

# Scarce Resources in Health Care



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**Office of Health Economics**

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## Office of Health Economics

The Office of Health Economics was founded in 1962 by the Association of the British Pharmaceutical Industry. Its terms of reference are:

- To undertake research on the economic aspects of medical care.
- To investigate other health and social problems.
- To collect data from other countries.
- To publish results, data and conclusions relevant to the above.

The Office of Health Economics welcomes financial support and discussions on research problems with any persons or bodies interested in its work.

## Introduction

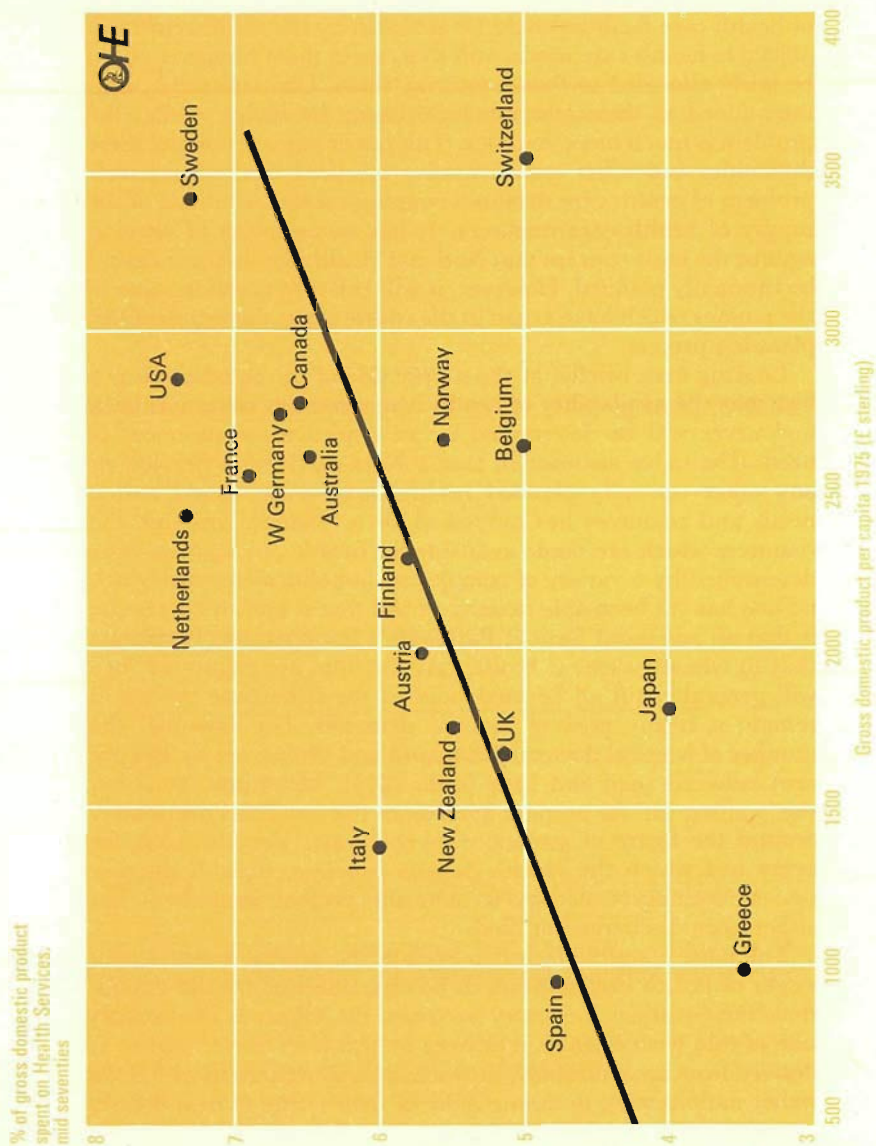
Over the past few years serious efforts have been made in Britain and elsewhere to achieve a more rational distribution of health care resources. It has often been assumed that an optimum supply of health care facilities could be achieved by the measurement of objective health care needs, and that, then, these resources could be fairly allocated to those requiring them. Unfortunately, well-intentioned as these attempts have been, the reality is that the problem is much more complex. This paper sets out some of these difficulties and offers some tentative solutions to the intractable problem of health care demands running constantly ahead of the supply of health care resources. It has no intention of arguing against the basic concept that National Health Service care should be rationally planned. However, it will call into question some of the notions which have arisen in the course of the discussion of this planning process.

Looking first, briefly, at the supply side of the equation, it is a fact that the availability of health care resources never has been and never will be determined by an objective measurement of need. The naive assumption that a National Health Service, or any other centrally planned health care system, could match needs and resources has proved to be a chimera. Instead, the resources which are made available for health care appear to be determined by a variety of complex socio-political systems which no one has yet been able to unravel. All that is known for certain is that an advanced form of Parkinson's law operates. It appears that to whatever extent health care facilities are expanded they will generally still all be used; and at the same time there will remain a steady pool of 'unmet' demands. For example, the number of hospital doctors in England and Wales rose by 130 per cent between 1949 and 1974 (OHE, 1977). Meantime, however, the 'waiting list' for hospital admissions has remained obstinately around the figure of 500,000 over the years. Very broadly, for every bed which the Health Service provides, there is another patient waiting to occupy it once the present incumbent has either been discharged or died.

The most plausible factor to explain the overall levels of provision of health care appears to be characterised by the maxim that 'the wealthier a country becomes, the higher is the proportion of that wealth which it devotes to health services.'<sup>1</sup> Figure 1, derived from an OECD study, shows an overall pattern in which the richer nations seem to devote more of their riches to health care.

<sup>1</sup> The same is almost certainly true of education and social service as a whole. In this sense it can be argued that 'wealthier nations often tend to become more caring nations'.

**Figure 1** Regression of 'health service expenditure as percentage of GDP' on 'Gross Domestic Product per capita' Organisation for Economic Co-operation and Development, Paris



*Note* One possible explanation for this pattern of expenditure would be that the 'price index' for health care rises disproportionately in wealthier countries.

*Source* OHE from OECD data

The Figure is based on somewhat shaky data, and there are discrepancies in the years used for expenditures for different countries. Nevertheless, it seems to lead to an inevitable conclusion that wealth rather than need still seems to be a prime determinant of the availability of health care. Traditionally that statement tended to apply to individual families; now in the late 1970s it appears to apply similarly on an international basis.

However, this paper is not primarily concerned with the availability of resources for health services. It is concerned instead with the use of these resources and how the problems of continuing shortages of health care arise and might be tackled. These are not local British problems. Difficulties in allocating scarce health care resources seem to occur world wide. Even the richest nations, devoting relatively much higher proportions of their greater wealth to medical care, face the same sort of problems of shortage as those which occur in Britain. Clearly additional manpower and money are not the answer.

Furthermore, the paper does not attempt to deal with the 'caring' side of medicine, with all its own problems and shortages. Clearly there is unlimited scope for improving the conditions of the mentally handicapped, the chronic sick and the elderly, for example. However, this paper, instead, is concentrating primarily on the difficulties which exist in the provision of 'curative' services, such as surgery, radio-therapy, physiotherapy and of course pharmacology. It is with shortages in these areas that the discussion will be concerned.

## The nature of demand

Originally in 1948, when the British National Health Service was initiated, there was a very real pool of untreated ill-health amongst the less wealthy which could readily be dealt with within the resources of available medical technology. This was illustrated by the sudden upsurge in the provision of dentures and spectacles which, because they had been relatively expensive, people previously had been unable to afford. But similarly, many patients could for the first time receive medical treatment free of charge for ailments for which they would previously have been unable to afford a doctor's consultation.

However, the pattern of demand and availability of care in the early years of the NHS was confused by a parallel (but unrelated) development. Coincident with this free availability of health care, there came a number of notable medical advances. In many cases these originated from the newly emerging multinational pharmaceutical firms. The most striking of these new 'cures' was the treatment of tuberculosis (OHE, 1962). Within a very short period

the long waiting lists for places in TB sanatoria disappeared, not because more beds were made available or because they were now 'free' but largely because chemotherapy had for the first time provided a readily successful treatment. In the same way, the infections such as pneumonia and scarlet fever could for the first time be effectively controlled by the antibiotics. As other examples, puerperal sepsis could be controlled and mastoid operations became obsolete. Indeed a whole range of similarly dramatic medical advances in the treatment of acute infections became available. Thus in the early years of the National Health Service there appeared to be relatively few 'shortages' of facilities because advances in chemotherapy made extra hospital resources available to treat more chronic sickness. In the early years it appeared that the dream of Beveridge and Bevan for a health service to cater for a steadily reducing need for treatment might be realised.

By the mid-1950s it was starting to be recognised that the control of infectious disease was to be an exception in the pattern of progress in medical care. By contrast, many other medical innovations such as advances in anaesthesia had the reverse effect. They increased the scope for expensive health care facilities rather than the reverse. Perhaps understandably, the architects of the NHS had overlooked this potential effect of technological progress on the capacity of medicine and surgery to deal with an ever-expanding range of technical medical problems. The reductions in demand for care which they had anticipated (and which had materialised, for example, in the case of tuberculosis) gave way instead to steady increase in the demands and apparent need for health care resources. This pattern of demand had never been foreseen in 1948. Had the state of medical art remained at the constant level which existed in 1948 – as doctors and politicians had expected it to do – there would have been little or no problem in 1978 in financing all of the very limited procedures to which doctors and surgeons would still be restricted.

Instead the reality is that pharmacological, biochemical, medical and surgical activities have all taken huge strides forward since the 1950s. Unlike the chemotherapy of tuberculosis these have often demanded increased resources. For example, brain surgery, transplant surgery, more precise biochemical diagnosis and a positive cornucopia of new medicaments for previously untreatable chronic illnesses have become available over the past thirty years. Medical and surgical practice has been transformed, and correspondingly the public have come to expect medical treatment in 1978 which bears little resemblance to their expectations in the 1940s.

It is important to make the point here, however, that it is not the public itself which has created the demand for new and more

advanced therapy. People have never spontaneously demanded new medical technologies except in the most general sense of wanting 'a cure for cancer', 'a cure for the common cold' or relief in general terms from any symptoms which they might be suffering. They had few, if any, specific expectations.

Going back to the 1950s, it was not the sufferers from arthritis who were demanding the development of an artificial implantable hip. Hence, in this sense, there was no 'shortage' of hip transplant operations in the 1950s. The surgery did not exist in a satisfactory form and there was no specific public demand that it should be developed. It was medical scientists along with interested engineers who developed the artificial hip on their own initiative. Similarly, pharmacological treatment of acute anxiety or depression was not available to the public although these conditions were widespread and their existence was generally recognised. Hence there was no 'demand' for tranquillisers and anti-depressants. It was scientists in the pharmaceutical industry who developed the pharmacological innovations which could then be so widely prescribed.

Once again there was no public demand for an 'artificial kidney' in the 1950s. It was members of the professions who spontaneously developed the technology and who first offered it to patients whom it might benefit. Thus it is important to understand that medical innovation is not stimulated by public demand as such; it is stimulated by medical needs as seen by the innovators. The growth in available medical technology is stimulated by the technologists - academic and industrial scientists and the scientifically-minded doctors - themselves. It is the research workers - and not the public - who force forward the frontiers of medical science. It is the scientists who in a sense 'create' potential new 'needs' which can only be fulfilled if new resources are made available.

Nevertheless, once a new development has occurred, it tends to become 'news'. The media eventually focus on it and publicise it. But even at that stage the public and doctors may be relatively slow to awaken to the potentialities of new treatments which could prove lifesaving for themselves or their patients. The availability of renal dialysis, for example, was demonstrated in the United States in the early 1960s, but it was almost a decade later before there was a general demand for widespread dialysis facilities in Britain. And this was a particularly spectacular example of a lifesaving technological breakthrough. For less dramatic advances public and professional awareness may play very little part in the spread of the new technology. Although effective 'anti-depressant' medicines have been available since the late 1950s, the specific clinical state of depression may still sometimes be unrecognised either by patients or their doctors.



Thus in the earlier stages the demand for newer and safer treatments tends to be 'technology' or 'specialist' led rather than being called for in advance by the public or the professions at large. However, over a period of time the public and their doctors do come to expect that the new medical techniques (or new medicines) should be available for their benefit. It is at that stage that the problems of shortages in medical care reach the limelight.

All of this explains the unlimited potential demand for medical care which, since the mid-1950s, has been a constant feature of all health care systems. It is responsible for the 'shortages' and the 'queues' which arise in every health service where payments by the patient have ceased to act as a limiting factor on demand. One simple fact, however, should by now have become clear. The existence of shortages is inherent in any system of medical care which is more or less 'free at the point of access' and which nevertheless permits unlimited scientific innovation and progressive advance in the quality and scope of care which can be provided for its patients.

### Controls on demand

Under the British National Health Service the primary responsibility for attempts to match this potentially unlimited demand against strictly limited resources falls on the shoulders of the family doctor. Every member of the public has the right to be on a family doctor's 'list' and the doctors are required under their terms of service to ensure that all necessary care is provided for the patients in their practice. Thus, except in an emergency, the family doctor is *intended* to be the only point of entry into the formal NHS system, and he can use whatever devices he likes both to limit the demands made on his own time and also to limit the demands made by his patients on the specialist hospital services. In doing this, he must implicitly define what he considers 'necessary' treatment under his terms of service.

Thus it is an unwritten and unwelcome responsibility put upon the British general practitioner that he has to try to make limited health care resources appear to meet all the justifiable 'needs' for medical care. He also has the even more difficult task of trying to satisfy all 'demands' for care – whether they represent legitimate needs or not. He has not been trained, and is often emotionally unsuited, to tell his patients that their demands for care are unreasonable. He may have an even more traumatic problem if he is faced with patients for whom he knows that effective treatment could be possible, if only sufficient resources were available.

However, although family doctors may have the initial responsibility in this respect, they do not usually face this latter problem alone. As in the case of renal failure, it is often the hospital consultant who ultimately makes the decision about whether

specific lifesaving facilities can be made available for a particular patient.<sup>2</sup>

The general practitioner will also tend to learn by experience and by consultation with the hospital specialists what treatment is likely to be available in local hospitals for less dramatic operations, such as hernias or varicose veins. Here the family doctor can refer the patient to hospital, to spend perhaps months on a 'waiting list'. Alternatively, the family doctor can discourage the patient from seeking hospital treatment knowing that it is unlikely to be readily available. In many other cases, of course, the family doctor may genuinely consider that the patient's disorder is too trivial to justify referral to hospital. In all these variety of situations the family doctor and the hospital consultants together have to perform a precarious balancing act in trying to see that those most in need of treatment receive it, and that those in lesser need are still left satisfied with the limited care which they are receiving.

### The concept of 'rationing'

Against this background, there has been much recent discussion of a concept which has come to be called the 'rationing' of health care. One of the most articulate arguments for the existence of 'rationing' under systems of health care came in a recent paper in the *Milbank Memorial Fund Quarterly* by the medical sociologist, David Mechanic (1977). However, his is only one of many voices which have been speaking in terms of 'rationing' health care.<sup>3</sup> Because the usage of this term seems to be gaining ground without demur, it may be worthwhile pausing to examine the appropriateness of the word and of the concepts which lie behind its use.

In his Milbank paper, Mechanic re-emphasises the point that 'there is almost unlimited possibility for the continued escalation of medical demand and increased medical expenditure'. Based on this thesis Mechanic and others argue that there is (and must be) 'rationing' of resources. He goes on to explain that in his terminology 'techniques of rationing are in process of transition and most countries have yet to reach a reasonable end-point in this transitional process. The process is one of movement from *rationing by fee* through a stage of *implicit rationing* through resource allocation to a final stage of *explicit rationing*'.

However, 'rationing' is an odd word in this context and is not necessarily the right one to describe the process. In many ways, 'triage' used in its battle-field medical sense is more appropriate.

2 Specifically in the case of renal dialysis and transplant the hospital consultant may also be assisted in his decision by an advisory committee.

3 In particular M H Cooper recently published a book in Britain under the title *Rationing Health Care* (1977).

This is the process of sorting those cases in most urgent need of attention, first, from those already too far injured to benefit from treatment and, second, from those whose minor injuries can conveniently wait until the immediate emergency has subsided. In a sense, this sorting process is similar to the principles of selection which every National Health Service doctor sometimes has to apply when trying to cope with the apparently inexhaustible demands from his many patients. He has to choose those who will most benefit from the limited resources at his disposal at that time. Another phrase which can appropriately be used instead of 'rationing' is 'priority selection', this specifically implies that not all in need of treatment will receive it.

By contrast, the word rationing was originally used to refer to the issue of rations to the armed services; it meant simply the daily portions issued to each man. It was only later, as far as the British public were concerned, that the use of the word 'rationing' had a connotation of shortage of supplies during wartime. In this situation, it came to mean the basic allowance of commodities to each person obtainable by purchase based on ration books of coupons.

Thus, rationing in the proper sense of the word did not arise from the growth of demand but from a need to control supply of both kind and quantity. It is a control that is normally exercised on a large scale by central government through standardisation of products and production. If production and innovation can meet the market demand there is no need for rationing. It is only when a free market for some reason cannot be allowed by government that production and innovation come under control to produce rationing. Where demand exceeds supply and there are no controls, supply under private enterprise will move up to meet demand but there will be a price on the supply. Hence Mechanic correctly argues that traditionally price limited the choice of consumer of health services as it did in Britain in the 1930s and still does for many people in the United States in the late 1970s. This he calls *rationing by fee*. But this is not in reality rationing. In all Western industrial systems a corresponding system exists for all goods and services although its effect is masked because advancing technology makes alternatives available at lower prices. Thus the market for expensive new cars is limited – ie, 'rationed by fee' in Mechanic's health service sense – and most people must make do with cheaper alternatives. Indeed there are many who make do with obsolescent second-hand cars, lacking much of the latest technology, or else must go without a car altogether. However, it is now generally accepted that this sort of 'rationing by fee' or 'free market' is inappropriate in relation to medical care.

Mechanic next argues that the appearance of various forms of national health schemes produces *implicit rationing* because cen-

trally-funded health care costs still prevent everyone having the best and most appropriate modern medical treatment. As has already been explained, medical technology has moved too rapidly ahead of what national budgets can afford out of their total financial commitments. The latest and best medical treatment may simply be too costly or else unavailable. 'The assumption is (he says) that physicians exercise agreed upon standards of care and that services are equitably provided in the light of the services'. This begs the question; it is a statement of his conclusion. The postulate of medical care (from which the argument *should* start) is that each doctor will do his best for each of his patients, in the light of his clinical knowledge and judgment, *with the resources available to him*. As long ago as 1959 the American Medical Association's House of Delegates had reached the conclusion that: 'The individual physician and the medical profession as a group must also be concerned with maintaining a proper balance between adequate medical care for the welfare patient and economical use of public funds . . . The individual physician, as the key person in the care of the welfare patient, must, therefore, take into consideration not only the medical but the financial aspects of various acceptable modes of treatment.' (Roy, 1976).

Mechanic continues to expound this principle when he turns to *explicit rationing*. This 'is not only to set limits on total expenditure for care, but also to develop mechanisms to arrive at more rational decisions as to relative investments in different areas of care, varying types of facilities and man-power, new technological initiatives and the establishment of certain minimal uniform standards'. This concept of explicit rationing is further illuminated by Mechanic's note that 'the difficulty of imposing explicit rationing is more political than scientific'. Thus explicit rationing would be a political control system. It would begin with a budgetary allocation of resources and proceed through a system of controls to set limits to facilities, manpower and its distribution, technical innovation and finally to the clinical judgement of doctors. 'Explicit rationing' does *not* mean that every individual is *guaranteed* equal access to appropriate medical care or equal shares. Treatment is still within the postulate that the doctor will do his best with the resources available to him but there are now such constraints on those resources as government decides; the end product is (as Mechanic says) bureaucratic medicine, governed by political decisions. Thus in a drift from what has been called 'rationing by fee'; through 'implicit rationing' to 'explicit rationing', the individual doctor would tend to pass from the phases of being a clinical 'entrepreneur' through being an 'expert' in apportioning scarce resources to the ultimate position of becoming a 'bureaucrat' or 'economiser', controlled in the resources available to his patients by a central authority. There is

little doubt that this form of explicit rationing of health care would be unacceptable to many doctors and patients in a mixed economy such as Britain's. Many people would probably prefer to return to the principle of 'rationing by fee', for example through private health insurance.

### 'Rationing by science'

Before the concepts of implicit and explicit rationing had been so clearly enunciated by Mechanic and others, the epidemiologist Cochrane had already suggested that the problems of scarce resources could be alleviated in a process which he referred to as *rationing by science*. This was based on the observation that, when subjected to scientific evaluation, a substantial proportion of medical care appeared to be ineffective and hence unnecessary. (Cochrane, 1971). Cochrane's argument was that if all this unnecessary treatment could be eliminated, the resources already available for medical care would probably be sufficient to meet all scientifically proven needs. This beguiling concept has much to commend it. However, difficulties arise both at the practical level and at a philosophical or sociological level.

First, in his book *Effectiveness and efficiency; random reflections on health services*, Cochrane concludes with a quotation from Agatha in Eliot's *The Family Reunion*:

Not for the good that it will do  
But that nothing may be left undone  
On the margin of the impossible.

Cochrane implies, justifiably, that much of medical care has always been carried out on precisely this basis. It may be particularly true in life-and-death situations, but also no doubt often applies in attempts to alleviate less serious illnesses. There is often little or no scientific evidence that a particular treatment may benefit a particular patient, yet the doctor feels impelled to carry it out so that 'nothing may be left undone' even if there is only the remotest chance of success.

To a large extent this question of 'rationing by science' brings out into the open two essentially conflicting principles in medicine. On the one hand there are those medical scientists and epidemiologists who want specific proof of efficacy before a medical or surgical procedure is introduced; on the other there are the more sympathetic practicing physicians who have to deal personally with actual patients, who are both anxious and hopeful. Undoubtedly, practicing doctors should be more scientifically critical of the procedures which they request or undertake for patients under their care. But they have understandably always been reluctant to admit to their patients that medical science has nothing to offer.<sup>4</sup> In the last analysis they are still often going to suggest 'curative' treatments even if they know that on a statis-

tical basis there may be little chance of success. In this situation, it is hard for the practicing doctor to face up to the fact that by ordering such an unpromising procedure he may – in the overall picture – be depriving other patients of treatments with strong chances in favour of success, such as renal dialysis and transplant or hip replacement. To use Mechanic's phrase, he is reluctant to accept the existence of 'implicit rationing'. However, he would perhaps be even less happy to have to practice medicine under the principles of 'explicit rationing'.

Apart from this practical difficulty, a more philosophical argument has been advanced against the concept of 'rationing by science'. This is the sociological view that one of the most important theoretical effects of the British National Health Service has been to make *all* medical treatment freely available to the whole population. It can be argued that if the Health Service is viewed in this light, it is relatively unimportant whether the treatments provided are effective or not. On this basis it could be considered 'socially divisive' if the rich could buy ineffective medical care which was prohibited under the 'free' National Health Service. This appears as a totally irrational attitude from the point of view of medical scientists, who would argue in the reverse direction. In their view only *effective* medical care should be universally available, and it could be much more evenly distributed if 'free' ineffective procedures could be eliminated. Those with money should be left free to buy scientifically unproven care if that is the way they choose to spend it.

In any case, however, the important point for the physician is that whatever medical scientists and sociologists may feel on theoretical grounds, the practical problems described above still remain to be solved. Clearly, according to Mechanic's argument, 'rationing by science' would be no more than a particular aspect of 'explicit rationing'. The present discussion in many ways highlights the fact that medical practice, under any system of explicit rationing, could very easily degenerate into a system of medical bureaucracy, with the availability or non-availability of different procedures being determined by the authorities rather than by individual doctors.

4 Doctors may often, of course, be able to offer symptomatic relief even if they cannot offer a 'cure'.

## The role of technology

What should by now have become clear is that the major problems of inequality in health care and the attempts to solve them arise from the expanding technological scope of medical care. Any meaningful attempt to share out equitably the available health care resources is bedevilled by the success of technological innovation. Technology is only desirable in a 'rationed' society when it increases the availability of existing scarce resources through improvements in productivity. By contrast, it has been pointed out that it makes a nonsense of any attempt to apportion equal shares when technology is continually creating new – and necessarily scarce – procedures. Thus inequality in health care has to be accepted if innovation is to be allowed to proceed. The ultimate results of bureaucratically apportioned – that is, 'explicitly rationed' – health care would inevitably be the virtual stagnation of medical innovation.

It is important, however, to make a distinction at this point in the discussion between 'high technology' innovation which involves substantial resources for every case treated as opposed to the alternative form of equally 'high technology' innovation which results in little more than marginal costs per case. The archetypes of these two alternatives are, of course, renal dialysis or transplants on the one hand, and the widespread use of a particular cheap antibiotic on the other. Both can be life saving and both have been costly to develop. However, surgery and elaborate medical procedures involve a repeated high cost for every patient treated, whereas most medicines can be prescribed at a relatively very much lower (ie, more or less 'marginal') cost per patient. In general the shortages which have been discussed so far refer only to the former type of innovation. Such 'shortages' have been almost unknown for medicines under the British National Health Service. It is only in a very few cases, particularly in hospitals, that some expensive new medicines (eg, for cancer) have probably been prescribed at less than optimum frequency primarily in an attempt to restrict pharmaceutical costs (Teeling-Smith, 1978).<sup>5</sup> However, for the normally-priced medicines used in general practice, their cost has very rarely been an over-riding consideration in a decision not to prescribe. Nor has there been any trace of shortages or restrictions in supply.

It is particularly ironic that general practitioners have, nevertheless, been made particularly aware of the cost of their prescribing through the activities of the Regional Medical Officers of

5 A similar situation of course tends to arise with any very expensive new medicine: eg, cortisone when it was first introduced. It is only when mass production technology can bring down the price that it becomes readily prescribable.

the Department of Health and through their local medical committees. By contrast, very little effort has been made to force general practitioners to think in terms of the 'opportunity costs' of their decisions when they refer patients to hospital.<sup>6</sup> There is also evidence that general practitioners are generally aware of the cost of the medicines which they prescribe (OHE, 1975). Perhaps they may even take costs into greater account when choosing a particular medicine than when they were recommending a much more expensive surgical procedure for example.

It is also important to distinguish between essentially 'research' costs as opposed to 'service' costs. This can be illustrated again in relation to the cost of chemotherapy in cancer. Here most forms of therapy are still in a relatively experimental stage, and their high price should, therefore, be regarded as a research rather than a service cost. This is obviously also true for much experimental surgery and other experimental medical techniques.

Yet another type of difficulty in distinguishing between initial costs of innovation and costs of individual treatments in 'service' can be illustrated by reference to advanced radiotherapy. Here the cost of the initial machine may be several hundreds of thousands of pounds. Once it has been purchased, however, the actual costs incurred in the treatment of each individual case will be marginal when compared to the original purchase price.<sup>7</sup> In this case the process of 'rationing', if that were to be the right word, would apply at two levels. First there is the decision whether or not to purchase the equipment. With limited capital funds the number which could be afforded is restricted. Second, once the equipment has been purchased, there is the decision as to which patients should be allocated time for treatment on it. Here in the first case a 'once-off' investment has been made which is different from the funds spent on pharmaceutical research and development, for example. Unlike the case of pharmaceutical research, a renewed heavy initial investment for radiotherapy must be repeated each time that a new machine is provided in order to make the facilities available for a new group of patients.

### International factors

A further factor needs to be taken into account in a discussion of the contrast between very heavy 'sunk' research costs for a new medicine and the continuing high 'in-service' costs for other types

6 An average NHS prescription in 1976 cost £1.56, whereas an average spell spent in an acute hospital cost £299.

7 'Marginal' is here being used in its economic sense. The only costs for the actual treatment will be the materials used, staff time and an element of wear and tear on the machine.



of medical and surgical innovation. This is the international consideration. If a new medical innovation results in a new technique (such as surgery) this will in principle become freely available on a world-wide basis as soon as it has been reported in the medical literature. The country which initiates the procedure will gain little or no financial advantage over the others which start to use it once its benefits have been published. Conversely, each country which adopts the innovation must find the funds to implement it out of its own health care budget. They will gain freely from the knowledge embodied in the original medical or surgical research; but they are still left to find the substantial sums needed to implement this knowledge as a routine health care procedure. This is clearly the case, for example, with some transplant surgery.

By contrast, in the development of a new medicine the very high initial costs of research and development will be borne primarily by private industry in one or two countries. However, once the new medicine is marketed it will fairly rapidly become available world-wide. In this case, however, the innovation, as a chemical substance, will be patentable, and the initiator can be assured of commercial returns from his original research investment. Thus in general each individual dose will make a contribution (through profits or royalties) to the original innovator. But nonetheless the cost of the pharmaceutical treatment will approach the true marginal cost, especially for well-established medicines which have been on the market for several years. This is in contrast to the cost of surgery, where the full economic cost has to be borne on each occasion that the operation is performed.

There is a nice paradox here. In the case of general medical or surgical innovation the innovator gains little or nothing in direct economic terms. Yet those who benefit from the innovation will all pay the same high price as the innovator for the benefits of the procedure. On the other hand, a new pharmaceutical innovation will bring economic rewards to the firm which has developed it and to the economy of its country; but nevertheless those in other countries which use the innovation will pay only a marginal price. As the recovery of the original R and D costs can be on a world-wide basis, the contribution made by each individual treatment is relatively small. Thus the high technology 'transplant' type of innovation which brings little or nothing to its inventor is costly to all those who use it. The high technology development of a medicine on the other hand may bring handsome rewards to its originator, but is nevertheless still comparatively inexpensive in actual use. In the context of this paper, new medicines need rarely be restricted in their use on the grounds of cost. This is a marked contrast to the restrictions which have to be applied to the use of other types of high technology medical innovation, and which have been referred to as 'rationing'.

## A redefinition of aims?

Against the background of this discussion, covering the nature of demand and technology in medical care, it is perhaps useful to return next to some first principles in medical care. In introducing the National Health Service, the Minister responsible, Aneurin Bevan stated that 'medical treatment and care . . . should be made available to rich and poor alike in accordance with medical need and by no other criterion' (Abel-Smith, 1978). However, it has already been explained that Bevan never envisaged the explosive growth in needs and demand which would flow from the technological revolution in medical care since the 1940s. He could never have foreseen a situation where almost unlimited resources could be devoted to medical practice, all of which can be justified if one accepts that doctors may freely pursue the practice of medicine at 'the margin of the impossible'.

Thus it is no longer feasible to provide medical care based on the 1940s concept of 'need'. However, this paper has also argued that any forms of bureaucratic control or 'rationing' have grave inherent dangers. Those responsible for the organisation of medical care have to face up to these growing problems. One way in which they might try to do so, would be by redefining the objectives of health. Rather than falling back on the traditional models of ill-health based on experience in the 1930s, new positive aims for health care could be stated as follows: a healthy childhood; a productive and satisfying adult life; and a comfortable old age. Increasingly, on this criterion, the test of medicine on a life span would be its success of the treatment in each of these periods of life to accomplish the aim set for the following period. It is now at least a questionable ethical medical service to mankind to treat at any stage for survival only. This refers, in particular, to some of the most expensive high technology medicine applied in the terminal stages of an illness. The objective of medical care should be to 'add life to years rather than years to life' (Lasagna, 1978).

However, this statement of objectives leaves many challenges unanswered. There might, for example, need to be a fundamental shift in public and professional attitudes to health, in which the individual would have to accept a very much greater degree of responsibility for his own well-being. This has recently been actively encouraged in Britain, particularly with the Health Education Council's campaign to 'Look After Yourself'. There would also need to be a greater acceptance of the inappropriateness of professional treatment when trivial symptoms are apparent. This leads to one of the most difficult areas of all, attempting to re-educate the public into believing that 'good health' is primarily their responsibility rather than that of the National Health Service. But there is also a need to educate people against expect-

ting too much high technology medicine, especially if the outcome of the illness is unlikely to be affected.

Still seeking for solutions in these difficult areas, the example of triage in the armed forces has already been mentioned. However, analogy with military medicine cannot be pressed too far. Clearly, there is a danger, if one examines the military models, of reaching an extreme form of bureaucracy, or the worst sort of 'explicit rationing' to use Mechanic's phrase. However, in other respects, the objectives of military medical care are the same as those which should now be postulated for a National Health Service. The objective was to keep the army 'fighting fit'; that is to ensure that as high a proportion as possible were well enough to perform their daily duties.

This leads, of course, to the concept of preventive medicine, but in the present context it would need to have a much wider meaning than that usually attributed to it. It comes back to the objectives for health care set out above. Present behaviour and treatment should not only be concerned with current symptoms, but should more importantly be concerned with future prognosis at a later age. Nevertheless one has to face up to the fact that these statements of objectives – important as they are – seem to have very little bearing on the imbalance between needs and supplies which are continuously being aggravated by the advance of medical technology. 'Keep-fit' programmes and emphasis on preventive rather than curative programmes of medical care may have an important part to play, but it would be naive to assume that they provide any solution to the problems of shortages of health care with which this paper has been concerned. It is nevertheless an important step in the right direction that the World Health Organisation's meeting at Alma Ata in 1978 was so clearly oriented in favour of primary medical care in the broadest sense (WHO, 1978).

## Conclusion

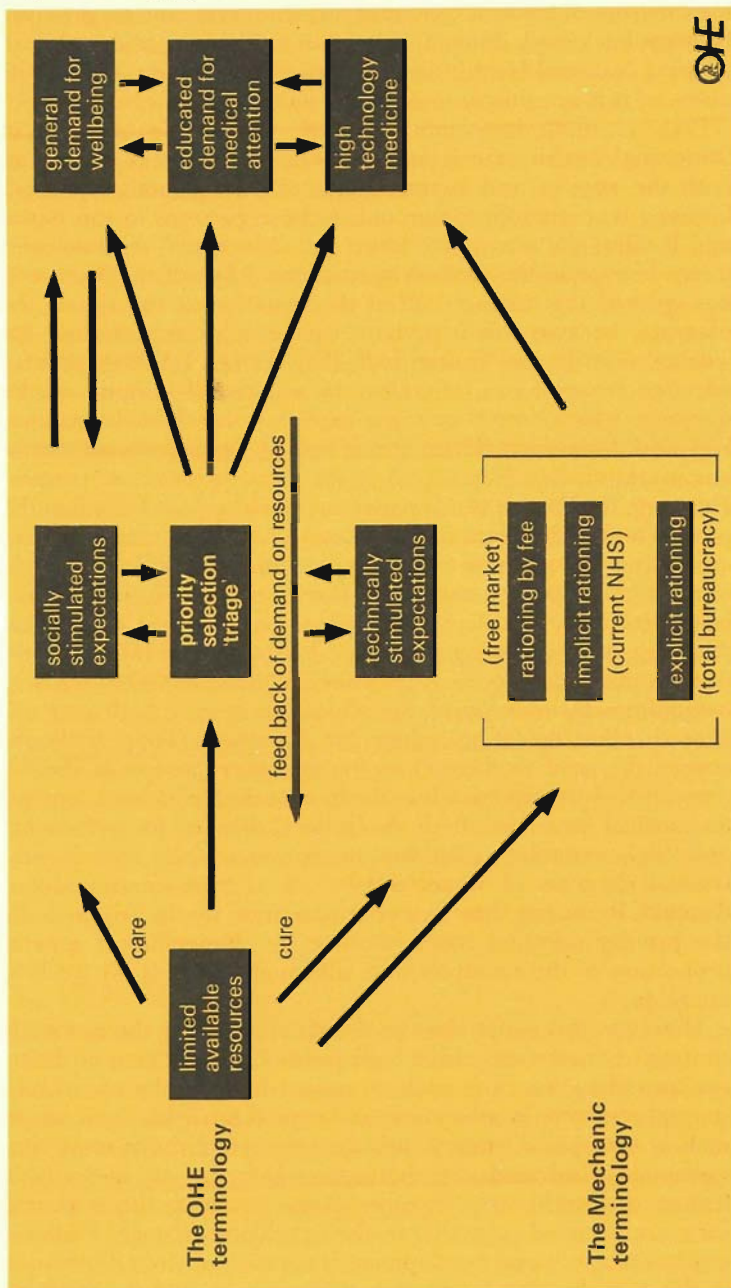
It is obvious that potentially unlimited demand for health care must be restrained, but this paper has argued that it cannot be 'rationed' in the usual sense of the word. This is partly because formal rationing would lead to further undesirable bureaucracy in medical care. It also implies equal medical needs for the population as a whole. More importantly it is undesirable because continued rapid technological innovation in medicine and surgery would make a nonsense of any bureaucratic attempt to ensure an equitable distribution of the most advanced forms of medical care. If health care were to be effectively 'rationed' it would be likely to stifle all further innovation in the more expensive branches of

medicine such as transplant surgery. Instead of Britain being in the forefront of medical technology, it would become progressively more backward. From this it follows that some medical care under a National Health Service must always be unevenly available – if it is not simply to be unavailable altogether.

Perhaps most importantly of all the simple concept of 'rationing' health care ignores its intensely complex nature on both the 'supply' and 'demand' side of the economic equation. Figure 2 is an attempt to summarise the arguments in this paper and it offers the alternative 'OHE' and 'Mechanic' terminologies to try to explain the various interactions. Most of the discussion has ignored the 'caring' half of the equation at the top of the diagram, because this is perhaps even more complex than the 'curing' side. In the 'curing' half, the OHE box labelled 'priority selection (triage)' can, of course, be accused of begging all the questions which have been made explicit in Mechanic's terminology and discussions. There are, of course, elements in all Mechanic's arguments encapsulated in the 'priority selection' process. However, the burden of this paper has in many ways been that the process and interactions in the allocation of health care resources are indeed too complex to break apart and to describe in simple terms such as 'explicit rationing'. For all the reasons which have been described, health care resources are not, and cannot be, allocated on a rationing principle. A much more informal and flexible planning process is necessary, which inevitably leads to inequalities at least where the allocation of very high cost advanced technological procedures are concerned. There is also, of course, the need to channel an increasing proportion of the demand side of the equation into the box marked 'educated demand for medical attention'. Both the 'general demand for well-being' and 'high technology medicine' boxes undoubtedly contain substantial elements of 'unnecessary' – or at least unattainable – demand. Reducing these by better education would help to make the priority selection more effective by channelling a greater proportion of the resources into educated demands for medical attention.

However, this paper has also drawn attention to the economic contrasts between expensive high technology medicine of different sorts. In some cases each treatment involves the use of substantial resources in manpower and capital facilities: these areas, such as transplant surgery, are the ones which have most conspicuously illustrated the shortages which are an inescapable feature of health care. In other cases, however, the economic costs are incurred primarily in the development stage. Pharmaceutical research and development is the most obvious illustration in this case. For this latter type of investment, and the products resulting from it, there have been virtually no shortages. Instead

**Figure 2** *Supply and demand in health care*



there has been considerable acrimony over the 'marginal' price to be paid for the medicines which have resulted from the research investment.

Against the background of this discussion, it appears that much of the controversy over pharmaceutical prices in the past twenty years has been misguided. Throughout the world, the emphasis has tended to be on a cheap drug policy, attempting to restrict the profits made by the multinational pharmaceutical innovators. If the arguments in this paper are correct, the opposite policy should have been advocated. There should have been a conscious international effort to stimulate pharmaceutical research and to allow generous rewards for innovative success. It is also an interesting side-light that the existence of various forms of Pharmaceutical Price Regulation Schemes (typically the British PPRS) have tended to ensure that the additional cost of treating extra patients is a truly marginal one. This is because increased profits gained from additional sales have been clawed back in price negotiations. However, although these matters really lie outside the scope of this paper, it is clear from the discussion here that problems of health care shortages could be greatly alleviated if a larger proportion of illness could be treated with medicines rather than with very expensive medical technology. Insofar as the encouragement of pharmaceutical innovation can provide alternatives to surgery and other costly procedures, it should be vigorously encouraged.

In the early days of the Health Service, the chemotherapy of tuberculosis and other infections brought enormously cost-effective treatments to health care. There is recent evidence that such cost-effective treatments might now be repeated in other fields. An example here has been the recent development of a new medicine for the treatment of stomach ulcers. Previously these often needed complicated surgery, but now the taking of tablets may sometimes avoid the need for an operation. Studies in various countries are demonstrating the economic advantages of this shift from one type of health technology to another (Netherlands Economic Institute, 1977). Another current example is the use of medicines to dissolve gall-stones, which previously needed to be removed by surgery: again there are obvious economic advantages for the purely medical approach. The recent *Lancet* editorial suggesting chemotherapy for the treatment of brain abscess is only another of many examples (*Lancet*, 1978).

This, of course, goes back to the original precepts of Beveridge and Bevan in their design of the National Health Service. If disease really could be contained by the use of medicines and vaccines instead of having to be dealt with by very expensive technological procedures, it would help dramatically to reduce the apparently inevitable shortages. The demand for health care

will never wither away, but perhaps its cost could be very much more effectively contained if pharmaceutical innovation were to be more actively encouraged.

The alternative is to continue indefinitely increasing the technological content of health care service procedures, and thus to exacerbate the current shortages. It has been argued that 'rationing' cannot solve the problem. It is, therefore, necessary to look to alternative technologies – and perhaps pharmacology in particular – to solve the present recurrent health care dilemma of excessive needs and demand perpetually outstripping available resources.

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