Essentials of Health Economics

Part V—Assessing the costs and benefits of treatment alternatives

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In this article we discuss an area of health economics with which some doctors are likely to be already familiar; the *cost-benefit approach* or *economic appraisal*. There has been a rapid growth in recent years in the publication of studies purporting to be analyses of cost benefit or cost effectiveness of health care alternatives, especially in medical journals. In a recent review, the Office of Technology Assessment of the US Congress identified over 600 papers dealing with these topics.¹ The published work varies greatly both in its quality and scope, ranging from back-of-the-envelope costing studies to more detailed economic assessments linked to controlled clinical trials.^{2,3}

Economic appraisal

There are not and never will be enough resources to enable the community to pursue all desirable objectives. If this notion of scarcity of resources is accepted, then the logic of comparing the costs and benefits to the community of alternative actions has much appeal. Decisions in the health care field are too often made on the basis of one option being more beneficial than another—irrespective of cost—or being cheaper and disregarding relative benefits; doctors were more prone to the first error, accountants to the second.⁴ Because of scarcity, and the fact that more resources devoted to one activity means less devoted to another, we can (and should) think of costs in terms of benefits sacrificed for the best alternative use of the resources concerned—opportunity costs. That is, the real cost of the undisciplined use of high technology diagnostic aids may be that community services for the elderly or mentally handicapped are forgone.

The main problem is in converting this undeniable logic into analyses whose results we can trust. Economic appraisal takes on a wide brief in attempting to assess all the costs and benefits of treatment options, not only to the NHS but also to patients, families, other agencies such as local authorities, and the community at large. There are obvious problems both in assessing the impact on health of treatment alternatives and in attempting to bring all the costs and benefits into a common unit for comparison. Whereas health service costs and savings may be readily converted into money terms, patient and family items such as the time taken to obtain treatment or nurse sick

relatives and the benefits of reducing pain and suffering are much more difficult to evaluate, as will be seen from the following examples.

COST ANALYSES

In some situations undertaking solely a *cost analysis* can provide useful information.⁵ Medical research⁶ has shown that patients with chronic bronchitis can benefit from long-term oxygen treatment in the home (up to 15 hours a day) yet there are three quite distinct methods of service delivery; cylinder oxygen, liquid oxygen, and the oxygen concentrator, a machine which extracts oxygen from air. At present domiciliary oxygen treatment is only available using small F-type cylinders pre-

Annual cost per patient for all methods of providing oxygen.

scribed by GPs. Relative effectiveness of the treatment methods does not differ, although each method has its advantages and disadvantages to the patient. Because cylinders and liquid oxygen represent a steady expenditure through time whereas concentrators require a capital outlay in terms of equipment and workshop facilities but may have lower running costs in the long-term, the costs of the three methods were analysed in more detail (figure). Concentrators represented a good buy for all but the smallest numbers of patients. The analysis could also help a health authority decide whether to set up its own workshop facilities or take advantage of the concentrator rental schemes now being offered. As an aside the analysis also identified the losses in efficiency due to inflexibility in NHS budgetary arrangements. Cylinder oxygen can be freely prescribed on the non-cash-limited family practitioner committee budget, whereas concentrators would have to be purchased from a cash-limited health authority budget.

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Other studies of this type have examined the comparative costs of home and hospital care for adult haemophiliacs and responants,⁷⁻⁸ the costs of different forms of maternity care,⁹ and the costs of dental care in fluoridated and non-fluoridated areas.¹⁰ In such studies it is important to note whether both capital and revenue costs have been considered and whether all those costs falling on patients, their families, and other agencies have been taken into account. The most common fault is to calculate the costs of a community-oriented option, possibly ignoring non-NHS costs, and then to compare this with an average hospital cost figure which may not reflect the costs of treating the condition concerned. Such an approach might give a misleading picture of the comparative costs of hospital and domiciliary care.

COST-EFFECTIVENESS ANALYSES

None of the studies already mentioned considers directly the relative effectiveness of the treatment alternatives being examined. Often this will be an important issue, as in the debate over the increased use of short-stay and day-case surgery for certain common conditions. Here a *cost-effectiveness analysis* is required and a good example is the recent study by Waller *et al.*,¹¹ which compared 48-hour postoperative stay for patients with inguinal hernia and varicose veins with more traditional methods (seven days postoperative stay). A movement towards shorter stays has often been suggested on the grounds of cost savings to the NHS, but questions have been raised about postoperative complications and the amount of community support services required. This appraisal, which was linked to a randomised controlled trial, showed that there was no significant difference between the alternatives in terms of clinical effects or attitudes of patients. Overall, the short-stay method did prove more cost-effective but the difference was smaller than expected (when all the non-hospital costs were added in). Furthermore, the freed hospital resources, in this case staff and available beds, must be put to good use. The point was made in part I of the series that economics is not necessarily about cost cutting.¹² In this case selection of the more cost-effective short-stay option might increase costs, if the freed beds were used to treat other patients. NHS expenditure would only be cut if wards were closed or plans to provide more beds in the future were abandoned. What the cost-effectiveness analysis shows is that there is an opportunity to use resources better and that clinicians and administrators should work together to ensure that the potential benefits from shorter stays are realised.

There are many other studies of this type, including analyses of day-case surgery versus traditional surgery for patients with hernias and haemorrhoids,¹³ cimetidine in the treatment of duodenal ulcer,¹⁴ the use of nurse practitioners in primary care,¹⁵ combinations of transplantation and dialysis in the treatment of chronic renal failure,¹⁶ and different methods of screening school children for asymptomatic bacteriuria.¹⁷ The main point about such studies, in addition to costing and interpretation of results, is the quality of the medical evidence on which the economic analysis is based. In particular, in situations where good evidence is lacking do the authors examine the sensitivity of the economic results to changes in some of the key medical variables?

COST-BENEFIT ANALYSES

The most difficult situation to evaluate is one in which not only the relative cost-effectiveness of options has to be examined but also how much of our scarce resources should be devoted to one set of treatments rather than to others. This issue could be discussed within the context of a particular client group, such as the balance of institutional and domiciliary care for the

elderly, or across client groups; for example, how much should be spent on treatments for chronic renal failure as opposed to other treatments? Ideally, in these situations a full *cost-benefit analysis* where all the costs and benefits are placed in money terms should be undertaken. Then comparisons could be made across a wide range of choices. There are much fewer examples of studies tackling these wider issues, and for obvious reasons most do not evaluate fully all costs and benefits.

Nevertheless, useful information can still be produced, as in the study by Buxton and West¹⁸ on long-term haemodialysis. Firstly, the authors calculated the relative costs of home and hospital treatment, building in a number of the sophistications already discussed. Then, rather than attempting to place a money value on the humanitarian aspects of extending life, the authors analysed the cost to the community of a year's life extension gained by dialysis net of any gains in production resulting from a few patients being able to return to work. The implied costs were £2600 and £4720 a year for home dialysis and hospital dialysis respectively. The authors then suggested that policy makers compare figures with the price being paid to extend life in other spheres. These comparisons can be enlightening if only for the inconsistencies found. At a time when it was being argued that Britain could not extend its renal services it could be shown that the implied cost (per year of life gained) from some safety legislative proposals would be much greater. Of course no one is suggesting that the quality of the years of life saved is the same for all options or that there is a "right" amount to pay to extend life, but such analyses do provide a useful starting point for asking questions about investments in life-saving measures both inside and outside the health care system.

Health status indices

Other wider and more complex choices in health care issues include mass screening programmes for the detection of fetuses with spina bifida cystica,¹⁹ the costs and benefits of screening for phenylketonuria²⁰ and for cancer of the cervix,²¹ and options for the provision of computed tomography scanners within an English health service region.²² Studies of this type remind us that implicitly we do value pain, suffering, or life when making resource allocations in health care. The main choices we face are whether these judgments are made implicitly or explicitly and whose values are to be used. Should they be those of health professionals, patients, public representatives, or some combination of these parties? The methodology of these studies should indicate clearly when and how value judgments were incorporated into the analysis. The problems of measuring benefit in setting priorities were discussed in part III of the series.²³ One area of multidisciplinary research worth mentioning here is that of developing *health status indices*. The object of this approach is to express states of health or ill-health in terms of the level of physical, mental, and social functioning they permit and to obtain from individuals assessments of the relative value they place on each state. In the context of assessing treatment alternatives this is an extension of the traditional criteria of treatment "success," such as complication rates, recurrence rates and time before return to work. Some of the methodological issues and their applications are discussed elsewhere.²⁴⁻²⁵

Next week's article will continue to assess the costs and benefits of treatment alternatives.

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Letters to a Young Doctor

Try not to get locked into a specialty

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Getting locked into a specialty in the first few years after registration is a constant problem. If you specialise too early you may be unable to get out of the specialty and into another, and unable to progress to the consultant post you desire because the specialty is overcrowded. You may move in and out of specialties with comparative ease at senior house officer grade, but it becomes harder as a registrar, and harder still as a senior registrar, when you may become identified with your subject. For example, a person who has spent several years in orthopaedic surgery, either as a registrar or senior registrar, will find it nearly impossible to obtain a post in general surgery since he will then be competing with those who are ascending the general surgery ladder. His chances in specialties even further removed from orthopaedic surgery, such as obstetrics and gynaecology, medicine, or pathology, are often negligible. There was a time when it might have been possible to enter general practice after realising that you were a failed specialist, but the training for general practice has altered. It is now a specialty in its own right and is becoming more and more difficult to enter; the competition is often severe.

There are many degrees of getting "locked in" without having much hope of moving either laterally or onwards. For instance,

it might be very valuable to spend a year as a registrar in cardiology if you are going to be a physician. This makes the post part of a defined path to a career. But if you stay for two years—or worse, three—then it may be impossible to get back into general medicine in a good job. You may have branded yourself as wanting a consultant post in cardiology by having stayed too long. You ought to know that the competition for posts in that subject at senior registrar and consultant level is very severe. Similar considerations apply to almost any narrowly specialised job. At the right time and for the right length of time they are fine, but you must beware of drifting into them without careful thought and just carrying on in the same post because you like it, and become more and more comfortable. Drifting can wreck your career. Instead, your career deserves careful planning.

As you get closer and closer to applying for consultant posts you will have to estimate the chances of getting one. For this you will need an appropriate copy of *Health Trends*, which is published quarterly by the Department of Health and Social Security. Once a year in *Health Trends* they publish "Medical and dental staffing and prospects in the NHS in England and Wales," an analysis of hospital posts by specialty, sex, and grade. They also give the estimated number of retirements from each specialty over certain years. For instance, volume 14 number 2 of May 1982, page 31 gives the following tables:

These tables alone are not enough to help you. You must learn the numbers of likely candidates for the possible vacant posts. This has to be done from the main tables, which give all grades of staff in all the disciplines. To take the example of anaesthesia, 387 is given as the number of senior registrars in post. Then you

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