welfare of individual patients. It is still early days in these developments and inevitably there must be stresses and straining until the right balance is found.

The serious and frightening moral dilemma confronting doctors which they have so far failed to face is—at what point does it become professionally irresponsible to carry on maintaining clinical responsibility when supporting resources generally are steadily and surreptitiously declining?

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Monetary value of a human life

SIR,—Dr W I Card and Mr G H Mooney in their interesting paper (24-31 December, p 1627) show the difficulty of making decisions in the NHS and illustrate how rational solutions may be reached by use of a decision theory model. This type of analysis is probably familiar to the policy makers at the Department of Health and Social Security, but many, who work in hospitals, may find the theory strange and difficult to handle. With the help of games theory, however, it should be possible to construct a simple model displaying the economic forces which must eventually shape policy. What follows is a broad outline of the "Hospital Management Game." Obviously advanced players would require a far more complex model but it would have the same economic core.

The fundamental rule is that the hospital manager must keep solvent to stay in the game; if he is to win he must show sufficient profit to enable him to take over other hospitals. He makes a profit when he provides a utility with a monetary value in excess of its cost—namely, $pu > C$. For the sake of simplicity only two outcomes are considered, survival and death. The manager must try to increase the probability of survival and this can only be achieved by the systematic monitoring of all admissions. To rely on the excellence of the clinical team would be most unwise, as the highly proficient are prone to undertake the treatment of high risk cases. Clinical performance must be audited, and control placed firmly in the hands of those who show a consistent profit.

The measurement of u, the utility of survival, is, as Dr Card and Mr Mooney have pointed out, difficult and contentious, but it is surely reasonable to relate it to the productive capacity. Unfortunately it is often impossible to estimate the productive capacity of a patient—one acute coronary thrombosis may look very like another—but this problem could be solved by the use of a centralised computer linking the DHSS and the Inland Revenue. The record could be adjusted annually and an accurate figure for each patient relayed to the intensive care unit within a very short time. The importance of this service can scarcely be overestimated, as without it physicians and surgeons could easily commit the catastrophic economic error of treating the wrong patient. Now comes the disagreeable element in the system—cost. Even the finest centre of excellence must in the end prove to be but a splendid façade if its costs exceed its profits. At all times stringent economy should be the rule. Unproductive beds must be weeded out and redundant staff dismissed. However, it is important that a misguided emphasis on humane values should not lead to disproportionate economies in the maintenance of the hospital fabric. Well-maintained institutions have a high utility value. Furthermore, neglect of the fabric may lead insidiously to absurd capital costs far in excess of any value which might be assigned to the patient-orientated functions of the hospital.

The model makes it clear that geriatric inpatient treatment is a hopelessly bad buy: an appeal to general implicit values may provide some additional money but never enough to cover the cost. The winning strategy must lie in emphasising community care and gradually reducing beds and staff. This should be done with circumspection and with proper regard for public relations. Poor presentation of hospital policy can cause much misunderstanding and may even give rise to irrational assertions of individual values, thus causing much local difficulty and costly delays. Even in the most rationally planned organisations abuses tend to creep in and managers must be vigilant and ensure that black markets do not develop within their hospitals. Old people are often selfish and, if not watched, may succumb to the temptation to buy treatment over and above what is allocated to them by the regulations. Also the young sometimes attach sentimental value to their aged parents and may attempt to purchase life-saving remedies, despite the fact that these are inappropriate, uneconomic, and contrary to public policy. Possibly these evils could be averted by a contributory scheme for the purchase of negative years, payments being made during the worker's productive life. As well as reducing the beneficiary's official age, the negative years would serve as a useful low-cost incentive for the nation's working force.

Some may feel that this model is too idealistic, but, provided they grasp the essential fact that a man's life is worth a finite amount of money, they will undoubtedly find their own way to a rational solution of the problems of the NHS. We should all take encouragement from the scientific advances which have now made it possible to develop an extremely valuable military weapon—the neutron bomb—which does no damage to property, thus at last making an economically successful war a real possibility. Surely, this should spur us all on to make an equal success of our Health Service.

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SIR,—The proposals of Dr W I Card and Mr G H Mooney (24-31 December, p 1627) to seek a consistent financial valuation for human life for the purpose of resource allocation for forms of health care are inappropriate. The use of such valuations in decision-making would lead to unsound and inhumane decisions.

Their argument is based on the fallacy that the objective of medical treatment is to "save life" (that is, "prevent death"). We are not, nor do we seek to be, immortal. We may postpone but cannot ultimately prevent death; we should not pretend to ourselves or to others that we can. In making decisions most clinicians intuitively take account of the likely duration and quality of life in the extra years that are likely to result in a way no "formula" will achieve.

The proper objectives of medicine are humanitarian. We must seek to prolong life only where expectations as to quality warrant this. It is not costly to "cure" pneumonia with antibiotics. But to do so in an octogenarian who has prostatic secondaries in his spine would be inhumane. In such circumstances life might be deemed to have a "negative value" both to the individual and to society. In other circumstances there may be wide divergence between the values of life of an individual to himself and to society—the psychopath who enjoys his life but is an expensive hazard to others, and the genius with painful and chronic disease and craving for euthanasia but who is an asset to the community, are both extreme examples. Not only have we separate scales for value to "self" and to "society," but both of these range from highly "positive" values to low "negative" ones. The use of any form of "mean" in these circumstances is a nonsense.

The absurdity of using a measure unrelated to the real objective is most beautifully illustrated by the last of the illustrative examples tabulated by Drs Card and Mooney. The purpose of building blocks of flats is not to "save life" but to provide homes in which families may live in reasonable comfort and security. Building regulation changes to ensure that flats do not collapse would still have been necessary to give sufficient peace of mind and confidence to enable high-rise flats to be let even if nobody had died at Ronan Point—and if there had been no death in that disaster the "implied value of life" would doubtless have been infinity, not a mere £20m. In fact, of course, a value is "implied" only when the expenditure was incurred with the express intention of securing the object to be valued. If expenditure is incurred for a different reason it is irrelevant to the valuation of any object secured as a byproduct.

One of the great dangers of our time is the development of pseudoscientific management theories which take account of only those factors which can be measured and expressed in numbers and ignore other and equally important aspects of the situation. We must not allow such theories to be applied in situations where they can do as much damage to the Health Service as they have in industry. There, because accountants were able to compute so-called economies of scale but did not know how to measure the diseconomies caused by the consequent deterioration of labour relations, governments pursued policies of promoting "mergers," large company growth, and nationalisation. These have had a detrimental effect on our economy. While it is possible in several ways to assess in financial terms the value for some particular purpose of a human life, we have no means of valuing suffering or pain. Statistics are valuable only if used wisely. We need to learn when *not* to use them and how to use them better.

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Adjuvant liver perfusion in colorectal cancer

SIR,—It is encouraging to see in the paper by Mr I Taylor and others (19 November, p 1320) new ideas being tested for the treatment of patients with colorectal cancer when one remembers that only one in four patients are alive five years after hospital treatment. However, the design and conduct of randomised trials in large-bowel cancer is a difficult subject. Even when relatively small numbers of patients are being compared, whether formally or informally, it is helpful to report as much as possible about the matching of the groups. It would have been interesting to know more detail about the staging of the tumours—for example, the harvest of lymyh nodes and the number of nodes involved, especially in the patients who developed liver secondaries.

The authors seem to have assumed that heparin has no intrinsic action to prevent the development of secondary tumours. However, there is evidence[1] to suggest that anticoagulants