- All letters must be typed with double spacing and signed by all authors.
- No letter should be more than 400 words.
- For letters on scientific subjects we normally reserve our correspondence columns for those relating to issues discussed recently (within six weeks) in the *BMJ*.
- We do not routinely acknowledge letters. Please send a stamped addressed envelope if you would like an acknowledgment.
- Because we receive many more letters than we can publish we may shorten those we do print, particularly when we receive several on the same subject.

Rationing

SIR,—Richard Smith's editorial on rationing implies that I expressed paternalistic, indeed undemocratic, views in my Harveian oration.¹ I should like to try to explain myself.

Like others with whom I've debated the issue Smith fails to distinguish between rationing and determining priorities. In determining priorities, I agree, everyone should be involved—doctors, nurses, other health professionals, managers, and the general public—and I made this point in my oration. This is what happened in Oregon. As Smith says, the process was not easy and some rather bizarre proposals emerged first time round; the latest, much improved set of priorities was arrived at with the help of medical advice and guidance. This professional role is neither paternalistic nor improper: I would not feel competent to vote on the best way to provide our energy needs over the next few decades without the advice of physicists.

Rationing is something different. It is the deliberate withholding of certain services because of costs or lack of facilities or staff. It is a policy decision, one that is taken by the government or a health authority, not by the public. An example of successful rationing was the government's prohibition of heart transplantation in 1973. It was accepted because the public at the time had strong ethical reservations about the operation anyway; I suspect that it would not be accepted today. An example of unsuccessful rationing was the attempt some years ago by West Midlands Regional Health Authority to impose a limit on the number of patients admitted to a renal dialysis programme because the budget was overspent. The doctors in charge of the programme objected furiously and publicised the issue, and as a result the restriction was withdrawn. My sympathies were with the doctors: they were the ones who had to tell patient number $x+1$ that, although he was an otherwise fit young man ideally suitable for dialysis, he would have to go home to die because they had used up their quota of x places on the programme. This sort of explicit rationing by authority forces doctors to make unpalatable, indeed unacceptable, decisions at the bedside or in the clinic. Of course, they object. Why should they function as the authority's hatchet men?

If rationing is to be explicit I believe that it will work only if a defined block of services is withdrawn or withheld, such as bone marrow transplantation or in vitro fertilisation. The public—and the doctors—then know that these services are not available; like it or not, there is no choice. In deciding which whole service to exclude a wise government or authority would take account of the public's view of priorities and delete those placed at the bottom of the public's list or face the electoral consequences.

Anything less than an absolute embargo on

specific services places clinicians in an extraordinarily difficult position. Which patients should they select for their annual quota of coronary bypass operations? Should they reserve judgment on a particular patient in case a more deserving one comes along to take up the last quota place? Such decisions are being made today by individual doctors dealing with individual patients, most starkly by those with tight budgets. It is this sort of rationing that I would prefer to see implicit rather than explicit, not through a belief in medical imperialism or paternalism but through a concern about the anguish that patients and their relatives might feel if they knew that they were being denied services that other patients had received explicitly because of cost.

Smith might wish to argue—and I might be persuaded to agree—that this sort of explicitness is precisely what is needed to open people's eyes to the present government's parsimonious attitude to our NHS. In my Harveian oration I made the point that if we spent as much on our health service as the average for countries in the Organisation for Economic Cooperation and Development we could probably meet all reasonable clinical demands now and for some time to come at a level inferior to none—that is, serious rationing could be deferred almost indefinitely.

Sadly, I suspect that our NHS will remain underfunded. I strongly support Smith's plea for more public debate about medical priorities and rationing. This is what I intended my Harveian oration to stimulate.

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1 Smith R. Rationing: the search for sunlight. *BMJ* 1991;303:1561-2. (21-28 December.)

SIR,—Murray Cochrane and colleagues report that Southampton and South West Hampshire Health Authority would not shy away from setting priorities, even though it was hard.¹ But health authorities should do this with caution and recognise that in shifting implicit rationing away from doctors and making it explicit they assume a heavy burden and the rationing must be carried out fairly. One of the greatest strengths of the NHS is its foundation on social ideals. It aspires to social justice, equity in health care, and providing an effective and efficient service. It is essential that the new reforms reinforce these basic principles.

Cochrane and colleagues point out some of the inherent difficulties and dilemmas in setting priorities, not least the dearth of information on the effectiveness of different treatments. There is a more basic difficulty: health is a concept shaped by value as well as fact. Fact is objectively verifiable, whereas value is not. Many people have tried and failed to derive value from facts, and if factual knowledge about diseases, their causes, and their

treatments is used alone to define health needs and set priorities they will be wrong.

The call to follow Oregon and make rationing decisions explicit and rational is therefore only part of the solution.² The general public would have some involvement, but what is crucial is that any universal system must try to allow for variation in individual perceptions of need because individual people will place different values on each disability or condition. This flexibility is potentially lost when clinicians are no longer responsible for rationing.

Health authorities must accept that there is no universally right answer, but this should not deter them from attempting their difficult task: decisions must be made. Explicit rationing must be seen to be built on the common ground of fact and to accommodate variation in individual values to provide a service that is sensitive to individuals.

Doctors undoubtedly have a role in setting priorities by advising on the technical grounds and the range of services that they think should be provided. In addition, the health authority should consider itself to be accountable to its resident population and explain its range of services and how it determines priorities and, most importantly, how patients can appeal against particular decisions.

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1 Cochrane M, Ham C, Heginbotham C, Smith R. Rationing: at the cutting edge. *BMJ* 1991;303:1039-42. (26 October.)

2 Smith R. Rationing: the search for sunlight. *BMJ* 1991;303:1561-2. (21-28 December.)

Economic approach to priority setting

SIR,—Cam Donaldson and Gavin Mooney suggest that purchasing authorities should maximise health gain by shifting the balance of services towards those with a lower marginal cost per quality adjusted life year (QALY), making epidemiological needs assessment unnecessary.¹ Their argument seems uninformed by knowledge of the methods of needs assessment and takes inadequate account of current views on the limitations of using QALYs.

Firstly, needs assessment is not a simple summation of morbidity or of loss of life years. Need is defined as the population's ability to benefit from health services.^{2,3} This depends on both the occurrence of health problems and the effectiveness of services. Needs assessment has much in common with the authors' economic approach—indeed, it incorporates it. But, unlike their pure QALY approach, it does not conflate morbidity and service effectiveness until morbidity has been analysed. This is important because of the range of

severity of health problems and the variety of options for care and care settings.

Secondly, concern about the use of QALYs still focuses on doubts about their adequacy as measures of health gain¹ and on the technical validity of comparisons of costs per QALY.² Though these problems may be overcome, we believe that the authors' conclusions are mistaken, even when considered within the logic of their own "economic" arguments.

The authors fail to acknowledge that the marginal cost per QALY changes with the extent of unmet need for a service. If services are provided first to those with greatest need the marginal cost per QALY will increase as provision is increased. As the point at which need is completely met is approached the marginal cost per QALY is likely to increase sharply because the marginal benefit derived from increasing provision declines. For example, the number of people in a population who need hip replacement is finite.³ Once services have reached the level at which all such people receive a replacement quickly the QALYs gained by increasing provision further will be zero and the marginal cost per QALY infinite. The only way around this problem is to estimate cost per QALY at each level of unmet need (not service provision as the authors suggest), based on an understanding of the distribution of severity of a health problem within the population.

It might be argued that for most services unmet need is so great that gain in QALYs can be assumed to remain constant over the range of any marginal increase in service provision. We believe that this view cannot be accepted uncritically and that the estimation of unmet need must form the basis of a strategy for planning and purchasing health services, even where maximising QALYs is the agreed objective. This can be achieved only by considering a wide variety of formal and informal information on the occurrence of health problems and the effectiveness, balance, and costs of services.² This is the business of needs assessment.

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- 1 Donaldson C, Mooney G. Needs assessment, priority setting, and contracts for health care: an economic view. *BMJ* 1991;303:1529-30. (14 December.)
- 2 NHS Management Executive. *Assessing health care needs: a DHA project discussion paper*. London: Department of Health, 1991.
- 3 Stevens A, Cabbay J. Needs assessment needs assessment. *Health Trends* 1991;23:20-3.
- 4 Harris J. QALYing the value of life. *J Med Ethics* 1987;13:117-23.
- 5 Drummond MF. Output measurement for resource allocation decisions in health care. *Oxford Review of Economic Policy* 1989;5:59-74.
- 6 Frankel S. Health needs, health care requirements and the myth of infinite demand. *Lancet* 1991;337:1588-90.

Cost effectiveness of magnetic resonance imaging

SIR,—A K Szczepura and colleagues present a valuable analysis of the costs of a magnetic resonance imaging service¹ but conclude that there is no evidence of a beneficial effect on their patients' quality of life. This conclusion is based on a cohort study without a control group. Mean quality of life scores are presented, based on responses to questionnaires completed at the time of the scan and six months later; the mean score for the whole group fell by 0.059, but there is no statistical analysis of these data to indicate significance, confidence intervals, or the statistical power of this study. Only 52% of the patients in the study completed questionnaires, and the possibility of sample bias is not discussed. Moreover, their data relate to a group of patients who had a wide variety of brain and spinal diseases.

It seems inappropriate for conclusions about the impact of radiological investigations on patients' quality of life to be drawn from an audit of this nature.

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- 1 Szczepura AK, Fletcher J, Fitz-Patrick JD. Cost effectiveness of magnetic resonance imaging in the neurosciences. *BMJ* 1991;303:1435-9. (7 December.)

AUTHORS' REPLY.—L J Abernethy is wrong to suggest that our study concludes that magnetic resonance imaging has no beneficial effect on patients' quality of life. The main focus of our evaluation was the impact of imaging on diagnosis, diagnostic certainty, and patients' management and the economic implications for the health service. In the service setting with which we were faced we were unable to set up a randomised controlled trial. To achieve our main objectives we chose a controlled observational methodology as the optimum means of ensuring adequate prospective control.¹ The lack of an external control group naturally meant that we were not able to identify with any certainty whether patients' quality of life changed because of magnetic resonance imaging. In the paper we state that "there was no indication that patients' quality of life improved after magnetic resonance imaging."

Furthermore, our study was restricted to neuro-science referrals, and large scale improvements in quality of life were not expected. The pattern we observed is similar to that reported by Dixon *et al.*² Both studies show a relatively high average quality of life for patients at the time of their scan and a slight deterioration six months later. In our study we also recorded the prognosis made by consultants at the time of referral. This predicted a slight deterioration overall, which was confirmed by the quality of life measurements.

Because our chosen methodology could not measure the impact of imaging on patients' quality of life we considered recruiting a contemporary control group of matched patients from other centres to obtain this information. Owing to financial constraints we had to reject this idea. Similar quasiexperimental studies, however, failed to recruit genuine control populations in earlier evaluations of new medical imaging technologies such as computed tomography.³ All this is fully explained in our report on the project¹ but could not be included in the condensed version published in the *BMJ*. Interestingly, the most recent document summarising the Australian trial of magnetic

resonance imaging (produced since our paper was submitted) concludes that further work is needed to measure the effects of magnetic resonance imaging on patients' quality of life "but that such data may be difficult to obtain."⁴ Our experience supports this.

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- 1 Institute of Medicine. *Assessing medical technologies*. Washington, DC: National Academy Press, 1985.
- 2 Dixon AK, Southern JP, Teale A, Freer CEL, Hall LD, Williams A, *et al.* Magnetic resonance imaging for the head and spine: effective for the clinician or the patient? *BMJ* 1991;302:79-82.
- 3 Russell I. The evaluation of computerized tomography: a review of research methods. In: Culyer AJ, Horisberger B, eds. *Economic and medical evaluation of health care technology*. Berlin: Springer-Verlag, 1983.
- 4 Szczepura AK, Fletcher J, Fitz-Patrick JD. *An evaluation of the introduction of magnetic resonance imaging (MRI) in a UK service setting*. Warwick: Health Services Research Unit, Warwick Business School, 1991. (Occasional paper No 1.)
- 5 Hailey DM, Crowe BL, McDonald JG. *Assessing the place of MRI in Australia*. Canberra: Australian Institute of Health, 1991.

SIR,—A K Szczepura and colleagues¹ discuss the cost effectiveness of magnetic resonance imaging in the neurosciences. I wish to highlight the sensitivity of the cost per patient to changes in the throughput of patients; reinterpretation of the authors' data with some modifications leads to a far more favourable outcome for the use of magnetic resonance imaging.

The authors compared the annual costs in their unit in Coventry with those at other sites in the United Kingdom and in Australia and the United States. I have used the authors' data, with some modifications to take account of the current prices of equipment in the United Kingdom, to analyse the sensitivity of the cost of an examination to the number of patients scanned. The theoretical maximum throughput for magnetic resonance imaging is difficult to assess; in the private sector low throughput may result from an inability to attract referrals, while in the public sector it may result from underutilisation of equipment. I estimate that an achievable throughput approximates to one patient every 30 minutes with a 1.5 T system, falling to one patient every 45 minutes with a 0.5 T system. These figures are quite achievable, given that a typical lumbar spine examination, with imaging in two planes and up to date sequences, takes under 10 minutes at 1.5 T.

I have not included the cost of upgrading the system in this analysis as it is not necessary to

Estimated annual cost (£) of magnetic resonance imaging service in United Kingdom, based on 1991 prices

	Field strength*			
	Mid-field	Mid-field	Mid-field	High field
Patients per year	2 250	2 880	3 840	5 760
Patients per day	9	12	16	24
Operating hours	8	8	12	12
Annual capital costs:				
Equipment†	107 000	107 000	107 000	179 000
Accommodation‡	20 000	20 000	20 000	20 000
Total annual equivalent	127 000	127 000	127 000	199 000
Annual revenue costs:				
Staffing‡	105 000	105 000	155 000	155 000
Operating	48 000	48 000	48 000	48 000
Service and cryogenics	65 000	65 000	65 000	85 000
Variable	38 000	49 000	65 000	98 000
Total costs	256 000	267 000	333 000	386 000
Total annual cost	383 000	394 000	460 000	585 000
Direct cost/patient	170	137	120	102
Net effective cost§	89	56	39	21
Net effective cost	27	-6	-23	-41

*Mid-field includes 0.5 T and 1.0 T systems; high field is 1.5 T systems.

†Assumes that equipment has a seven year life and accommodation a 25 year life at 6% discount rate. Average prices are mid-field equipment £600 000, high field equipment £1.0m, and accommodation £250 000.

‡Staff costs increase to account for extended hours.

§Assuming improved management benefit from magnetic resonance imaging of £80.

||Assuming reduction in existing procedures, saving £62.