

Roles of the Schools of Public Health in the New Age of Vaccines -

(Grantmakers in Health - October 1984)

I've been asked to discuss roles and opportunities for the U.S. in the New Age of Vaccines insofar as schools of public health are concerned. I feel it is more appropriate that I discuss the role of academically-based public health programmes in international development as it is the programmes which are the relevant factor and less their academic location.

Many of the roots of the present immunization initiative rest within the smallpox eradication programme and thus I'd like to reflect first on how and why this initiative developed, as I believe it will be helpful to you in understanding certain needs and initiatives which I will propose.

When we began the smallpox programme in 1967, the single, most commonly used vaccine in the developing world was that for smallpox. Perhaps one-half of the persons in the third world had been vaccinated at some time in their lives albeit mostly with subpotent vaccine. In contrast, it is doubtful that more than 5% had received any other vaccine.

Nevertheless, smallpox persisted as a major problem with some 10 to 15 million cases each year. In most countries, we found that the vaccine had usually been administered by special teams. The quality of the vaccine used was rarely or adequately monitored. The intensity of activity of the teams was generally proportionate to the perceived intensity of smallpox. When an epidemic occurred, this was customarily followed by an epidemic of vaccination. As the disease subsided so did

the activity. Surprisingly few health centres in any country offered vaccination of any sort or participated in the reporting of smallpox or in the control of outbreaks. The responsibilities of the health centres, as their directors saw them, were to provide much curative therapies as they had - by and large, palliative therapy primarily for respiratory, parasitic and diarrheal diseases.

What surprised and impressed us in most countries was not so much the death as the comparative plethora of health centres and health staff - little supervised, rarely working outside their health centres and usually poorly supplied with drugs of any sort - but when supported and encouraged, their interest and their productivity could be multiplied many times. We worked with many laboratories to improve the quality and quantity of vaccine available and gradually this problem was solved - primarily through the development of production centres in the endemic countries. More important, however, we worked within the existing health structure to improve management, reporting of disease, vaccine distribution and the participation of the many underutilized but usually willing staff. Little appreciated is the fact that it was they who really achieved the eradication of smallpox - international staff never numbered much more than 100 individuals at any time.

As the program progressed, we gave a great deal of thought as to how we and the countries concerned might serve to build on this experience and to institutionalize some sort of program whose long-term objectives included the distribution and delivery of a product throughout a

country - to all villages - and whose results could be continually monitored in a manner that would serve to redirect and constantly improve the program - and, in so doing, serve to improve the management and operation of the entire health system. To us, immunization appeared to be the most cost-effective intervention and the most logical vehicle for doing this. Thus, in 1974, WHO first began its expanded programme of immunization to provide six vaccines to all children, not as an end in itself but as a specific intervention which, if successful, could have an effect extending widely across the health system - to programmes of fertility control and nutrition interventions to activities better defined by Ken Warren in terms of selective primary care. The results of this initiative have so far been more successful in some countries than in others but overall, I am impressed that now, more than 30% of newborns receive at least DPT and polio vaccine contrasted to less than 5% when this activity began. A number of the techniques for management and assessment have come to be applied in other programmes as well.

Not foreseen at the time the special programme began was the enormous additional potential which might lie before us in vaccination - new all but unbelievable horizons made possible by the miracles of the biotechnology revolution so eloquently described by Dr. Lederberg. But, the word potential is used advisedly because between the biomedical science which defines a useful product and its successful use in the field lies a considerably and costly effort of testing and development of production capacity - subjects Dr. Hilleman will discuss - and the adaptation of the technology to local needs and approaches to health service delivery.

It has become apparent that it is in this area that there is a serious barrier to more effective implementation of existing programs and, indeed, in the testing and evaluation of new vaccines and other interventions. Specifically, this barrier is defined in terms of an all but total lack of centres of expertise concerned with research and the technical, managerial and sociocultural problems of conducting health programmes, and of institutionalizing them, and of adapting and field-testing new products as they become available. There is a continuing process - assessing what is being achieved, identifying constraints and devising simpler, more effective and more applicable procedures. As Dr. Lederberg has pointed out, we do not deal with one disease at a time but several -and among persons and populations whose responses differ because of nutritional, hormonal and genetic factors. It is a never-ending process which must be addressed simultaneously in the field and in the laboratory and in many countries. That which has been learned needs to be imparted to others. Centres which combine education, research and programmatic application are needed but in the international health sector, they are today all but nonexistent and, regrettably, little is yet being done to correct this problem.

Support for centres concerned with international health has all but vanished in this country. They have fared as poorly in other industrialized countries and in the developing countries as well. The well-known Schools of London and Liverpool in the United Kingdom have been literally fighting for their survival; those in other European countries have not fared better. In the United States, institutions to which many students from this and other countries come for training in

the U.S. resemble, in many ways, the "mom and pop" grocery stores, where a handful of faculty with some past experience in international health impart what they learned many years ago or as occasional visitors abroad. There are small readily scattered groups of molecular biologists working with parasites and, although doing brilliant work, many know little of the disease itself or its epidemiology and are incapable of assessing strategic priorities for intervention. In the developing countries, such institutions as are concerned with population-based initiatives are small, usually poorly supported and usually isolated from programme activities. Such efforts as have been made by WHO and bilateral agencies to strengthen these have been seriously handicapped by an inability to identify competent counterpart institutions in the industrialized countries with which they could be linked. In consequence, we find ourselves today with few in the industrialized and developing countries who are capable of bridging the gulf between the research laboratory and practical field application. Illustrative is the difficult problems which have been recently encountered in finding any suitable site for the field testing of malaria vaccine, and of identifying just one competent epidemiologist who is knowledgeable of the epidemiological and clinical aspects of malaria.

It seems to me that the time is overdue for this country to exhibit the leadership of which it is capable and to make a concerted effort to develop perhaps three or four academic centres, each with a specific link and base with several counterpart institutes in the developing countries. In my opinion, such centres should have an educational and a research mission, and explicit involvement in the implementation of

field programmes. An interdisciplinary team is requisite - comprised of those working on basic and applied problems in the laboratory, epidemiologists who are knowledgeable of the disease, experts in clinical tropical medicine, behavioral scientists who can probe sociocultural problems and others concerned with the practical problems of program management. Obviously, I'm not talking of a faculty of three or four persons but a group, perhaps 25 to 30 persons, who can and will commit themselves to long-term collegial relationships with at least two or three developing country institutions. It seems to me that to incorporate the variety of disciplines required, the base of operations requires a school of public health or a department of preventive medicine or geographic medicine whose concerns are population-wide interventions, rather than one-on-one curative care which has been and is the provenance of the schools of medicine.

To do this effectively would require expanding traditional academic boundaries to provide, for example, at developing country institutions, fully-acceptable clinical teaching rotations to interest a new generation of young physicians in the great challenge of tropical medicine; laboratory and field research opportunities for both U.S., national and other students; and an involvement in endeavoring to deliver programmes in the field. The Rockefeller Foundation network for the Great Neglected Diseases represents a beginning but its purview would need to be substantially expanded.

The Centres, of which I conceive as essential, if an important impact is to be made, would not be inexpensive. Government funds to foster such

centres would be helpful and USAID needs to be encouraged to support such efforts, as it has done in agriculture. Government funds, however, are constrained in use, problematical to employ, subject to political whims and often uncertain from year to year. Private foundation support for faculty, for domestic and foreign students, for travel, for specific programmes will be absolutely critical and while none can provide all necessary support, an orchestration of efforts with a commonly shared vision of what needs to be done could be decisive.

Lewis Thomas' quote that international science (and I would specifically note health) is unique in its ability to produce so much of immediate and practical value for the species. It is unique in its ability to bridge cultural and political barriers. And, if I may point out, we actually aren't talking about legions of trained people but thousands. I think back to the extraordinary impact of the Rockefeller Foundation in decades past which involved no more than perhaps 100 to 200 staff and trainees. And, let me remind you that smallpox eradication was achieved with a vaccine which had been available for more than 150 years but with little more than 100 international field staff - dedicated, inquisitive, innovative and generally under 40 years of age. Programs are fundamentally people, and the catalytic effect of a few hundred of the best and brightest could have a profound, long-term salutary effect on tens of thousands - in immunization, in family planning, in nutrition - indeed in a spectrum of activities which could assure a healthier, more equitable and more stable world.