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**Economic Evaluation in Health Care
Decision Making : Evidence from the UK**

Michael Drummond
Jonathan Cooke
Tom Walley

DISCUSSION PAPER 148

**ECONOMIC EVALUATION IN HEALTH CARE DECISION MAKING:
EVIDENCE FROM THE U.K.**

by

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April 1996

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ABSTRACT

Although economic evaluation in health care has a long-standing tradition in the United Kingdom, very little is known about its impact on decision making, particularly following the introduction of the internal market. Since managed competition appears to be growing in popularity worldwide, the UK is an interesting case study, as the reforms are well underway and there have been a number of efforts to conduct and to disseminate economic evaluations.

In this paper the potential for using economic evaluation in health care decision making in the UK is discussed. Then its actual impact is assessed in two ways. First, two case studies are discussed, on heart transplantation and the use of pharmaceuticals in the management of labour in pregnancy. Secondly, new data from a recent survey of potential users of economic evaluations are presented, with the emphasis on exploring the reasons for the impact, or lack of impact, of economic results.

It is concluded that the NHS reforms increase the potential for the use of economic evaluation. However, there is a need to increase decision makers' awareness of economic studies and to help them interpret study methodology and results. Although worries about validity of economic studies is one of the major barriers to their use, other important barriers relate to the multiple objectives being pursued, of which increased efficiency is just one, and the difficulties of freeing resources from existing services in order to divert them to more cost-effective treatments and programmes.

1. INTRODUCTION

Economic evaluation in health care has a long-standing tradition in the United Kingdom. The first study examined the costs and benefits of mass radiography screening for tuberculosis and was conducted almost 30 years ago (Pole, 1968). In 1987 Drummond and Hutton (1987) undertook a survey of economic evaluation in the UK for the European Community. They found that more than 70 studies had been conducted covering a wide range of health care interventions. However, most of these were conducted by independent researchers and very few studies had been commissioned by public authorities or private industry. Also, at that time the formal role of economic evaluation was limited to the 'option appraisal' of service developments, where one of the options was a capital scheme costing more than £5 million. Therefore, while many studies had been undertaken, they were only perceived as being required in conjunction with hospital building schemes.

Since 1987 the practice of economic evaluation in the UK has continued to expand with many more studies being published. In 1994 the Department of Health compiled a Register of Cost-Effectiveness Studies, with the assistance of researchers from the University of York (DH, 1994). This reviewed and classified 147 studies (from the UK and elsewhere) that contained cost-effectiveness data on around 500 health care interventions. The objective of the Register was to provide information to health care decision makers. Over the same period there have been a number of changes to the health care system in the UK (the National Health Service or NHS), the most fundamental being the reforms in 1990 which established an internal market. More recently there have been a number of initiatives to ensure that the content and delivery of care in the NHS is based on high quality research, through the NHS Research and Development Strategy.

However, despite the growing activity in economic evaluation and the encouragement being given to decision makers to take note of the results, very little is known about the impact of economic evaluation on health care decision making in the UK, particularly following the introduction of the internal market. Since managed competition appears to be growing in popularity worldwide, the UK is an interesting case study, as the reforms are well

underway and there have been a number of efforts to conduct and to disseminate economic evaluations.

The paper is organized in the following manner. First, the potential for using economic evaluation in health care decision making in the UK is discussed. Secondly, two case studies of the use of economic evaluation are discussed, one pre-dating and one post-dating the reforms. Thirdly, new data from a recent survey of potential users of economic evaluations are presented, with the emphasis on exploring the reasons for the impact, or lack of impact of economic evaluation results. Finally, a few general conclusions are drawn.

2. POTENTIAL FOR USING ECONOMIC EVALUATION IN THE NHS

Although a certain level of central direction is given to the NHS through the Department of Health, most decisions about the use of health technologies are taken in a decentralized manner. There is, for example, no restricted national formulary (or 'positive list') of medicines in the UK. Beyond a few items on the 'selected list' which are not reimbursed, all licensed products can be freely prescribed. It is up to purchasers and providers to decide what is appropriate and what is not. In the past the Department of Health has had more influence over the provision of expensive specialist facilities (such as heart transplants), especially where additional funding was required. However, nowadays the tendency is to leave the decision making to the health commissions, although with the recent introduction of new medicines for multiple sclerosis (e.g. beta-interferon) the NHS Executive has issued guidance (NHS Executive, 1995). This suggested that clinical responsibility for prescribing beta-interferon should remain with the hospital specialist (consultant) rather than the family physician (general practitioner). Nevertheless, the general thrust under managed competition, is to suggest particular courses of action to purchasers and providers, backed up by evidence where available. It is not the normal practice to issue firm directives on what care should and should not be provided.

In the context of the internal market, there are a number of points at which information about the cost-effectiveness of health technologies could be used. Henshall and Drummond (1994) identified four possibilities.

(i) **Deciding on whether or not a purchaser should place a contract**

Here economic evaluation could help inform the debate about priorities for health care, by providing data on the relative cost-effectiveness of various health care interventions.

(ii) **Deciding on the contract specification**

Here information on the relative cost-effectiveness of different treatment technologies could be useful; for example, in the choice between traditional or day-care surgery. It might also help in determining whether it was worthwhile encouraging (say) the use of colony stimulating factors (e.g. G-CSF) to prevent febrile neutropenia in patients undergoing highly immunosuppressive cancer chemotherapy.

(iii) **Managing the general practice fund**

Here, in addition to the decisions about contracting, fundholding GPs may be able to use economic evaluation to determine whether their own services are being provided cost-effectively. For example, if one class of medicine is superior to another in treating gastric oesophageal reflux disease (GORD), will this really lead to a reduction in the need for gastroscopies (Hawkes and Drummond, 1993)? Alternatively, would eradication of *H. pylori* in ulcer patients be cost-effective owing to a reduction in maintenance and episodic treatment? (Unge *et al.*, 1995).

(iv) **Monitoring indicative prescribing amounts**

Each local health authority or commission has one or more prescribing advisers, who may be a doctor with training in primary care or a pharmacist, and who monitors local prescribing. As professionals, they would see their first duty as the promotion of good clinical practice, but as officers of the authority they are also aware of the limited budgets for health care and of the need to promote the cost-effective use of medicines. They are responsible for the setting of prescribing "budgets" for general

practitioners, and for encouraging compliance with these budgets. The budgets in reality are open ended, and the advisers have no real sanctions to discourage overspending. They visit most GPs at least once a year, but those overspending (or underspending, which may be a marker of poor practice and undertreatment) more often. The advisers are under considerable pressure within their health authority to contain prescribing costs in the current year, and might have difficulty in justifying a short-term increase, even if this would lead to greater savings in the long-term in hospital budgets.

Given the decentralised nature of decision making about the use of health technology under managed competition, there is a need for the generation and dissemination of information on the effectiveness and cost-effectiveness of health care interventions. Since 1991 an NHS R&D Strategy has been in place to meet this need. The objective of the strategy is to ensure that the content and delivery of care in the NHS is based on high quality research relevant to improving the health of the nation. The strategy seeks to develop an R&D infrastructure to underpin all aspects of NHS activity including the formulation of policy management, the provision and purchasing of health care, the assessment of health care needs and the measurement of outcomes and quality.

Two specific outputs of the increased R&D funding are of particular relevance to the use of economic evaluation. First, several Effective Healthcare Bulletins have been produced. These review evidence on effectiveness and cost-effectiveness of health care interventions and provide advice to purchasers. The areas so far covered include: (i) screening for osteoporosis to prevent fractures; (ii) stroke rehabilitation; (iii) the management of subfertility; (iv) the treatment of persistent glue ear in children; (v) the treatment of depression in primary care; (vi) cholesterol screening and treatment; (vii) brief interventions and alcohol use; (viii) implementing clinical practice guidelines; (ix) the management of menorrhagia; (x) the prevention and treatment of pressure sores; (xi) cataract surgery; and (xii) the treatment of benign prostatic hyperplasia.

Secondly, the NHS Centre for Reviews and Dissemination has recently developed a database of economic evaluations which is available through direct on-line access. The NHS

Economic Evaluation Database (NEED) contains critical reviews of published studies from around the World and gives commentaries on their relevance to NHS decision-making. The NHS CRD now produces a new publication called 'Effectiveness Matters', which contains reviews of the evidence on particular topical clinical issues (e.g. H. pylori eradication).

It is currently too early to assess the impact of the R&D Strategy on the evaluation and use of health technology. However, it does demonstrate the commitment being made by government to evidence-based health care. Also, it is noticeable that more economic evaluations are being funded than was the case previously.

However, the fact that there is potential for using economic evaluation in the NHS does not mean that it is used in practice. Therefore, the next two sections of the paper contain different types of evidence on this issue. In the next section two case studies, where it has been argued that economic evaluation had an impact on decision making, are discussed. Then the results of a recent survey of potential users of economic evaluation are presented.

3. CASE STUDIES OF ECONOMIC EVALUATION OF HEALTH TECHNOLOGIES

In order to explore the impact of economic evaluation in practice, two contrasting case studies are presented here. In the first case, economic evaluation was used to inform a central decision on the provision of heart transplant services. This case predates the reforms. In the second case, an economic evaluation was communicated to providers in order to help them decide whether or not to use a medicine at the hospital level. This case postdates the reforms and is pertinent to decentralized decision making.

3.1 Planning specialist facilities: heart transplantation

In principle, the planning of specialist facilities offers an excellent opportunity for the use of economic appraisal in determining the rational diffusion and use of health technologies. First, specialist facilities often represent 'big ticket' items, so there is a prima facie case for investing resources in a more detailed evaluation. Secondly, because the development of

specialist facilities often requires official approval, for capital expenditure or a licence to provide the facility, there is an opportunity for the government (or other decision making agency) to influence the decision (Haan and Rutten, 1987).

Finally, there are good clinical reasons for not allowing a proliferation of specialist facilities. That is, there is a steep 'learning curve' for specialised medical procedures and there are thus strong arguments in favour of concentrating them in a few locations, where a strong clinical team can be assembled by having the opportunity to perform a number of such procedures. This means that there is likely to be slightly lower clinical resistance to the application of economic criteria in decision making about specialist services, than in situations where there is a strong belief among clinicians that technologies should diffuse more widely.

Potentially, there are a number of decisions about the planning of specialist facilities that could be subject to economic appraisal. These include: which specialized facilities to provide, how many to provide, where to locate them and their appropriate size. A number of studies have been carried out, including those of open heart surgery units, lithotripters, megavolt therapy, and magnetic resonance imagers.

Another feature of decisions about specialist facilities is that, in general, the major decision is only taken once for a given location. Therefore, of necessity, economic appraisal of investments in specialist facilities are often undertaken using only minimal local information and often draw heavily on data for appraisals undertaken elsewhere.

Before the 1990 reforms, decisions in the United Kingdom about the development of specialist services like heart transplantation typically involved the Department of Health since central funds were required. By 1982 around 50 heart transplants had been performed over the previous two years in two centres – Papworth and Harefield Hospitals. In the future the programmes at each centre were then expected to involve 15 to 20 transplants per year. A review of funding arrangements was required since, despite public support, the programmes relied heavily on a flow of charitable donations. Also, the possibility of funding a third centre had been discussed.

Therefore in 1982 the Office of the Chief Scientist at the Department of Health commissioned an economic evaluation of the two existing programmes from a team consisting of researchers from Brunel University and University of Cambridge. The study was published as a Department of Health monograph in 1985 (Buxton *et al.*, 1985) and considered programme costs, survival and quality of life of patients.

The results of the study have been fully discussed elsewhere (Buxton *et al.*, 1985). The purpose here is to outline some of the major methodological issues raised by the study and the uses to which the study results were put. (These points are also discussed at greater length in Buxton (1987).)

One major methodological issue arose from the fact that, for ethical reasons, patients could not be randomized to study and control groups. Therefore, quality of life improvements were based on a 'before and after' assessment. The gain in survival was estimated using data from historical controls and from patients who were unable to be transplanted owing to the lack of a suitable matching organ.

Another major methodological issue, affecting the estimation of both costs and benefits, was the changing nature of the technology. Some major changes, such as the replacement of the immuno-suppressive regimen by cyclosporin A, were easy to detect and to adjust for. Others, such as a gradual decline in the length of patient stay, were harder to identify and to interpret. In order to deal with changes over time the analysts adopted an approach whereby observations on patients were grouped in terms of standard six-month periods (or 'cross-sectional views') from the date of their transplant in order to build up a composite picture of post-transplant costs (see Buxton (1987) for more details).

More generally the study raised the issue of the appropriate timing for such an evaluation of an emerging technology. The analysts recognized that there was probably no right time for the study; an evaluation could be 'too early', in that developments in expertise in the future might improve outcomes and reduce costs. On the other hand an evaluation could be 'too late', in that the technology may be well-established before the results of the evaluation were known. More recently, it has been argued (Banta and Thacker, 1990) that

evaluations of health technologies should not be viewed as 'one-time' exercises and that they need to be approached on an iterative basis.

The transplant programmes were found to increase both survival and quality of life. The main question for economic evaluation was 'at what cost?'. The costs considered were all those associated with patients' in-patient stays at, and out-patient visits to, the transplant centres, subject to the exclusion of salaries of the surgical team, which were treated as overheads to the programmes, and capital costs. In addition, patient-specific estimates of the full drug costs were included irrespective of from where the drugs were dispensed. The average costs for the first six months (including the cost of the transplant operation itself and the immediate in-patient care) was £12,370 per patient at Harefield and £14,960 per patient at Papworth.

However, the average costs masked some important differences in cost structure between the two centres. The analysts pointed out that consideration of these data could greatly add to the understanding of the potential to generalize economic evaluation results from the two centres studied and the potential for improvements in the cost-effectiveness of the programme as a whole. For example, at Harefield considerable savings were made in nursing costs by accommodating the patients in apartments (flats) on the hospital site, rather than in hospital wards, during periods where their condition needed to be monitored but where intensive nursing support was not necessarily required.

The results of the study were reported in a disaggregated form, giving data on costs, quality of life and survival separately. On balance the analysts thought this preferable to a more speculative analysis, aggregating the results in terms of the incremental cost per quality-adjusted life-year gained. However, they did recognize that, in reaching policy decisions about the funding of alternative health technologies competing for the same resources, good summative information is necessary.

The United Kingdom heart transplant study is often cited as a good example of an economic appraisal that had an impact on policy. Certainly the Department of Health did

consider these data, alongside other factors, when arriving at its decision to continue funding of heart transplants at these centres and at other centres in the future. It may be that the data only confirmed prior prejudices that heart transplants should be funded. Certainly the decision suggested by the economic appraisal – to continue funding – was politically easier to take than that of discontinuing funding.

Although the UK heart transplant study is highly regarded, both for its methodological quality and its practical relevance to decision making, Buxton (1987) points out that there are often changing expectations, on the part of decision makers, about such evaluations. He stresses that, although the agreed research protocol adopted a method appropriate to answering a number of limited questions, at different points of time various relevant parties hoped, or expected, that the study would provide answers to many different questions, each of which ideally required a slightly different study; namely:

- How much do the transplant programmes cost the hospitals at which they are based?
- What impact do they have on the other work-load of the hospitals?
- Which of the two centres is the most cost-effective?
- Do patients survive longer after transplantation than they otherwise would?
- Should central funding continue to the existing two units?

- What is the optimal scale of activity?
- What should be the location of a third (or subsequent) centre?
- How does heart transplantation currently compare with other heart procedures in terms of value for money?
- How does heart transplantation compare with heart disease prevention programmes in terms of value for money?
- How does heart transplantation compare with other quite unrelated uses of health services resources in terms of value for money?
- What will be the picture in five years time?

Given such a plethora of questions, it is vital that the economic appraisal and its presentation should provide a robust information and data base for a variety of subsequent possible analyses. More importantly, under managed competition, it is not clear whether a central decision maker, such as the Department of Health, would have as much control over the ultimate decision to invest in new units. Individual providers may be prepared to make the investment as long as they thought purchasers would buy the services provided.

3.2 Using a medicine: prostaglandin PGE₂ in the management of labour

Most health care resource allocation decisions do not involve big ticket items like heart transplants. The second case study concerns the use of a drug in the hospital setting. The study was undertaken after the NHS reforms and is therefore more indicative of the potential role of economic evaluation under managed competition.

In the management of labour there is a choice between artificial membrane rupture, alone or with oxytocin and prostaglandin E₂ to induce labour. The difference in the acquisition cost of the medicines is clear, approximately £1 (for oxytocin) compared with £20 (for PGE₂). Although not a significant extra cost for a given patient, the total impact on the pharmacy budget of a hospital may mean that this expenditure comes under close scrutiny.

However, the differing effects of the two medicines may have broader impact on health care costs and the quality of care. Therefore, Davies and Drummond (1991) undertook an economic evaluation considering a wide range of costs, including those of the nursing and medical time in monitoring labour and the costs of managing complications, such as those leading to caesarean section and excessive postpartum haemorrhage.

The economic evaluation was based on a clinical decision tree, shown in Figure 1 for the case of a woman with an unripe cervix. It can be seen that, depending on the drug used, there is a given probability of labour starting. These probabilities, and those of spontaneous delivery, caesarian section and post-partum haemorrhage (PPH) were obtained from published controlled clinical trials.

Cost data were combined with those on probabilities and the expected cost per case of the alternative strategies calculated under different assumptions (see Table 1). It can be seen that, although PGE₂ has a higher acquisition cost than oxytocin, its use leads to an equivalent, or lower, expected cost for a woman with an unripe cervix. The base case analysis suggests that the expected cost per case for PGE₂ is £168, compared with £221 for oxytocin. (This assumed, for example, that the woman was monitored during labour 50% of the time and that the probabilities could be taken from trials of PGE₂.) If full monitoring costs are assumed (i.e. a midwife being present with the woman 100% of the time instead of 50%) the figures are £247 and £253 respectively. If the probabilities from a meta-analysis of all trials of prostaglandins are used, instead of those from trials of PGE₂ alone, then the estimates are £191 and £208 respectively, and so on. By contrast, expected cost per case is higher for a woman with a ripe cervix, although not always by the full difference in acquisition cost.

The results of studies like this are potentially of use to decision makers at the hospital level in considering whether or not PGE₂ should be included on the local formulary, or in determining guidelines for its use. Clearly the results need to be interpreted in the light of local factors, since some of the savings (e.g. in medical time in performing caesarian sections) may require managerial decisions to be made in order that they can be realised. There are, in addition, intangible factors, such as the pain of labour, which were not included in the study.

Figure 1: Decision Tree: Unripe Cervix

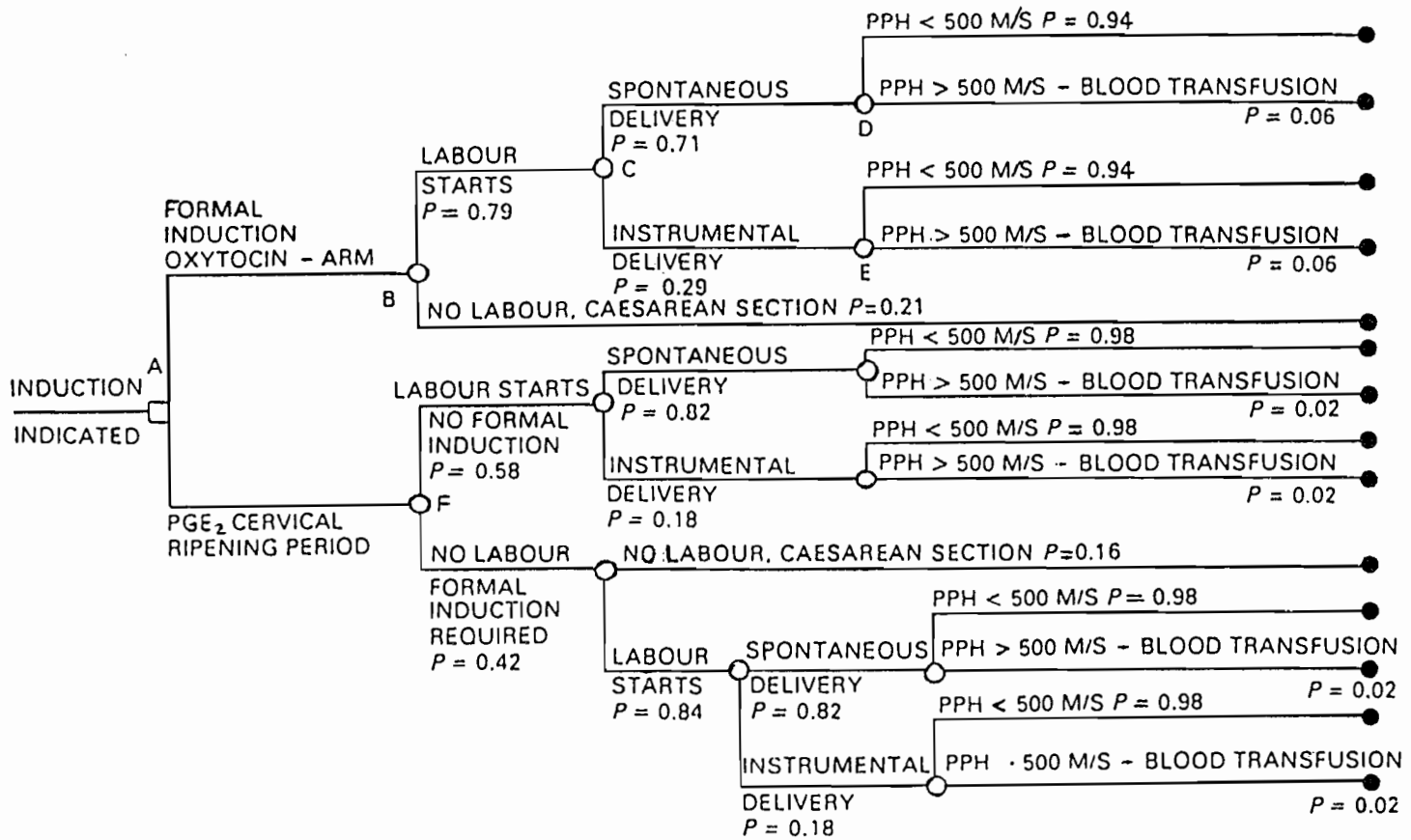


Table 1: Expected Costs (in £) per Case of Alternative Strategies

Assumptions	Ripening/induction with prostaglandin E ₂	Formal induction with amniotomy and oxytocin
Unripe cervix		
Base case	168	221
Full monitoring costs	247	253
Meta-analysis probabilities	199	208
Partial cost savings from caesarean section	144	148
Ripe cervix		
Base case	95	78
Full monitoring costs	129	100
Meta-analysis probabilities	115	112
Partial cost savings from caesarean section	85	64

The impact of this evaluation was evaluated by further study (Godman and Lockwood, 1992). Local decision makers were asked whether they had seen the results and whether these would lead them to modify their actions. Many decision makers replied in the affirmative. Further study has also been conducted in order to assess whether decisions on medicine acquisition were actually changed (Godman, 1993). Finally, since the original study embodied many assumptions, many of these were updated in a subsequent paper when more data became available. The conclusions of the original study were largely confirmed (Davies and Drummond, 1993).

3.3 Commentary on the case studies

The two cases illustrate that economic evaluation can have an impact on health care decision making in the UK. However, such examples are quite rare. The case on heart transplants shows that it is possible to influence a central decision, but the PGE₂ case is more relevant to the current NHS. Under managed competition the challenge is to influence a number of key groups, who make decisions in a decentralized market framework. Therefore, a survey of user groups was undertaken, in order to ascertain the extent of their knowledge and use of economic evaluation. The results are discussed below.

4. SURVEY OF POTENTIAL USERS OF ECONOMIC EVALUATION

4.1 Current knowledge of the impact of economic evaluation

There is currently very little knowledge of the impact of economic evaluation on health care decision making. Alban (1982, 1987) undertook two surveys of researchers, asking them for any information on the impact of their work. The general conclusion was that researchers knew of few instances where their work had had an impact and did not see this as a major objective in undertaking their research.

A similar study was conducted as part of a European Concerted Action project on the Methodology of Economic Appraisal of Health Technology (Davies *et al.*, 1994). This found

that approximately 20% of all studies were judged (by researchers) to have had an impact. However, no clear picture emerged as to why some studies had an impact and others not. Also, it was found that the notion of 'impact' was not easy to define.

One of the few studies surveying decision makers, as opposed to researchers, is that undertaken by Ross (1995) in Australia. She found that many decision makers in health departments at the Federal and State level understood what was meant by economic evaluation, and some had commissioned studies. The main barriers to the use of economic evaluation results were the short-term nature of the decision making process, lack of knowledge or expertise in interpreting study results by key personnel in the health care system, lack of timeliness in the production of study results, problems over quality of the studies and the importance of other factors (such as equity) in decision making.

Ross suggested a number of ways of overcoming these barriers, including a greater understanding (on the part of researchers) of decision makers' needs, improving timeliness of results, educating users in health economics, increasing managerial commitment and undertaking a number of demonstration projects.

These suggestions are similar to those made by Coyle (1993), writing from a UK perspective. He proposes a four-stage model of the impact of economic evaluation results, comprising dissemination of findings, recognition of their importance by decision makers, understanding by decision makers of the study results and utilization in decision making. Economic research can fail at any stage. He recommends that decision makers should become more involved in commissioning studies, that economists need to convince decision makers of the importance of both the efficiency criterion and the relevance of their studies and that studies need to be timely and results disseminated widely.

4.2 Limitations of surveys

Before considering the survey design, it is important to acknowledge some of the limitations of surveys of professionals. For example, Covell *et al.* (1985) asked physicians about their information needs in a questionnaire survey. They stated that they needed new

clinical information just once or twice a week, and that they gained this information by consulting textbooks and journals.

However, observation of the same clinicians identified 16 new information needs in just half a day. Only 30% of these needs were met in the clinics and offices where the physicians worked, and these were mostly achieved through consultation with colleagues, rather than through bibliographic sources. The conclusion is that, what health professionals say they do, is not necessarily what they really do.

In addition, Sibley *et al.* (1982) identified preferences for information prior to mailing continuing medical education packages to clinicians. In a controlled trial they found no difference in quality of care overall, or among clinicians who stated a preference for materials on any topic. One conclusion is that, what health professionals say they need, is not necessarily what they really need.

Because of these potential limitations the survey is best viewed as a hypothesis generation exercise. However, where possible, checks were built in to assess the validity of the responses obtained.

4.3 Design of the survey

Bearing existing knowledge in mind, a postal questionnaire survey of key decision makers in the UK was planned and executed. The survey was anonymous, since a primary consideration was to encourage truthful responses. However, this meant that it was not possible to send reminder letters to non-responders. It was decided to survey a number of the user groups outlined in Section 3 above. These were: (i) medical and pharmaceutical advisers, who advise GPs on prescribing; (ii) hospital directors of pharmacy, who play a key role in hospital formulary committees and; (iii) directors of public health, who usually take the lead in purchasing by health commissions. The fourth relevant group would be GP fundholders. However, this group was not surveyed because of their being over-exposed to questionnaires and being in dispute with the government over various contracting and budgetary matters. These factors would have probably resulted in a low response rate.

The questionnaire contained questions on several issues relating to the use of economic evaluation, such as:

(i) Knowledge of economics

Respondents were asked whether they had had training in health economics and whether they were aware of any economic evaluation guidelines in existence in the UK.

(ii) Importance of the efficiency criterion

Respondents were asked about how important they viewed overall improvements in efficiency, as compared with more narrowly focused objectives such as cost containment or reducing expenditure on their own budgets.

(iii) Sources of information on costs and outcomes

Recognizing that formal economic evaluations are only one of many potential sources of information, respondents were asked about the relative weight they would put on information of different types.

(iv) Barriers to the use of economic evaluation results

Respondents were asked to rank, in order of importance, potential barriers, including their lack of understanding (or that of others) of economic evaluation, perceived biases in sponsored studies (by industry or government) and difficulties in implementing study findings (in particular the problems of reallocating resources).

(v) Use of study results

Respondents were presented with a number of study references and asked whether they had heard of the study concerned, who had brought it to their attention, whether they found it convincing and whether they took any action as a result. The list of studies presented to each group different slightly, but a subset were common so that comparisons would be made between the groups. Also, for the prescribing advisers, two fictitious studies were added in order to check on whether respondents were merely responding in the affirmative because they were aware of the purpose of the

survey.

4.4 **Survey results**

4.4.1 *Respondents*

Responses were obtained from 178 prescribing advisers, 202 hospital pharmacists and 66 directors of public health (DsPH). The response rates, of 65%, 51% and 66% respectively, were in line with expectations. The low response rate for pharmacists might be partly due to the fact that more than one questionnaire was sent to those NHS trusts comprising more than one hospital. Therefore, if the Trust decided to send one composite response, the response rate would be biased downwards.

Of course it is not possible to infer anything about the views of those decision makers that did not respond, beyond the fact that they are unlikely to be more interested in economic evaluation than those who did respond.

4.4.2 *Knowledge of economics*

The proportions of decision makers that had undergone training in health economics, and their awareness of published cost-effectiveness guidelines, are shown in Table 2. In most cases the level of training was quite modest, consisting of a short course.

Table 2: Knowledge of economics

	Advisers	Pharmacists	DsPH	Overall
Training in health economics (%)	40.4	17.3	86.4	36.8
Aware of CE guidelines (%)	43.3	19.8	48.5	33.4

The high percentage for directors of public health is explained by the fact that health economics is often taught as part of the preparation for their qualifying examination. For advisers, the Medical Advisers Support Centre had developed a formal distance learning package. The level of knowledge of pharmacists is closer to that we would expect for health service personnel more generally. Post-registration training for hospital pharmacists is limited and courses have only recently been introduced. More junior pharmacists, studying on Diploma and M.Sc. courses, are more likely to have undergone training in health economics.

With the exception of pharmacists, a substantial proportion of respondents claimed to be aware of guidelines for undertaking cost-effectiveness studies. In the main they were referring to the recently-published DH/ABPI joint guidelines (DH/ABPI, 1994). However, some respondents were referring to guidelines published in textbooks, such as that by Drummond *et al.* (1987).

4.4.3 Importance of the efficiency criterion

It is often suggested that decision makers are so concerned about their own budget that they tend to lose interest in broader aspects of economic efficiency. Table 3 reports the results of a question to hospital pharmacists about the economic criteria used in listing drugs on the hospital formulary.

Table 3: Importance of the efficiency criterion

(Hospital Directors of Pharmacy) <i>In formulary listing what economic aspects do you consider?</i>	
	%
Acquisition cost of medicine	90.0
Better outcome, to balance higher drug cost	85.2
Savings in hospital, to balance higher drug cost	52.3
Savings outside hospital, to balance higher drug cost	50.0

NB: 12.9% of respondents reported that they did not have a formulary in their hospital. This is similar to the finding obtained earlier by Joshi *et al.* (1994).

As might be expected, acquisition cost of the medicine was the most frequently considered economic factor. Beyond this, a substantial proportion of respondents said that they would consider better outcome alongside higher cost. A predictably lower proportion of respondents reported that they would consider savings on other budgets alongside a higher acquisition cost. A different response was obtained from directors of public health, however, who obviously take a broader view. In this group 87.9% of respondents said they would consider savings on other NHS budgets when deciding between alternative therapies.

The survey did not explore in detail other potential influences on decision making, such as equity or political factors. However, when asked how important economic issues are in deciding between competing priorities in purchasing, only 9.1% of directors of public health considered that they were the most important factor. A further 48.5% said that they were very important, but secondary to other issues.

4.4.4 Sources of information on costs and outcomes used by decision makers

Previous surveys have indicated that decision makers obtain information from a wide variety of sources. Table 4 shows the responses from medical and pharmaceutical advisers,

who were asked how they would assess whether a more expensive medicine is worth the extra cost.

Table 4: Sources of information on costs and outcomes used by decision makers (Medical and Pharmaceutical Advisers)

<i>How would you assess whether a more expensive medicine is worth the extra cost?</i>	
	<i>%</i>
Clinical articles in peer reviewed journals	96.1
Formal economic evaluations	77.5
Opinions of other advisers	48.9
Opinions of other colleagues	41.0
Personal opinion	35.4
Other	9.0

As one might expect, articles in peer-reviewed clinical journals are claimed to be the most influential source, although it is unclear whether this response relates only to clinical articles (our intention), or articles in those journals more generally. Formal economic evaluations (at 77.5%) also fare well, although this response is almost certainly influenced by the explicit purpose of the survey itself. Perhaps more can be inferred from the large number of respondents who admitted to the use of personnel, or colleagues', opinion.

The use of formal economic evaluations to assess whether therapies were worth the extra cost was also high for the directors of public health (92.4%), being of the same order as clinical journals (93.9%).

In the case of pharmacists, the survey distinguished between sources of information for assessment of outcomes and cost savings. For assessment of outcomes, peer-reviewed clinical journals were used by 85.6% of respondents, compared with clinicians' opinions (78.7%), the drug information centre (70.3%), opinions of other pharmacists (52.5%) formal economic evaluation (49.5%) and the pharmaceutical industry (15.8%). For assessment of savings in resources, formal economic evaluations (56.4%) were the most frequently reported source.

4.4.5 Barriers to use of economic evaluation

One of the survey questions asked respondents to identify (from a long list) any obstacles, to the better use of cost-effectiveness studies, that they considered important. They were also asked to identify which obstacle they considered the most important.

Table 5 gives the overall response. It can be seen that difficulties in reallocating resources are considered to be a major factor, either in moving resources from secondary to primary care, or in freeing resources from existing budgets to pay for a new therapy. This suggests that more consideration should be given to exploring the managerial and organizational consequences of adopting new, cost-effective therapies.

The directors of public health were also asked what would make them more likely to increase their use of economic evaluations (Table 6). The most important factors appeared to be the development of clearer priority setting mechanisms in health commissions and improving the access to studies.

4.4.6 Extent of use of economic evaluation results

The respondents were asked whether they had seen particular published studies, how they had obtained them, whether they had found them convincing and, if so, whether they had changed the advice that they gave or had taken any other actions.

Table 5: Barriers to use of economic evaluation
(All respondents)

	An important obstacle (%)	Most important obstacle (%)
● Cannot move resources from secondary to primary care	64.8	17.5
● Studies open to bias because of large number of assumptions	55.6	12.6
● Budgets are so tight we cannot free resources to adopt therapy	50.4	8.3
● DH not interested in CE, only cost containment	48.9	8.1
● Industry funded studies not credible	58.7	7.6
● Studies need to be interpreted by a trusted source	30.3	6.1
● Savings in studies are anticipated, not real	42.8	5.6
● Don't understand studies	7.5	4.0
● Can't take a long-term view, budget this year important	30.0	3.4
● DH funded studies not credible	9.0	0.7

**Table 6: Removing barriers to use
(Directors of Public Health)**

<i>What would make you more likely to use economic evaluations in your work?</i>		
	Important factor (%)	Most important factor (%)
● Clearer priority setting mechanism in my authority/commission	66.6	18.2
● Easier access to studies	62.1	16.7
● More publications in mainstream journals	65.2	13.6
● More studies of broader public health interventions	71.2	13.6
● Greater pressure (e.g. central guidance) to use	31.8	10.6
● Having someone to critically review them	37.9	6.1
● More training in health economics	28.8	3.0

These questions were quite complicated both to ask and to analyse. It is therefore possible that some respondents were a little confused by this portion of the survey. (In particular, it should be noted that a substantial number of respondents claimed to have seen the two fictitious studies!)

The results for the prescribing advisers are given in Table 7. Data are presented for 13 economic evaluations (11 real and 2 fictitious). The interpretation of the first line of the table is as follows: 11.8% of respondents had seen the study of ciprofloxacin in respiratory

tract infections; of these individuals, 9.5% reported that the study had been given to them by a colleague in the NHS and 57% reported that they had been given it by the pharmaceutical company; of those seeing the study, 14.3% found the study convincing and 4.8% altered their advice or actions.

Further analysis of the data is required before strong conclusions can be reached. However, it is clear that the extent to which studies are known to decision makers varies. Also, with one or two exceptions, it appears that pharmaceutical companies are quite active in drawing studies to the attention of decision makers.

In the majority of cases, respondents were not convinced by study findings, although two studies fared well. The interpretation of the last column (altered advice or action) is difficult since some studies may have merely confirmed current behaviour. For example, comparing the two studies on the value of selective serotonin re-uptake inhibitors, the government sponsored study was found to be more convincing, but induced a similar level of change. This may be because current advice was in line with the recommendations of the study.

5. CONCLUSIONS

There is a well-established tradition of economic evaluation in the United Kingdom. However, as in other countries, there are few good examples of the impact of studies on decision making. Two have been discussed in the case studies above.

In principle, managed competition provides opportunities for the use of economic evaluation. A number of potential user groups have been identified: purchasing authorities (especially directors of public health and prescribing advisers), providers (including hospital directors of pharmacy), and fundholding GPs.

If economic evaluations are to be used they need to be undertaken in a timely fashion and made accessible to decision makers. Therefore, because of the decentralized decision making implicit in managed competition, it is important that mechanisms are in place to

generate the appropriate data and to disseminate them widely. Potentially the NHS R & D Strategy can meet this need, although it is probably too early to assess the Strategy's impact. Some activities, such as the production of the Effective Health Care bulletins and the development of databases of effectiveness reviews and economic evaluations, are likely to be particularly important and should be evaluated separately.

This paper reports on the most extensive survey on the use of economic evaluation yet undertaken in the UK. Although some preliminary results have been obtained, it is probably best to view the survey as a hypothesis generation exercise. The challenge is to design studies of stronger methodology in order to assess the true impact of economic evaluation on health care decision making in the UK. However, the main message from this study is that it does not matter what economic evaluations are undertaken if there are not the mechanisms to use the results.

**Table 7: Extent of use of results from economic evaluations
(Medical and Pharmaceutical Advisers)**

Study Name	Seen study %	Own search %	Given by NHS %	Given by Company %	Found Convincing %	Altered Advice or Actions %
Ciprofloxacin in respiratory tract infections	11.8	0	9.5	57.1	14.3	4.8
Enalapril in heart failure	48.9	0	17.2	55.2	60.9	55.2
Omeprazole in gastroesophageal reflux	38.2	13.2	19.1	54.4	36.8	19.2
H.Pylori eradication compared to long-term acid suppression	41.0	35.6	38.4	23.3	61.6	69.9
Ranitidine versus cimetidine in prevention of DU recurrence	30.3	18.5	37.0	37.0	20.4	14.8

**Table 7: Extent of use of results from economic evaluations
(Medical and Pharmaceutical Advisers)
(Continued)**

Study Name	Seen study %	Own search %	Given by NHS %	Given by Company %	Found Convincing %	Altered Advice or Actions %
Nicorette in cessation of smoking	18.5	12.1	24.2	36.4	36.4	15.2
Value of SSRIs (company initiated)	38.2	36.8	25.0	19.1	17.6	36.9
Value of SSRIs (government sponsored)	58.4	27.9	51.9	3.8	42.3	36.5
Arthrotec in protection of gastric complications of NSAIDs	36.5	12.3	13.8	70.8	21.5	16.9

**Table 7: Extent of use of results from economic evaluations
(Medical and Pharmaceutical Advisers)
(Continued)**

Study Name	Seen study %	Own search %	Given by NHS %	Given by Company %	Found Convincing %	Altered Advice or Actions %
Economic effects of migraine	21.9	0	12.8	69.2	15.4	12.8
Enteric coated versus standard naprosyn	14.0	24.0	4.0	76.0	24.0	24.0
Fictitious Study A	15.7	14.3	10.7	39.3	14.3	18.8
Fictitious Study B	21.3	13.2	18.4	52.6	18.4	13.2

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