they came upon 10 pounds of marijuana; 1 pound of hashish; various other drugs, including substances suspected to be LSD; a pistol; assorted smoking pipes and auxiliary paraphernalia; two teen-age girls sleeping with boyfriends; and a married couple with two young children in a college dormitory room. The courts will, of course, have the final say on the legal significance of whatever evidence the police choose to present in making their case. But accompanying the raiders, as invited observers, were ten newspaper reporters, and, on the basis of their accounts, it appears that the police did in fact find what they said they found.

Following the raids, two state legislative committees announced plans for investigations, and the grand jury that had handed down the indictments summoned campus administrators to testify at a further inquiry into Stony Brook's affairs. Meanwhile, the police commissioner who masterminded the raid