

"International Catastrophies and National Concerns"

Julia M. Jones Memorial Lecture

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I am honored to be asked to deliver the Julia Mary Jones Lecture. There are few indeed so preeminent in a field as to evoke an immediate association between disease and clinician, especially a disease so feared, so widespread and so devastating as tuberculosis. But such was the stature of Dr. Julia Jones. She represented more than this, however. As a colleague expressed it, "she was the teacher of chest medicine to a generation of students, residents and fellows." Many of those, I know, are here today and students, now teachers, are found throughout the world. No finer tribute could be paid to anyone.

Memory is short and many today forget that tuberculosis in the early years of this century was the nation's leading cause of death. Infection rates among those in the older age groups approached 100%. It was a disease which for decades commanded the attention and concern of the foremost figures in American medicine - Dr. Julia Jones being one of these. And, as you know, it was widely celebrated in opera and literature. In contemporary literature - such as Peanuts - the disease is almost unknown. My predecessor, Dr. William Welch, the first Dean of Johns Hopkins School of Hygiene and Public Health, played a key role in forming the National Association for the Study and Prevention of Tuberculosis, subsequently the National Tuberculosis Association. Although victory over tuberculosis has

not yet been won, progress has been steady and viewed in perspective, the achievements must be regarded as among the most brilliant in medicine. In 1977, the number of cases in the entire United States was only slightly more than 30,000, almost two-thirds of them being among those over 45 years of age. Deaths numbered just over 3,000. And the numbers are steadily falling. It is not unreasonable to speculate that some day the declining curve could reach "0". This Association justifiably can take real pride in its role in this achievement. At the same time, I believe that it is essential that it not entirely abandon its original purpose as leader, advocate and participant in a now little discussed but nonetheless landmark disease campaign. The last mile can be the most difficult! And let us not forget that tuberculosis today among more than half the world's population is little better controlled than it was in the U.S.A. when your Association took root.

During the same period that tuberculosis in this country moved steadily into the background of concern and attention, it has become increasingly apparent in this Industrial Age that preventable pulmonary disease is a far greater problem than any had imagined. Year by year, more and more agents are being identified as causal factors both in morbidity and mortality. There is no question but that many more are yet to be identified. The Association sensibly has broadened its area of concern, its mandate from a single disease to an organ, and is now confronted with a myriad of problems and possible priorities. It is difficult to know which to attack, how best to employ always scarce resources.

I pretend no special wisdom in deciding a quandry so complex. Perhaps, however, I might offer some perspective from more than a decade of experience in coping with one small segment of a multitude of catastrophic health problems which beset the developing world and a pallellel quandry of the international

community in deciding among a multitude of priorities in taking significant "next steps."

For the best part of 12 years, I served the role of an itinerant program manager, roaming the developing countries of the world, partaking of many experiences which the travel brochures inadequately portray - Swissair food poisoning, Bangladesh bed bugs, Sudanese fever, Ethiopian hyenas and even a few colorful adventures with Russian tanks in Czechoslovakia, Pakistan militia in Bangladesh and Somali guerrillas in Ethiopia. The adventures are more cheerfully related than endured. For 12 years, I saw but very little of the United States and so I have returned to this incredibly opulent country not quite a stranger but not an acclimated citizen either.

The smallpox eradication program and I became entangled as a result of a decision by the World Health Assembly in May 1966 that the World Health Organization should embark on its second global eradication program. The first, against malaria, was foundering and has since been abandoned. In 1966 the delegates spoke enthusiastically about eradicating smallpox and even went so far as to propose that it be achieved within a ten-year time limit. In fact, few believed that the goal was feasible, given the difficulties experienced with malaria eradication and the obvious practical problems of coordinating programs across some 50 countries - countries which included some of the most inaccessible and inhospitable terrain on earth and vast reaches of countryside rarely visited by government workers of any type. Appropriated was \$2.5 million, a sum which if divided by 50, the number of countries in which programs were required, amounts to an allocation of only \$50,000 per country. Approximately 250 million doses of vaccine would be required annually. If purchased, the vaccine would have cost more than had been allocated for the entire program. Our early tests of vaccine then in use in the various countries, showed that less than 10%

of vaccine in use met requisite standards. Some vaccine contained no detectable living virus at all. Reporting was a shambles.

Studies eventually revealed that only about 1% of all cases were being reported - that the actual total of cases that first year of 1967 was in the range of 10 to 15 million rather than 131,000, the number officially recorded. A plea was made to all countries for additional contributions to the program but the responses were few and reluctant. There was cause for pessimism and doubt and, in fact, converts to the belief that eradication might be achieved were few and far between until little more than four years ago. But pessimism and effective public health programs are incompatible. A dedicated, aggressive and irreverent band of national and international health staff persevered. Plans and strategy continually evolved. Each step, each action was continually questioned as to whether it was the most effective, simplest and least costly approach; collaborating laboratories sought answers to problems posed by field staff. There was a ferment of ideas, debate and directions. In consequence, the program's strategy and techniques changed and evolved steadily. Gradually, the number of infected areas were reduced in number, the numbers of cases declined. The last case of variola major, the most feared form of smallpox, the form which killed 20% to 30% of its victims, occurred on Bhola Island, Bangladesh, on October 16, 1975. Two years later on October 26, 1977, the last naturally-occurring case of smallpox developed in a 23-year old cook in Merka, Somalia - 10 years, 9 months and 26 days after the intensified eradication program began. Except for two cases of smallpox resulting from a laboratory accident, no further cases have been found. On October 26 of this year, two years after the last case, it should be possible for the World Health Organization to proclaim that smallpox has been eradicated from the world.

International assistance to this program amounted to an average of little more than \$8 million per year. With the complete cessation of smallpox vaccination - and more than 50 countries have stopped vaccination already - the nations of the world will realize a savings of some \$2,000 million annually. The United States alone will save annually an estimated \$300 million (expressed in today's dollars). Of greater importance, the annual toll of more than 10 million cases, 2 million deaths and countless cases of blindness has been stopped.

Although this has been an achievement to which all countries have contributed, it must also be recognized to be, in effect, a gift from the developing countries to the industrialized world since it was the developing countries which contributed most in terms of manpower and resources - more than twice what they received in external assistance. Yet all countries will benefit and will continue to benefit every year henceforth. In brief, we in this country and all industrialized countries owe a specific monetary debt to the developing world.

What appeared to be an impossible task in 1967 is now all but a reality. The strategy and methods employed in the program were unique and especially adapted to deal with a particular disease with special characteristics. It cannot serve as a template for dealing with any other disease in this country or abroad. I am convinced, in fact, that no program specifically directed toward dealing with any particular problem can or should be identical to programs addressing other problems. However, I believe there were several basic features of the campaign which perhaps may be more broadly generalized as we consider how best to cope with other disease problems.

First and foremost is a recognition of the key role played by the World Health Organization, an Organization which more closely resembles a voluntary Association than it does a government

health structure. The countries of the world in the forum of the World Health Assembly, voluntarily decided to make a commitment to eliminate smallpox. To some countries which experienced only the mild form of smallpox - variola minor - the disease was of far lower priority than many other problems with which they were beset. Such countries included Ethiopia, Somalia and Brazil. Nonetheless, they stood by their commitment and devoted scarce resources to the program. The role of the World Health Organization was that of mobilizing resources, of coordinating efforts, of encouraging those whose programs were lagging. With WHO serving as mediator, agreements were reached between countries to permit health teams from one country to work in adjacent areas of another. In Ethiopia, for example, there was a period when teams from Kenya, Sudan and Djibouti joined Ethiopian teams in Ethiopia in a united effort against a common enemy. No single government, no bilateral agency, however powerful or wealthy, could possibly have orchestrated this effort. To those who decry the United Nations agencies as being ineffectual should be noted the statement of a principal delegate at the Assembly - "If WHO were to achieve nothing but the eradication of smallpox, it would have more than justified its existence". But WHO has been and is engaged in a variety of programs. New initiatives already include a global immunization campaign against the major, killing childhood diseases; a coordinated program of research to discover new methods of prevention and treatment of the major tropical diseases; and a program to provide primary health care throughout the world.

It is surprising to many to learn that WHO's role is not and has not been that of an authoritarian supra-health ministry. WHO has no legal authority, no delegated responsibility which permits it to mandate any program in any country. A WHO medical officer cannot so much as pay a visit to a country unless the country agrees. Rather than a supra-health ministry, the Organization serves as a forum where politicians, public health leaders and

scientists may discuss and decide upon different possible approaches in solution of a problem and a context in which they may combine their talents to address major problems requiring further research. The Organization serves as a conscience to remind governments of their responsibilities and the commitments which they have made; it provides advice as to program strategy and direction; and it provides to them an extremely modest sum of money which may be catalytic to the implementation of an activity. Whatever the program, different countries and even disparate areas within the same country work out solutions which are unique to their own political and health structure and the economic realities of their own area. In smallpox eradication, it was a source of pride and satisfaction to observe that although there was a common objective, no two national programs were the same. Each country sought to achieve the objective in the way best suited to its own realities, taking into account developments in other countries. In many respects, the Organization more closely resembles an Association such as your own than it does a Ministry of Health or, if you like, a supra-national Ministry of Health. More specifically, the features I sense to be in common between the Organization and your Association are: (1) a role in which advocacy, leadership and persuasion are the essential tools, (2) the possession of limited resources, and (3) a central office of modest size - our smallpox office in Geneva consisted of only 6 professionals.

As a second feature, smallpox eradication dramatized uniquely the potential of prevention. Let us assume that instead of preventing the disease, we had set out to construct sufficient hospitals to treat the victims. Not less than 500,000 hospital beds would have been required - or the equivalent of 1000 hospitals of 500 beds each. As I noted, \$100 million was contributed to the smallpox program. How many hospitals might we have built with this money? Perhaps 2 or 3 spartan facilities, certainly not 100, let alone 1,000. The pioneer role which this

Association has played in the conquest of tuberculosis, in fostering ambulatory therapy - a form of secondary prevention - has had a no less dramatic effect in closing sanatoria, in releasing hospital beds for other purposes. How much would have been achieved had your efforts been devoted solely to the treatment of end-stage tuberculosis?

A third feature of the smallpox eradication campaign which bears an analogy to possible programs in lung disease control was the notable role which can be and was played by local health workers, by village volunteers - teachers, students, village chiefs. This was facilitated by research - research directed toward solutions, toward discovering simpler, better, more effective techniques. As the techniques became simpler and directions more definitive, it was possible to rely increasingly on lower level health staff and the villagers themselves - to vaccinate, to discover cases, to control outbreaks. With increasing local participation, progress in the program accelerated. Local people better understood the social constraints, the habits, the patterns of behavior of their fellows. They, better than anyone at District, National or International level, could practically translate principles and directions into an effective program in their own setting. Each new approach, however, was submitted constantly to the acid test of whether or not it facilitated a decrease in cases and the elimination of disease. Thus, continuing assessment and continuing evolution were hallmarks of the program, as I feel they should be intrinsic to every disease prevention program.

However notable the achievement of smallpox eradication may be, it represents no more than a first step in providing a reasonable measure of prevention and health care to the world's population. A quandry persists as to what should be our subsequent priorities. The magnitude of the continuing saga of illness, starvation and death which is enacted daily in each village, each



household throughout much of the world is formidable. The resources to deal with these problems are limited. One queries as to where funds for health have been expended. In recent decades the emphasis has been, unfortunately, on the construction in the major cities of magnificent temples of curative medicine, called hospitals, to care for a minute proportion of the population which have become sick enough and were geographically close enough to qualify for benefit. In most countries, the remaining funds, if any, have simply not permitted the extension of medical services to the 80% or more who live in villages. Nor have resources been made available for all too obvious and readily available preventive measures. Even today, entire wards in such hospitals are set aside for the treatment of tetanus, of rabies, of diphtheria, of typhoid fever - all preventable diseases.

But attitudes are changing. Last year, in what has been termed the declaration of Alma-Ata, countries throughout the world committed themselves to a radical change in their approach to health care. They affirmed a commitment to develop systems of health care which will extend to the 80% of the population which today have little or no health care and to an approach emphasizing prevention and early treatment. Numerous different approaches are already being tried. Common to all is an emphasis on local initiative, on the development of human resources at the local level and on the evolution of programs best adapted to local needs. The ambitious goal is to provide essential, primary care and prevention to peoples throughout the world by the year 2000. This seems almost Utopian but, as we found in the smallpox campaign, remarkable achievements are possible even with limited funds if there is local support and participation, clear objectives, definitive directions and a means to assess progress. Although I am encouraged by the commitment on the part of the developing countries to now assign resources, at least in principle, in a more rational manner, they are confronted with a

multitude of what can only be characterized as health catastrophes - problems of population, of nutrition, of infectious disease. Energies, so far, have primarily focused on problem description but very little on realistic solutions and directions and on definitive programs which are feasible within the limit of resources available. With limited resources, prevention and early treatment are obvious approaches. They represent, in fact, the only reasonable approaches. High cost tertiary curative medicine is entirely out of the question. But no country can undertake more than a small number of the many possible interventions. Definitive specific objectives, simplified solutions and a plan for continuing assessment of progress are necessary for this as any program if progress is to be made.

One wonders if this change in direction in the developing world has meaning to a country such as ours where health conditions are so vastly different. The problems we face, our national concerns, are not the same. Infectious diseases are still with us but now very much in the shadow of an overriding and entirely realistic concern about the quality of our environment - an environment unique to a modern, industrialized age, now replete with an array of new or comparatively new chemicals of known and unknown pathogenicity and to which is added each year not less than 500 new chemical substances.

This environment is being monitored hourly, daily, year after year by more than 200 million Americans each of whom possesses a filter, called a lung, through which some 7,500 liters of air pass daily, a quantity equivalent to a small swimming pool. Only in recent years, however, have we really begun to question and to appreciate what may be the impact of this environment not only on the filter itself but on the organism as a whole - the impact of inhaling asbestos, pesticides, benzene, and a host of other toxic compounds, only a portion of which have so far been identified as

toxic, carcinogenic or mutagenic agents - many more will be discovered. The lung, this enormously complex filter, is the recipient of insults never before imagined. One might characterize it as the "Target Organ of the Industrial Age."

The public response to the almost weekly account of newly identified hazardous substances has been to call for greater regulation, for prohibition of pollution, for "pure air". Regulation after regulation has been and is being promulgated with as little understanding of dosage as it relates to risk as we have of the nature and type of pollution which makes a bathing beach safe or unsafe - which is, today, almost none at all. The philosophy is "less is better" and, yet, unless we decide to dismember this modern industrialized society as we know it today, reason and science rather than emotion must eventually prevail. We can abolish motor vehicle injuries and death very simply by reducing the speed limit to "0". No one seems to be prepared to do this and yet, there are those who advocate legislation which mandates what amounts to pure air. There is need, as never before, for health professionals of many disciplines - toxicologists, epidemiologists, pulmonary physiologists, specialists in occupational medicine - to unite their talents with engineers, economists, industry, labor and others to rationally address problems in order to develop specific practical solutions which can be implemented. Your Association could play an important role in providing the forum required.

Solutions, as developed, will be able to be most readily translated into action in the major industrial establishments. Far more difficult to cope with are and will be the host of small businesses throughout the country which employ a veritable army of workers who are exposed daily to already identified, toxic substances as well as others still to be defined. These include welders, those engaged in the dry cleaning business, painters and literally hundreds of thousands of others. Short of employing a

regulatory police force which approaches an army in size, enforcement of safety standards is hopelessly out of the question. What we need and will need is an effective, intelligent educational program to make these workers aware of the environmental hazards, to encourage their use of protective measures and devices and to work with them in their application. How much better could this be done by a local organization which is perceived to be working with them and in their interests rather than by some regulatory authority or government agency. And does it not make more sense to devote one's principal energies toward the prevention of illness in this manner than toward the overwhelming problems posed by end-stage pulmonary disease?

Internationally, a revolution in health care delivery is fermenting and, in some areas, has begun. It has occurred in response to crisis, a catastrophe of illness, of death. What has been a national concern about environmental health in this country is now being viewed increasingly as an impending crisis. As the Chinese ideograph for crisis so aptly points out - crisis is comprised of two parts, "danger" and "opportunity". Clearly, there is danger but, there is also an opportunity to act constructively in this enormously complex problem area. There are parallels in the approach required in the developing world and in the industrialized countries.

Research is needed as never before to define real risks, to separate out threatening phantoms from practical concerns and to identify better, simpler, more effective tools to define problems and to implement effective preventive measures. To translate such measures into practical reality requires uniquely a community effort, no less than in the developing countries. Every community is different, every environment is different. Approaches applicable to one setting, to one environment, may be impractical or ineffective in another. Only gradually are we

beginning to appreciate that objectives and guidance can be established at a national level but translation of this into practical interventions requires local initiative, local support and understanding and appreciation of local realities. To do this effectively requires a forum of understanding and scientific comprehension rather than a mindless mandate for prohibition.

This Association with its strong tradition of community leadership, with its heritage of emphasis on prevention, with its mandate and concern, the "Target Organ of the Industrial Age," is uniquely poised to play a vital role both as advocate and participant in research, education and effective, sensible intervention. But with limited resources, difficult hard-headed selective decisions are important if substantial progress is to be made.