The Lancet · Saturday 1 November 1975

HEALTH—A DEMYSTIFICATION OF MEDICAL TECHNOLOGY*

H. MAHLER

Director-General, World Health Organisation

ANY group asked to design from scratch a model health care system for an industrial country would probably come up with as many solutions as there were respondents. No single "truth" is likely to be right or to satisfy all. We do not have any meaningful yardstick for some of the variables. Limitation of resources must mean that we should make different "trade-offs" between different courses of action or different groups of people; there would be a different appreciations of the history, structure, and future development of the country; and each person might be biased, concerned, or protective in a different way about the part he or she should play in an ideal health service system. Yet, amid such diversity, there might be some measure of unanimity.

The amount of State resources to be used would need to be decided by a statutory body. Somewhere there would be a mechanism by which drugs and supplies could be manufactured and distributed. There would be research-workers. There would be procedures to protect the population against epidemics and catastrophe from outside and inside the country. There would have to be a primary health delivery system which would be accessible and acceptable to all the population and to which people could go when they felt the need, and which would take responsibility for them in a health care sense. There would be a referral system. There would need to be people who accepted one or another health care roles in society and who were trained, licensed, employed, and supervised. Such people would be of many different strata and have different functions. One such group might well be called doctors and be the final point of referral and some of them might work in specially designed and equipped institutions which could be called hospitals.

If it is agreed that such a large number of common elements could appear in all our accounts it might be said that the variations within the pattern are of but minor importance and could be called matters of taste rather than of substance. If so, I would disagree. It is my thesis that the differences at this point *should* be of our greatest concern. In many countries they are *not*, and almost unwittingly actions are being taken within health care systems which are potentially dangerous and need to be brought out for public debate and reversed if necessary.

*Inaugural lecture of the British Postgraduate Medical Federation's 1975-76 Scientific Basis of Medicine series, delivered in London on Oct. 9.

The Mystery Holders

The wave of social consciousness in the 19th century in Europe and in North America broadened our understanding of "Health" but resulted in a reaction by the medical Establishment and a constriction which is still continuing. By legislation, by training, by organisation, and by the way in which health-related interventions are stated and restricted, there has been a progressive "mystification" in medical care which is continuing almost unchecked. As our understanding of cause and effect has grown, "medicine" has continued to restrict the range of problems for which it considers itself responsible and the gap between "health care" and "medical care" has become ever wider. This has been coupled with an organisational change which has influenced the manner of dealing with these problems, a gross restriction in the information available and decisions to be made by people outside the health professions, and an unnecessary but inevitable dependency of the population upon the holders of these mysteries.

If true, this is a grave charge. As with all such general charges the evidence adds up to suspicion rather than certainty. If one looks back to the last century in England, the attack upon some of the physical evils of the Industrial Revolution was clearly led by social reformers, such as the Chadwicks, the health professions having secondary roles such as certifying most questionably the health effects of rising damp and back-to-back houses. There was a change in the disease picture (especially the communicable diseases) but the evidence linking this to medical improvement interventions rather than to changes in the society and the environment is also questionable. The continuing decreases in incidence and mortality appear to be largely extensions of continuing trends and were not directly related, in time, to immunisation or to direct medical action.

In parallel with these changes in disease pictures came a change in distribution of health resources. On the one

hand there was the expansion of coverage to the universality of access which you now have, and on the other came the increased expenditure of specialised resources upon the few. This meant that a widening of the base did not result in a lowering of the peak or a flattening of the health expenditure pyramid. The peak is still rising higher, but this time it is a peak of expenditure directed towards the few, selected not so much by social class or wealth but by medical technology itself. Such an evolution is a world-wide rather than a peculiarly national trend. In some places where it has been examined it has been identified as an increasing expenditure upon persons in the final months or years before death. It appears that this expenditure does not measurably increase life expectancy or make humanly tolerable the closing episodes of the lives of elderly people. In other countries the increased expenditure on the few has been linked to the "upgrading" of health care interventions to higher and higher levels of the medical Establishment. This is typified by a statement of intent, within a developing country with a high maternal and neonatal mortality, that the medium-term objective will be to arrange that every woman in labour should be delivered by a consultant specialist obstetrician. Many other examples of the same trend can be cited. When added together they appear to say that health workers consider that the "best" health care is one where everything known to medicine is applied to every individual, by the highest trained medical scientist, in the most specialised institution. This type of thinking is clearly as dangerous as it would be for me, who spends so much time flying from Member State to Member State, if I preferred the aircraft in which I was travelling to be flown by a professor of aeronautical engineering rather than an experienced pilot.

If one follows this same line of thought one understands the inevitable side-effect that, as health care action moves higher and higher up the referral ladder, it comes to be justified more and more by the actions themselves and is more restricted. It is frightening but expected that when a specialised group is formed to perform certain actions it is evaluated and continues to be supported because of the *number* of such actions which it does, rather than by whether a problem is solved. There are counter-reactions to such trends well typified by the recent public debate over the treatment of spina bifida. Another example of reaction to this path could be a children's burn unit in a major city which showed that many of its intake of cases resulted from injuries caused by scalding coffee in the home. Rather than conducting research upon a more effective treatment of burns it directed its attention to the design of a coffee-pot which would not spill. The wide acceptance of the new design led to a decreased number of cases. But these exceptions make existing trends even more frightening.

Such trends towards restricted high technology might be said to be a byproduct of medical research distortions, and a good case might be made for directing a portion of the blame to the priorities of research-workers supported for the most part from national funds. But such finger-pointing cannot explain all that is happening. The movements of interventions further up the professional ladder and the increased restriction of action to fewer and fewer people does not seem to be related only to new research findings. The implications of such a movement are not only seen as an increase in costs with few measurable health advantages in terms of either morbidity and mortality: they are also seen as a downgrading in social status of health workers at the bottom of the pyramid, changing aspirations of health workers who understandably want to be legitimised to as high a point in the pyramid as possible, or public reaction such as the disturbances in the United States of America caused by the increase in malpractice litigation.

Four Questions

What I have been describing is not a single, simple, phenomenon of our time but a complex of events. Some of the elements of this complex might become clearer if phrased as four questions:

(1) Is it possible to assign health resources within a country on a problem-solving basis (using different mixes of preventive curative, promotive, and rehabilitative action)?

(2) What medical interventions are truly effective and specific for prevention, treatment, or rehabilitation, as measured in objective terms?

(3) Can such medical interventions and the risk groups to which they should be applied be described objectively and in such a manner that the amount of skill and knowledge required for their application can be assessed?

(4) Is it possible to design a health care Establishment to carry out the above tasks which will result in the most meaningful interventions reaching the greatest proportion of persons at risk, as early as possible, at the least cost, and in an acceptable manner?

There is little doubt that it would be considered reasonable to ask questions of this type if we were dealing with a non-health topic such as education or transportation, and to answer them with a positive reply. In health, persons within the Establishment might both disagree that the questions are the dominant ones, or relevant, or even try to make the case that health is in some way different. Non-health individuals might react differently and even express astonishment at these questions because many may fondly assume that their health services *are* designed to deal with problems; the interventions they pay for *are* known to be effective and appropriate; and the person who is responsible for the medical care they receive *is* the appropriate person in training and position for their needs. Such is not the case.

I am convinced that all of the questions can be answered positively. But this does not mean that, if a country and a health care Establishment did assign resources on a problem-solving basis, using methods known to be effective by the most appropriate people to apply them, this would be the perfect health service requiring no further change. Problems change; societies and priorities change, and will keep on changing. Society's instruments for action must keep changing too. New interventions will continue to be evolved as our knowledge and understanding grow. New types of action must lead to changes in the role of health workers. But if change would be needed in the future within a service based upon such principles, it is equally likely that change is needed *now* when we do not have such perfection.

The game of designing a health service rests upon such issues and it is likely to be a sterile exercise if it is allowed to end at this point. Few countries have the excitement of starting off designing a health service from

basic principles with a blank sheet of paper. Countries have pasts as well as futures and the incredible investment of the past in institutions, industries, people, knowledge, and public awareness and acceptance cannot be discarded with a playful laugh. It would be a foolhardy decision-maker who took lightly the risk of discarding what we now have in the hope that what would come next would be better.

But there is some middle ground between those either frightened of any change or confidently proud of present achievements, and the grim and embarrassing rationalists wanting to make a new start because they consider that the present system is an adapted historical accident, unjustifiable on any grounds, and following its own professional path divorced from people's needs.

Objective Measurement

The entry point in my view are my questions 2 and 3. Techniques already exist to examine medical technology and to express in objective terms what works, whether it matters, and what it costs. The studies on such subjects have been of three types.

The first are cold, planned, controlled clinical trials testing whether intervention A gives a better result than intervention B. Such clinical trials are medical extensions of the scientific method; their mechanics are widely known, and both their conduct and their results give satisfactions to both the investigators and the consumers.

The second type of study is much more rare and is not greeted with such universal approval. A good example is the study of anæmia in the United Kingdom where the questions were: What is anæmia? What level of hæmaglobin really matters? and How effective is the treatment to persons below this level? So much of ill-health as we now see it is not divided from the normal by a clear division point; yet establishing where the dividing line rests not only is of concern to millions of individuals, but also, if it can be related to outcomes, can save huge amounts of money and man-hours of work, and false explanations to patients with complaints. Some members of the Establishment look upon such studies as a threat to long-held assumptions. The design and conduct of such studies can be very difficult, expensive, and time-consuming and must raise some ethical difficulties.

There are even fewer examples of the third type of study. These are trials which require the results of the previous two trials as their starting point. They start from a dialogue between the national medical Establishment and the national Goverment which recommends that at this time, and from evidence provided by trials such as the above, such-and-such a health problem is relevant and important and this-or-that intervention to a certain part of the population could be the best national strategy. From this decision a trial could be designed to see how this could best be done on the grounds of cost, efficiency, and acceptability. There are examples of such trials of this third type and the national strategy aimed at the ascertainment and treatment of phenylketonuria from birth in many countries is a particularly good one. Some such trials are multistaged, and the provincial trials in Mexico aimed at decreasing deaths in infants from diarrhœal disease are a case in point. Here a review of the evidence clearly pointed to dehydration as the immediate main cause of death, and the first trials based upon district rehydration centres were clearly effective in decreasing mortality. But rehydration centres were also expensive, required specialised staff, needed transport systems to the inaccessible villages, and had the image of high technology brought to bear on what is understood as a household problem. The next phase of the trials was the preparation and testing of salts for rehydration in such a form that they could be produced cheaply, prepared and used by anyone including the mother, and distributed through existing networks. This proved to be equally effective, much cheaper, and highly acceptable. But, while one can view such successful trials with satisfaction, one is equally aware that there have been very few examples to choose from; for many of the trials have been directed at rare rather than common problems, and some of the results have been rejected. In some of the examples which I have been associated with, the evidence of the trial has been accepted but the findings have not been applied. I suspect that this has sometimes been because the medical Establishment plus its efficient medical lobby has considered that the necessary health service changes would either decrease or change their influence, their status, or their incomes. The public outcry, when the subject has been one of public debate, has been on the grounds that there will be a decrease in the "quality" of service. "Quality" is a dangerous argument to make in a health service which is not problem-oriented but institution-oriented. As the public becomes increasingly aware that different drugs—all of which have been monitored for national standards of safety and efficacy and which are similar in all relevant respects except price—are being prescribed for the same condition, it is highly likely that such examples of apparent rejection of a successful trial will be used against the medical Establishment as a whole.

I strongly advocate a massive encouragement of all three types of trials and I consider that, while these have been largely completed in my particular field of tuberculosis, there are enormous gaps in many other problem areas. As the World Health Organisation responds to requests from Governments for assistance at the periphery, we are aware that at the village level a considerable proportion of the interventions have not been examined in this way. We suspect that at the district hospital, health centre, level the proportion is at least as great.

Claim for Diversity

While there may be little disagreement that medical interventions or technology need to be tested objectively and that this testing should continue to the population-based problem level, I am aware of implications which require further discussion. It is reasonable to ask whether, if such testing is completed with the best of our presently available knowledge and gives a meaningful result, this answer should be a national or a world standard and whether all of us should conform to it. If a country makes a different decision, will it be providing or advocating a lower "quality" of care? The answer to both these questions must be No for two different reasons. Firstly, both the importance and the nature of problems vary from place to place, and from country to country. A good example of this is the different responses to oral poliomyelitis vaccine in tropical and tem-

perate zones. But, even after putting these important arguments to one side, there are good reasons for advocating national rather than international decisions. If I return to the diarrhœal disease example I mentioned earlier, the result of providing rehydration centres, of distributing simple home-based rehydration fluids, or of possibly improving the environment and decreasing fæcal-oral transmission or assisting families to provide their children with an adequate diet, may all be the same. All may result in a clear decrease in deaths from diarrhœal disease. Some may have other positive or negative effects as well such as decreasing diarrhœal incidence or decreasing the likelihood of dying from measles. Each may have a different cost. All of these variations are important and need to be taken into account when a decision is made; but it cannot be said that one country is right and another is wrong if each collects and considers the evidence objectively and comes to a different decision. In the same way it cannot be said that a country which decides upon rehydration by the mother has taken a decision to give a lower quality of service than the one which will build rehydration centres staffed by doctors or nurses. I can think of major disadvantages of discouraging diversity between countries in the same way that there must be omissions, waste, and dangers through not having a national decision-making process within countries or regions to answer and decide upon such questions.

The collection of evidence which can be used to decide what is our problem-based health technology opens great opportunities of research for the individual research-worker, for professional groups, and for Governments. This is research in the broadest sense and need be no poor and low-class relation to other research aimed at increasing fundamental knowledge of our biomedical world. And this type of research would make major contributions to the demystification of medical technology.

Starting Points for Change

Up to this point I consider that what I have said should not be in major conflict with the main lines of world medical thought—although in deep conflict with actual delivery of health care. However, I wish to make two further points which are more speculative and are much more an expression of my views upon the world and society than upon medical technology.

The first is that, while health services are clearly an integral part of a country's social policy and political structure, we must assume that health policies and actions can be changed and improved without a change in the basis of government. If this is possible, and if a Government considers that health is a basic right of each member of its population, then a change to a more efficient, acceptable, and just health system can be made by concentrating upon and answering the three final questions I have already given. I am conscious of the number of "ifs" I must make in this statement and the few examples I can show to base it upon. Much of my conviction must come by analogy from other sectors where the starting point for progressive change has been an agreement upon the nature and the extent of the problem followed by an objective assessment of what can be done about it, thus avoiding subjugating the problem to technology. I consider that agreement upon the usefulness, practicability, and ranking of this priority step would be a major advance. We all know that there are serious defects in the health systems of many countries and we must have a starting point for change. One such point suggested frequently is a change in the education and training of health workers, but there have been no clear successes using this strategy. It has proved easier for health workers to adapt to the existing system, even when they are trained for different tasks, than to change the system itself. Another purposed starting point has been centralised planning. While this has resulted in documented successes, these have frequently been where the problems have been clear (such as epidemic disease) and the interventions have been equally clear. What I am advocating, for the industrial as well as the developing world, is for the health Establishment to make a major effort to describe all the health problems and the alternative ways of dealing with them in an objective way and then to accept a national decision process based upon this evidence. Such a series of steps has risks as well as advantages and assumes both a level of scientific detachment which is clearly obvious to all and an acceptance that the final decisions are made by society rather than by the concerned professionals.

My final point has two parts and is equally speculative. The first is that it makes good social, economic, and professional sense for countries to take the choice of intervention options nearer to the consumer whenever they have the chance. If I use my diarrhœal disease example, I would say that making rehydration salts for babies available to mothers in every home is likely to be more useful in the short, medium, and long term than expecting the mother to take the baby to a special centre and have this service done for her. There should be no secret either in the way in which diarrhœal disease occurs or in its treatment. There appears to be no possible reason why the knowledge and the skills of dealing with it should not go down the professional tree to every household at risk. This is what I mean by "demystification" of medical technology.

There are other possibilities of reversing the trend which is pushing medical action higher up the professional tree. Surely there are immediate opportunities of shifting action downwards at least one step—from teaching hospitals to regional hospitals, from consultants to general practitioners, from general practitioners to nurses, from nurses to mothers? Such a process has to be undertaken carefully and with real understanding. I am well aware of the apparent relationship between, for example, those areas in Europe which have moved from domiciliary to institutional deliveries and a decreasing maternal and neonatal mortality. Which factors have influenced these changes have never been clarified but the relationship may well be real. The indicators of success in a reverse move aimed at other problems may be very different ones from deaths. Possibly we could expect similar figures for disease and death but rising indices expressing satisfaction and understanding, a decrease in costs, and a larger population group who will have this service. And it is this larger population participation that eventually might open the doors to effective prevention of, for example, cancer and cardiovascular diseases. Indeed it could bring us closer to W.H.O.'s constitutional objective: the attainment by all peoples of the highest possible level of physical, mental, and social

well-being and not merely the absence of disease or infirmity.

If such indices matter as objectives as well as methods of measurement, there are other implications. They must also influence the studies upon the definition of health technology which I mentioned earlier. They may be one more factor, even the dominant factor, in deciding what is important or relevant as well as who should have the responsibility for action.

Conclusion

The medical Establishment is in real trouble. Not only is it caught in the worries of rising costs versus finite budgets but it has the problem of defining its own image and philosophy. In our present world, "high technology" is no longer thought of as the description of "what is possible"—whether this be in atomic power or voyages to the moon. Now it must be the assistance in reaching certain goals under quite clearly defined conditions. We must simply state what we can do, so that all can understand, and then help to design a service based upon society's values and with a human face. I am confident that it can be done, if we want to do it—and the United Kingdom has indeed demonstrated a good deal of pragmatic vigour in this respect. But I am sceptical that we are anything near the critical mass of professional desire to stop confusing health with conventional medical wisdom. If this scepticism proves correct, then we can look forward to a long period of confrontation before anything like the dialogue I have proposed can begin.

CORONARY HEART-ATTACKS IN EAST LONDON

HUGH TUNSTALL PEDOE*

Medical Unit and Cardiac Department, The London Hospital, E1

DAVID CLAYTON J. N. MORRIS

Medical Research Council Social Medicine Unit, London School of Hygiene and Tropical Medicine, WC1

WALLACE BRIGDEN LAWSON MCDONALD

Cardiac Department, The London Hospital

Summary All cases of cardiac infarction, acute coronary insufficiency and sudden death occurring in residents of the London Borough of Tower Hamlets below age 65 were registered over nearly three years, and survivors were followed up for one year. The attack-rate in men aged 45–64 years was 1 per 100 per annum but the recurrence-rate in survivors was 1 per 100 per month. Immigrants from Asia had more than the average, and those from the Caribbean one tenth of the average attack-rate. Although it was unusual for general practitioners to manage cases at home by choice, nonetheless two-thirds of the deaths happened outside hospital and half of these were not witnessed. Half of those suffering coronary heart-attacks had a previous history of coronary disease and a sizeable minority were already unfit for work. Approximately half of those attacked were alive at one year.

*Present address: Department of Epidemiology, St. Mary's Hospital Medical School, Norfolk Place, London W2 1PG.

Introduction

"CORONARY heart-attack" is a term which can be used to cover the major acute presentations of coronary heart-disease—namely, cardiac infarction, acute coronary insufficiency, and sudden death. By studying all cases coming to medical or medicolegal attention within defined communities, it is possible to obtain series of cases that are more representative than those found by normal clinical means, and to measure the total impact of these attacks both against the known population and against the size and efficacy of efforts made to deal with them. A number of community studies would enable comparisons to be made of the frequency and natural history of attacks in different localities and of the ways in which their medical services operated. Two British studies have already been reported from Oxford and its environs[1,2] and from Edinburgh.[3,4] We describe here a third, from the inner London Borough of Tower Hamlets. This was itself part of a multicentre comparison of frequency and management of coronary heart-attacks in eighteen European cities, coordinated by the World Health Organisation.[5,6]

Between April, 1970, and December, 1972, 1039 attacks were studied and their outcomes were followed up for a year. Information was obtained on the medical and social antecedents, circumstances, and sequelæ of the attacks.

Methods

Study Area

Tower Hamlets, although an administrative part of London, is well demarcated within it by two bounding rivers (the Thames and the Lea), by the largely non-residential City of London, and by Victoria Park. It is also virtually coextensive with its four constituent postal districts. Formed in 1965 by the amalgamation of Bethnal Green, Poplar, and Stepney, it is the traditional East End of London. Those eligible for registration in the study, or its population denominator, were the resident men and women below age 65. (Those over 65 were excluded, firstly so that the study could concentrate on people of working age, and secondly because attacks in the elderly are more often associated with multiple pathology or the absence of confirmatory tests.) The study period was centred on the Decennial Population Census of April, 1971,[7] and information on the size, structure, and characteristics of the population was derived from this source.

At the time of the study, eight hospitals within the borough admitted coronary cases; seven operated casualty departments, the eighth was a specialist chest hospital. Three hospitals had coronary-care units, but oscilloscopes and ratemeters were in general use on the acute medical wards of the others. There were a hundred general-practitioner principals with surgeries in or adjoining the borough, a large proportion in single-handed practice. Few of these were resident and much of their work at night and weekends was done for them by deputising services. However, there is a strong local tradition of patients referring themselves directly to casualty departments for a medical opinion. Employment is provided locally and this and the large number of hospitals mean that it is unusual for residents falling ill and seeking admission to go outside the borough. These factors make Tower Hamlets unusually self-contained and suitable for a registration study such as this.