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# **Economic Appraisal of Health Technology in the United Kingdom**

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# **DISCUSSION PAPER II**



**ECONOMIC APPRAISAL OF HEALTH TECHNOLOGY  
IN THE UNITED KINGDOM\***

by

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## 1. INTRODUCTION

In this paper we assess the current state of the art of economic appraisal of health technologies in the United Kingdom. The paper is organised along the lines suggested in the Workshop proposal. Although the main interest of the Workshop is in 'high' technology, such as imaging techniques and advanced therapeutic interventions, we have included (in Appendix 1) details of economic appraisals of other health care innovations, such as community care options for the elderly and mentally handicapped. We believe that these appraisals both give the interest in high technology a sense of perspective and raise methodological issues that are relevant in the evaluation of advanced medical procedures.

We have not included a discussion of a major case study in economic evaluation of health technology in the UK. The most appropriate example would be the recently completed appraisal of heart transplants commissioned by the Department of Health and Social Security (DHSS). This is to be discussed in another paper presented at the workshop (Buxton, 1985).

## 2. WHAT ECONOMIC APPRAISALS HAVE BEEN CONDUCTED TO DATE?

A classification of the major economic appraisals conducted to date is given in Appendix 1. We have also included a number of appraisals in progress that have been brought to our attention. It can be seen that the list contains 71 studies, of which 26 consider technologies that are of central concern to the Workshop. These include C-T scanners, magnetic resonance imaging, renal dialysis and transplantation, neonatal intensive care, open heart surgery, coronary care, bone marrow transplant, intraocular implants, new medical equipment and new drugs (such as H<sub>2</sub> receptor antagonists). However, the interest in long-term care, particularly community care options for the elderly, mentally ill and mentally handicapped, should also be noted. Although fears about the resource consequences of high technology often prompt its evaluation, it is worth remembering that in many European countries demographic changes mean that an increasing proportion of the health care budget is likely to be devoted to long-term care. (The care of the elderly, mentally ill and mentally handicapped is also a priority in many countries, although some would argue that the pace of technological change in the acute sector has meant that resources have been diverted from such priority areas.)

### 3. WHO HAS CONDUCTED THE APPRAISALS?

This topic has two dimensions: who commissions the appraisals and who carries them out? Whereas the latter question is usually easy to answer, the former is often more complex in that independent researchers may be receiving sponsorship from public or private organisations through the giving of grants to their institutions, although specific appraisals may not be commissioned as such. It is therefore likely that DHSS and the research councils engage in much 'latent' commissioning through their continued support and approval of the activities of certain university departments or institutes. They may also give ex post approval to project proposals but not necessarily be active in setting the research agenda.

These points should be borne in mind when interpreting the list given in Appendix 1, where 'independent research' features prominently in the 'Commissioning Body' column. Another potential source of bias in our sample is that published articles were our main data source. It is therefore possible, although in our view extremely unlikely, that there is much activity in economic appraisal of health technology that does not result in published work. Nevertheless, we consider that the main groups undertaking economic appraisals in the UK are independent researchers, the government (primarily DHSS and the relevant government departments in Northern Ireland, Scotland and Wales), health authorities and the industry. We discuss these in turn.

#### 3.1 Independent researchers

The vast majority of studies listed in Appendix 1 were carried out on the independent initiative of health service researchers. Very little is known about how individuals formulate their research priorities. No doubt opportunism plays a major role, as well as the individual's perception of the likelihood of a study being published if satisfactorily completed.

It should also be noted that clinical practitioners were involved in many of the studies. In their case an important motivation for undertaking economic appraisals of new health technologies would



be to justify the technology's development in the face of competing demands for scarce health service resources. It is obviously very difficult to be an objective evaluator of a technology when one is also an advocate for it. However, on occasions some clinicians have shown a remarkable degree of detachment when evaluating their own clinical practice. (Although not from the UK, the study by Boyle et al (1983) on neonatal intensive care is a good example.) Ultimately, any bias **in the way studies are carried out** can be detected through a critical appraisal of study methodology, such as that prepared by the Department of Clinical Epidemiology and Biostatistics, McMaster Health Sciences Centre (1984). (See Table 1.) However, it is much harder to detect potential biases in the **selection of topics for study or the way in which the evaluation problem is presented.**

### 3.2 Government

Because of their central advisory role to the NHS, the government health departments play an important part in the conduct and application of economic appraisal. Although the DHSS has its own Economic Advisers' office, its role is mainly as a stimulator and commissioner of work. Specific economic appraisals are seldom conducted "in-house" by DHSS, although work has recently been done on the miniaturisation of x-rays (Rogers et al, 1982), renal dialysis (Mancini, 1983, 1984), and digital radiology (Burchell, 1985).

For particularly important policy problems, or technologies which appear to have large resource implications, major studies have been commissioned from outside bodies, mainly universities, with specific expertise. The study of costs and benefits of heart transplant programmes recently published (Buxton et al, 1985) falls into this category, as does the work on care of the elderly and mentally handicapped (Wright et al, 1981, 1985). The commissioning of independent work of this nature allows the DHSS a certain flexibility in using the results in policy formation.

Table 1 Ten Questions to Ask of Any Published Study

Source: Department of Clinical Epidemiology  
and Biostatistics, McMaster University  
Health Sciences Centre (1984)

1. Was a well defined question posed in answerable form?
  - (a) Did the study examine both costs and effects of the service(s) or program(s)?
  - (b) Did the study involve a comparison of alternatives?
  - (c) Was a viewpoint for the analysis stated or was the study placed in a particular decision-making context?
2. Was a comprehensive description of the competing alternatives given (i.e., can you tell who did what to whom where and how often)?
  - (a) Were any important alternatives omitted?
  - (b) Was (should) a "do-nothing" alternative (have been) considered?
3. Was there evidence that the programs' effectiveness had been established? Was this done through a randomized, controlled clinical trial? If not, how strong was the evidence of effectiveness?
4. Were all important and relevant costs and consequences for each alternative identified?
  - (a) Was the range wide enough for the research question at hand?
  - (b) Did it cover all relevant viewpoints (e.g., those of the community or society, patients and third-party payers)?
  - (c) Were capital costs as well as operating costs included?
5. Were costs and consequences measured accurately in appropriate physical units (e.g., hours of nursing time, number of physician visits, days lost from work or years of life gained) prior to valuation?
  - (a) Were any identified items omitted from measurement? If so, does this mean that they carried no weight in the subsequent analysis?
  - (b) Were there any special circumstances (e.g., joint use of resources) that made measurement difficult? Were these circumstances handled appropriately?
6. Were costs and consequences valued credibly?
  - (a) Were the sources of all values (e.g., market values, patient or client preferences and views, policymakers' views and health care professionals' judgements) clearly identified?
  - (b) Were market values used for changes involving resources gained or used?
  - (c) When market values were absent (e.g., when volunteers were used) or did not reflect actual values (e.g., clinic space was donated at a reduced rate) were adjustments made to approximate market values?
  - (d) Was the valuation of consequences appropriate for the question posed (i.e., was the appropriate type, or types, of analysis — cost-effectiveness, cost-benefit or cost-utility — selected)?
7. Were costs and consequences adjusted for differential timing?
  - (a) Were costs and consequences that occurred in the future "discounted" to their present values?
  - (b) Was any justification given for the discount rate used?
8. Was an incremental analysis of costs and consequences of alternatives performed?  
Were the additional (incremental) costs generated by the use of one alternative over another compared with the additional effects, benefits or utilities generated?
9. Was a sensitivity analysis performed?
  - (a) Was justification provided for the ranges of values (for key parameters) used in the sensitivity analysis?
  - (b) Were the study results sensitive to changes in the values (within the assumed range)?
10. Did the presentation and discussion of the results of the study include all issues of concern to users?
  - (a) Were the conclusions of the analysis based on some overall index or ratio of costs to consequences (e.g., cost-effectiveness ratio)? If so, was the index interpreted intelligently or in a mechanistic fashion?
  - (b) Were the results compared with those of other studies that had investigated the same questions?
  - (c) Did the study discuss the generalizability of the results to other settings and patient/client groups?
  - (d) Did the study allude to, or take account of, other important factors in the choice or decision under consideration (e.g., distribution of costs and consequences or relevant ethical issues)?
  - (e) Did the study discuss issues of implementation, such as the feasibility of adopting the "preferred" program, given existing financial or other constraints, and whether any freed resources could be used for other worthwhile programs?

The DHSS is much more active internally in the technical appraisal of medical technologies mainly through its Scientific and Technical Services Branch (STB). Evaluations of medical equipment are conducted at a series of centres in hospitals and medical schools, producing information on technical performance, safety, and purchase and operating costs. The STB also funds research and development projects on new devices and requires some form of appraisal of the technology before funds are committed. A full description of STB activities is given in Higson (1983).

The various elements of DHSS concerned with the assessment of technology have recently formed a Technology Assessment Group, which includes medical, economic, scientific and technical representatives. Apart from the work on the STB outlined above, no formal system of assessment exists at present for new technologies being introduced into the NHS. The decentralised nature of equipment procurement allows hospitals and health authorities a great deal of freedom to choose, within financial allocations, provided equipment meets safety standards. The development of the role of the Technology Assessment Group will reflect any changing attitudes towards formal assessment.

### 3.3 Health Authorities

In the United Kingdom health authorities have an important influence over the diffusion of health technologies, since they control the budgets for the provision of health services. (The exception to this rule, in most of the UK, is the provision of family practitioner services.) However, while health authorities now carry out, at the Government's request, option appraisals of large capital schemes (DHSS, 1981), there is little evidence that they undertake systematic appraisals of clinical developments, including choices in the adoption of new health technologies. There are a number of possible explanations for this. These include the lack of available expertise, lack of awareness of economic appraisal techniques and the lack of incentives to carry out such work, not least the political and administrative framework within which health care resource allocation decisions are made. (Many of these 'problems' of applying economic

appraisal in the NHS have been discussed by Ludbrook and Mooney (1984).)

It may be that in the future health authorities, given their financial problems, will play a more active role in commissioning or undertaking economic appraisals. In most health service regions there are monies available for 'locally-organised health services research'. (See Section 7.3 below.) It should also be remembered that in employing those clinicians and other health service professionals that become involved in economic appraisal of health technology, health authorities are indirectly providing resources for the activity.

### 3.4 Industry

Unlike the USA, where medical technologies must pass through a series of regulatory hurdles, the UK system does not place a great burden on manufacturers in terms of evaluation and justification of products. The main marketing effort of the medical equipment industry in the UK has traditionally been in convincing the medical profession to demand the equipment. Demonstration of quality, performance and new functions has generally been thought to be more important than the production of evidence of cost-effectiveness. In the current financial climate this attitude may be changing.

In the field of single-use products greater attention has been paid to cost and effectiveness, particularly in the pharmaceutical industry. In justifying a switch from surgery to drug therapy, or from sterilisation of syringes to disposables, the cost implications can be paramount, and companies have realised that good cost-effectiveness data are a strong marketing tool. Because of the obvious vested interest of the company concerned in the results of any study, the industry generally commissions independent bodies to conduct appraisals, and tries to avoid suspicion of bias in the results. The studies of cimetidine and wound dressings (Culyer et al, 1981; 1983) are examples of work receiving support from the manufacturers of products under evaluation.

#### 4. WHAT IS THE METHODOLOGICAL QUALITY OF THE APPRAISALS?

The methodological quality of many of the appraisals listed in Appendix 1 has been assessed (Drummond, 1981; Drummond et al, 1985), using criteria similar to those listed in Table 1. In short, the quality of published work is highly variable and acceptance of a paper for publication in a reputable journal is by no means a guarantee of quality. A particular concern is the number of economic appraisals undertaken clinicians alone and published in medical journals. However, it would be wrong to suggest that involvement of an economist in the research team has always led to good work.

In a recent review of the state of the art of economic appraisal, Drummond et al (1985) noted the following recurring weaknesses in the published literature:

- failure to specify clearly the viewpoint from which the appraisal was carried out;
- failure to base the economic study on good medical evidence, such as that generated by controlled clinical trials;
- the unthinking use of average costs, particularly in estimating for the costs of hospitalisation;
- failure to consider patient, family and volunteer costs where these were relevant;
- inadequate allowance for uncertainty in cost and benefit estimation;
- inadequate consideration of the link between appraisal results and the decisions, in health service planning and clinical practice to which they pertain;
- failure to consider factors other than economic efficiency (including equity considerations and the managerial procedures required to bring about a change in policy).

## 5. WHAT HAS BEEN THE IMPACT OF APPRAISALS ON DECISION MAKING?

### 5.1 Evidence of impact

There is very little systematic evidence of the impact of appraisals on health service decision making at the governmental, health service planning or clinical levels. This is partly because, with two notable exceptions (Alban, 1982; Ludbrook and Mooney, 1984), no-one has sought to assemble such evidence; it is also partly because decisions are (rightly) made as a result of a number of considerations, of which evidence on the costs and benefits of options is just one. One interesting finding of the study by Alban (1982) was that those undertaking economic appraisals did not necessarily have, as an objective, the desire to influence decisions. Their main objective was to produce publishable findings. It is likely, therefore, that a major reason for the lack of impact of economic appraisals of health technologies is that the majority are undertaken by independent researchers with no clear link to health service decision making at any level. In essence, the majority of appraisals begin as studies looking for a decision, rather than vice versa!

It therefore comes as no surprise that evidence of impact is more often found either where the study is specially commissioned and the decision maker awaits the study results (or makes sure that results are produced!) before committing himself (e.g. Buxton and O'Brien, 1985), or where one of the research team is in a position to change policy as a consequence of the study (e.g. Woodward and Drummond, 1984).

### 5.2 Reasons for lack of impact

Many of these have already been mentioned, such as the lack of a clear link between those conducting the study and those taking the decisions. Indeed, apart from in-house economic appraisals performed by the DHSS and the minority of appraisals that have been formally commissioned, there appears to be no clear mechanism for using the results of economic appraisals of health technology

in the UK. In general, a great reliance is placed upon the dissemination of knowledge through medical and other health service professional journals, although a few other initiatives have been taken. (These are discussed in Section 8 below.) Although the medical journals may be a good mechanism for transmitting the results of clinical evaluations, where the level of interest and understanding of the reader is high, they may be less effective in disseminating the results of economic appraisals.

Another difficulty worth mentioning is that on occasions the financial incentives for adoption of the new technology may be lacking, even though there is good economic evidence. This was the situation in the UK with the oxygen concentrator. Although of lower cost to the Health Service overall, the concentrator would require health authorities to commit extra expenditures from their own equipment budgets, whereas the other main method of providing long-term domiciliary oxygen to chronic bronchitics, cylinder oxygen, was funded by the Family Practitioner Committees. (Lowson et al, 1981.) A common feature of new health technologies, such as improved imaging techniques or new therapeutic procedures, is that they offer the potential for cutting costs as they reduce hospitalisation. However, unless efforts are made to reduce bed capacity, expenditure is likely to rise on adoption of such technologies if they enable patient throughput to be increased.

## 6. HOW CLOSELY IS ECONOMIC APPRAISAL INTEGRATED WITH OTHER RELEVANT FORMS OF RESEARCH?

In the appraisal of health technology it is most important that economic appraisal is closely integrated with medical evaluation. From the list of studies in Appendix 1, it appears that the situation in the UK is encouraging, in that 29 of the 71 studies listed were undertaken by a multidisciplinary team involving medical and economic researchers.

However, the track record in linking economic appraisals with controlled medical evaluation (especially randomised controlled trials) is less impressive, only 16 appraisals being undertaken alongside clinical trials. The arguments for and against undertaking economic evaluation in association with clinical trials, and the methods of 'phasing in' the economic research as more is known about the medical performance of the new technology, are not straightforward. However, most health economists in the UK would welcome a closer involvement with clinical research colleagues, particularly at the trial design stage. Culyer and Maynard (1981) noted that while there had been many trials of cimetidine, a new drug technology in the treatment of duodenal ulcer, none provided an adequate foundation for their economic appraisal.

Obviously a recurring difficulty with new health technologies is that it is impossible to generate medical evidence on all the existing and projected applications. Therefore, the development of better economic evaluations of new health technologies is somewhat hampered by the difficulties in assembling reliable medical evidence about them. However, we can think of few cases where economists have knowingly failed to use good medical evidence where it existed. In fact, many of the studies listed in Appendix 1, although not linked to a controlled trial, were based on the best available medical evidence. Typically, evidence is drawn from a number of sources and reinterpreted in the context of the treatment choice(s) being examined in the economic study. For example, in economic studies employing decision analysis existing evidence is used to derive the probabilities of given outcomes from clinical interventions (Weinstein and Feinberg, 1980).



Economists sometimes disagree with their clinical research colleagues in situations where a decision is going to be made without reliable medical evidence. Most economists would prefer to perform their study, using sensitivity analysis to allow for uncertainties in the medical data. Most clinical researchers would prefer to argue for generation of the medical evidence, although in reality many technologies become adopted without such evidence.

Of course it should also be recognised that in a minority of cases randomised controlled clinical trials may be difficult to mount for practical or ethical reasons. A case in point is the study by Buxton et al (1985) on heart transplants. Although no controlled clinical evaluation was possible, the economic study was based on outcome data from two transplants units.

Other relevant forms of research with which economic appraisal could become more closely integrated are those in medical statistics, health services management and health service policy making. Although a minority of the research teams conducting economic appraisals have included a statistician we can think of hardly any that have included management or policy specialists. This might be an area well worth exploring, particularly if there are concerns that there is a lack of impact of appraisals on health service decision making.

## 7. WHAT IS MEDICAL/HEALTH SERVICES RESEARCH POLICY AS IT APPLIES TO HEALTH TECHNOLOGY?

### 7.1 Medical Research Council and Economic and Social Research Council

These two research councils have three forms of support for research activities: long-term funding of units and centres, programme grants and specific project grants. Decisions on funding are made on academic criteria, although recently the subjects considered worthy of study, particularly by the ESRC have become much more closely related to policy-making.

The interest of the MRC in health technology is through the conduct of trials to establish clinical efficacy and effectiveness, although funding is also given to basic research, which may produce new devices and procedures. A proportion of the MRC budget is ear-marked for "health services research", but until recently this has not been thought to include economic work. However, the MRC has recently funded a cost-effectiveness study of NMR imaging (Hutton et al, 1985) to be combined with existing programmes of clinical research on NMR.

The MRC research units tend to be subject-related and have multi-disciplinary staffing including statisticians, epidemiologists and sociologists as well as those from the various medical specialities. Specialist medical sociology and bio-statistics units are funded by MRC but not specialist units for health economics. The major ESRC commitment to economic research in health is the funding of the Centre for Health Economics at the University of York. A considerable proportion of the workload of the CHE is concerned with appraisal of medical practices, although the ESRC funding requires a commitment to developing the methodology of the subject area. DHSS also has a role in CHE (see below).

### 7.2 Government Initiatives

The DHSS has a long-standing programme of health economics research which it funds at the University of York. This has now

been incorporated in the CHE along with the ESRC financed sections. The work for DHSS is always policy-related and has included economic assessment of different health technologies (e.g. Wright, 1981; Williams and Kind, 1985). As well as specific project grants to other researchers (see Appendix 1) the DHSS also funds economic work in its multi-disciplinary research units. (e.g. Health Care Research Unit, University of Newcastle; and similar units elsewhere, such as the Department of Community Medicine, St Thomas' Hospital Medical School). The core funding of these units includes provision for an economist, to permit economic evaluation to be included in appraisals where appropriate.

The Scottish Home and Health Department (SHHD) funds a Health Economics Research Unit (HERU) at the University of Aberdeen, which carries out research and evaluation relating to the whole NHS, not only Scotland, although some local priority is given to issues unique to the Scottish NHS. The Common Services Agency for the Scottish NHS, based in Edinburgh, carries out for Scotland what the STB does in England. The need for economic as well as technical appraisal of equipment and supplies is being recognised here as well.

Co-operation between the government departments and research councils is demonstrated not only in the joint-funding of research centres, but also in the way some individual studies are generated and funded. That part of the MRC budget for health services research was previously held by the DHSS and allocated directly by them. The current arrangement is that DHSS expresses its views with regard to proposed allocation of the funds by the MRC. A recent example is the NMR imaging cost-effectiveness study. This is funded by MRC but DHSS were very active in advocating the commissioning of the work. In fact the whole programme of NMR research funded by the MRC is co-ordinated by a joint MRC/DHSS committee.

Economic evaluation of health technology is seen as a multi-disciplinary activity by DHSS. There is no separate

research budget for purely economic work and projects which involve economic evaluation must be sponsored by one of the policy divisions of the DHSS before they can be funded. The whole process of commissioning research at DHSS is currently under review, and how any changes will affect technology-related work can only be guessed at present.

### 7.3 Locally Organised Research

Most health authorities have funds set aside for research work, some of which may be used to conduct assessments of new technology. This is most likely if a hospital within the authority acquires a new technology not widely available to the NHS. The results of such research are of interest to other authorities and, provided free exchange of information takes place, such studies can prove very useful. Formal arrangements for assessment of different supplies by the 14 English Regional Health Authorities have been set up by the Health Service Supply Council, to avoid duplication of effort at the local level.

Co-operation of health authorities is vital to the success of many studies. Some are directly commissioned by an individual authority to tackle local problems (e.g. Kyle and Drummond, 1985 and Ward, 1985). Others may involve health authority personnel (e.g. Hagard et al, 1976) and most will rely on authorities for the provision of data at some stage. DHSS attempts to monitor research activities in the NHS and to provide pump-priming funds for studies with service-wide implications. However, it is at the local level, where the results of studies must be accepted if they are to affect resource allocation decisions, that a review of research strategy could prove most fruitful. It is our impression that currently the majority of local research monies are used to support the personal research projects of clinical staff and are not linked to the policy issues facing the NHS. However, such research monies are in any case minute in comparison to the resources devoted to the management of the NHS. Perhaps the management structure itself should develop the capacity to undertake economic appraisals of health technology.

## 8. WHAT EFFORTS ARE MADE TO DISSEMINATE THE RESULTS OF ECONOMIC APPRAISALS?

### 8.1 Publication in medical journals

As can be seen from Appendix 1, the main method of dissemination of results of studies is through publications in medical journals. This is reinforced by many pressures in the process of conducting research. Researchers aim for publication as a way of career advancement as well as a means of communicating valid results worthy of wider application. This can conflict with service needs if the publication is tailored to suit the editorial policy of the journal rather than the immediate needs of policy-makers.

### 8.2 Government Publications

The above problem can be avoided by careful research management. DHSS funded projects result in reports to the sponsoring policy division in the first instance. The contents of these may be put to immediate use in internal decision-making, they may be used to justify policy decisions (e.g. the Buxton et al, 1985 Study on Heart Transplants), or they may be shelved as background information. Sometimes the full study is published immediately (e.g. Buxton et al, 1985) but more often the material is processed further by the researchers into journal articles for publication.

The Health Departments have other ways of disseminating the results of studies more directly. They may be incorporated in circulars and advice notes to health authorities. Publications such as Health Trends (Health Bulletin in Scotland) are distributed widely and carry short articles reporting on 'in-house' work or commissioned studies, although these journals have an independent editorial policy. Studies of medical equipment are published in Health Equipment Information, and a recent issue of HEI was devoted to the whole question of technology assessment, including economic aspects.

Although not a government publication, the Drugs and Therapeutics Bulletin (published by the Consumers' Association) had occasionally contained information on the comparative costs of health technologies.

### 8.3 Management Education

Personal communication has always played a major role in the NHS, and the results of studies can often be disseminated faster if supported by educational efforts. The need for and conduct of economic evaluation has been a major topic on courses for NHS managers organised at the National Education Centres, such as those at the Universities of Birmingham, Manchester and Leeds, and the Kings Fund College in London.

More recently considerable effort has been directed towards management training for clinicians, particularly those involved in NHS management, to communicate the basic ideas of economic evaluation. The CHE at York and HERU at Aberdeen have been active in this area. Teaching of this type is assisted by the use of case-study material and is used as a vehicle for spreading the results of recent economic appraisals and for encouraging more local initiatives.

### 8.4 Special Events

Conferences and seminars are another way of communicating and discussing the results of studies. These can be highly organised and publicised, such as the recent consensus conference in the UK on CABG, or less formal, for an invited audience, such as the DHSS seminar on NMR held in December 1984.

Events of this type find favour with all parties interested in health technology assessment. The researchers welcome a platform to publicise their work and the sponsors of the research gain a wider impact for the results, whether they be the DHSS wishing to influence NHS decision-making, or a manufacturer wishing to influence potential purchasers.

## 9. CONCLUSIONS

Our assessment of the current situation with regard to economic appraisal of health technology in the United Kingdom is as follows.

On the positive side it is clear that there is a long-standing tradition of economic evaluation of health care alternatives and that there are a number of health services researchers who are willing and able to undertake such assessments. The methodological quality of the studies reported in the literature is variable but there are now many studies that conform to acceptable methodological standards. In addition there is evidence that government health departments and the research councils have provided financial support for such work, either through the allocation of specific research grants or through the long-term funding of academic institutes. To some extent the funding bodies have encouraged the integration of economic evaluation with other forms of health service research. Such integration could be further encouraged.

Nevertheless, there are a number of areas in which improvements could be made. First, the majority of economic appraisals of health technology are undertaken by independent researchers who have no direct link with health service decision makers at the central or local levels. Few appraisals are specifically commissioned. Second, there is no formal mechanism for disseminating the results of economic appraisals. A great reliance is placed on publication in academic journals, many of which may not be read by key decision makers. Finally, there is no formal requirement for health authorities or government departments to undertake economic assessments of new health technologies before their adoption. This is in contrast to the requirements for the assessment of developments involving health service buildings.

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**Appendix 1**

**CLASSIFICATION OF ECONOMIC APPRAISALS OF HEALTH**

**TECHNOLOGY UNDERTAKEN IN THE UK**

AUTHOR(S), DATE	TECHNOLOGY ASSESSED	DISCIPLINES INVOLVED	LINK TO CONTROLLED MEDICAL EVALUATION	COMMISSIONING BODY	DISSEMINATION/ IMPACT
Pole (1971)	Mass miniature radiography	Economist	No	Independent research	Published in edited collection
Reynell et al (1972)	Coronary care unit	Clinicians	No	Independent research	Published in <u>British Heart Journal</u>
Wager (1972)	Community and residential care for the elderly	Accountant	No	County Council	Published by CIPFA
Buxton and West (1975)	Long term haemodialysis for chronic renal failure	Medical physicist, economist	No	Independent research	Published in the <u>British Medical Journal</u>
Sissouras et al (1975)	Coronary care unit, mobile coronary care unit	Operational researchers	No	Independent research	Published in <u>Hospital and Health Services Review</u>
Thorn et al (1975)	Screening for cancer of the cervix	Clinician, epidemiologist	No	Independent research	Published in the <u>Lancet</u>
Bartlett et al (1976)	C-T scanning of the head	Clinicians, management consultants	No	Independent research. Some interest from the Regional Health Authority	Published in the <u>British Medical Journal</u>
Carter et al (1976)	Home maintenance for haemophiliacs	Operational researcher, clinician	No	Independent research	Published in the <u>British Medical Journal</u>
Hagard et al (1976)	Screening for Down's Syndrome	Operational researcher, epidemiologist	No	Independent research. One author worked for the NHS	Published in the <u>British Medical Journal</u>
Hagard et al (1976)	Screening for spina bifida cystica (using alpha fetoprotein test)	Operational researcher, epidemiologist, economist	No	Independent research. One author worked for the NHS	Published in <u>Brit. J. Prev. Soc. Med. Stimulated DHSS to undertake its own study</u>

AUTHOR(S), DATE	TECHNOLOGY ASSESSED	DISCIPLINES INVOLVED	LINK TO CONTROLLED MEDICAL EVALUATION	COMMISSIONING BODY	DISSEMINATION/IMPACT
Rich et al (1976)	Screening for asymptomatic bacteriuria	Clinician, economist	Yes		Published in <u>Brit. J. Social Prev. Med.</u>
Stilwell (1976)	Schools' BCG Vaccination	Economist	No	DHSS, indirectly	Published in <u>British Medical Journal</u>
Taylor (1976)	Hip replacement	Economist	No	Independent research	Published in <u>Proc. Royal Society</u>
Glass (1977)	Screening for Down's Syndrome	Economist	No	Independent research	Published in Edited Collection
Glass et al (1977)	Community-oriented psychiatric services	Economist, clinician	No	Independent research. One author worked for DHSS	Published in <u>Psychological Medicine</u>
Holtermann (1977)	Screening for thalassaemia major	Economist	No	DHSS/North West Thames RHA	Report to health Authority
Reid et al (1977)	Rural out-patient clinics	Sociologist, statistician, economists	No	Independent research, indirectly funded by DHSS	Published in journal articles
Russell et al (1977)	Day case surgery	Statistician, clinician, sociologist, economist	Yes	DHSS, indirectly	Published in the <u>Lancet</u>
Thomson (1977)	C-T head scanning of the head	Clinician	No	Independent research	Published in <u>Health Trends</u>
Beresford et al (1978)	Injection sclerotherapy and surgery for varicose veins	Clinician, epidemiologist, economist	Yes	Independent research	Published in the <u>Lancet</u>
Prescott et al (1978)	Day case surgery	Clinician, statistician	No	Scottish Home and Health Department	Published in <u>J. Epid. and Comm. Health</u>

AUTHOR(S), DATE	TECHNOLOGY ASSESSED	DISCIPLINES INVOLVED	LINK TO CONTROLLED MEDICAL EVALUATION	COMMISSIONING BODY	DISSEMINATION/ IMPACT
<u>Simpson et al</u> (1978)	Screening for breast cancer	Epidemiologist, economist	No (?)	DHSS	Published in <u>J. Epid. Com. Health</u>
<u>Waller et al</u>	Short stay surgery	Epidemiologist, sociologist, economist	Yes	DHSS	Published by DHSS
<u>Engleman et al</u> (1979)	Induction of labour in pregnancy	Economist, clinician, epidemiologist	Yes	Independent research	Published in <u>Community Medicine</u>
<u>Goode et al</u> (1979)	Treatments for infected wounds	Clinicians	Yes		Published in <u>British Journal of Clinical Practice</u>
<u>MacFarlane et al</u> (1979)	Day hospitals in care of the elderly	Clinician	No	Independent research	Published in <u>Age and Ageing</u>
Black (1980)	Screening for neural tube defects	Clinicians, economist	No	DHSS	Report published by DHSS. Evidence to governmental committee
Haberman (1980)	Heart transplants	Accountant	No	Independent research	Published in <u>Health and Social Service Journal</u>
<u>Stilwell et al</u> (1980)	Laboratory tests in hospitals	Economist	No		Published in <u>Annals of Clinical Biochemistry</u>
<u>Culyer et al</u> (1981)	Cimetidine for ulcer	Economists	No	Private Foundation	Published in <u>Social Science and Medicine</u>
<u>Dixon et al</u> (1981)	C-T in patients with abdominal mass	Clinicians, (?) statistician	Yes	Independent research. Support from industry acknowledged	Published in the <u>Lancet</u>

AUTHOR(S), DATE	TECHNOLOGY ASSESSED	DISCIPLINES INVOLVED	LINK TO CONTROLLED MEDICAL EVALUATION	COMMISSIONING BODY	CLASSIFICATION/IMPACT
Mangen et al (1983)	Community psychiatric nurses	Clinician, statistician, economist	Yes	Economic assistance from DHSS	Published in <u>Psychological Medicine</u>
Strathclyde Diabetic Group (1983)	Disposable syringes for diabetics	Clinicians	No		Published in the <u>British Medical Journal</u>
Cohen et al (1984)	Day hospital for psychiatric care	Economist, statistician and clinician	Yes	Independent research, funded indirectly by SHHD	Published as HERU discussion paper
Donaldson et al (1984)	Day hospitals for the elderly	Economists	No	Trent RHA	Report to the health authority Journal articles planned
Newns et al (1984)	Neonatal intensive care	Clinicians, economists	No	Independent research	Published in the <u>Archives of Diseases In Childhood</u>
Woodward et al (1984)	Contact lenses	Optician, economist	No	Independent research. One author worked in the NHS	Published in <u>Ophthalmic and Physiological Optics</u> Policy adopted in the hospital concerned
Mancini et al (1984)	Satellite dialysis unit	Economist, clinicians	No	DHSS	Sent to selected NHS personnel
Akehurst et al (1985)	Antepartum anti-D	Economists	No	Independent research	In progress
Buxton et al (1985)	Heart transplant	Economists, community physicians	No	DHSS	Published by DHSS Input to policy decisions

AUTHOR(S), DATE	TECHNOLOGY ASSESSED	DISCIPLINES INVOLVED	LINK TO CONTROLLED MEDICAL EVALUATION	COMMISSIONING BODY	DISSEMINATION/ IMPACT
Davies et al (1985)	Intraocular implant	Clinician, optician, economists	Yes	Independent research	Conference paper Forthcoming in medical journal
Hutton et al (1985)	NMR	Economists	Yes	MRC	In progress
Kyle et al (1985)	Community care for the elderly mentally infirm	Epidemiologist, economist	No	Health Authority	Report to health authority. Forthcoming in medical journal
Stillwell (1985)	Automated white cell differential counters	Economist	No (?)	DHSS	In progress
Ward et al (1985)	Options for chronic renal failure patients, inc. CAPD	Economists, clinician	No	Health Authority using local research funds	In progress
Williams (1985)	Coronary artery bypass grafting	Economist	No	Independent research	Presentation at a consensus conference Published in the <u>British Medical Journal</u>
Williams (1985)	Screening for syphilis in pregnancy	Epidemiologist	No	Independent research, author worked for the NHS	Published in <u>Community Medicine</u>
Wright (1985)	Extended training of ambulance staff for mobile coronary care	Economist	No	DHSS	Report to DHSS, published in <u>Social Science and Medicine</u>
Wright et al (1985)	Community care for the mentally handicapped	Economists	No	DHSS	Report to DHSS

AUTHOR(S), DATE	TECHNOLOGY ASSESSED	DISCIPLINES INVOLVED	LINK TO CONTROLLED MEDICAL EVALUATION	COMMISSIONING BODY	DISSEMINATION/IMPACT
Fordyce et al (1981)	Hospital, residential home and community care for the elderly	Economist, epidemiologist	No	Independent research, although interest from the NHS in the locality	Published in Health Bulletin Decision taken by Health Board before study finished
Foster et al (1981)	Drug therapy for wound sepsis	Clinicians	Yes	Independent research. Support from industry acknowledged	Published in the Lancet
Kay et al (1981)	Bone marrow transplant	Clinicians	No	Independent research	Published in the Lancet
Lowson et al (1981)	Oxygen concentrators	Clinician, economists	No	Independent research	Published in the Lancet. Discussed in the Drug and Therapeutics Bulletin
Ludbrook (1981)	Hospital dialysis, home dialysis and transplant for chronic renal failure	Economist	No	Independent research	Published in Applied Economics
Royal College of Radiologists (1981)	Skull radiography for head injury	Clinicians (economist advice acknowledged)	Yes	Royal College	Published in the Lancet
Wright et al (1981)	Hospital, residential home and community care for the elderly	Economists	No	DHSS	Published as a monograph
Banester et al (1982)	Re-use of dialysis equipment	Clinician	No		Published in British Medical Journal
Beardsworth et al (1982)	CAPD		No	Independent research	Published in Health Trends



AUTHOR(S), DATE	TECHNOLOGY ASSESSED	DISCIPLINES INVOLVED	LINK TO CONTROLLED MEDICAL EVALUATION	COMMISSIONING BODY	DISSEMINATION/ IMPACT
Forster et al (1982)	Outpatient physiotherapy	Economist, epidemiologist	Yes		Published in <u>British Medical Journal</u>
Gibbins et al (1982)	Augmented home nursing	Clinicians (economist advice acknowledged)	No	Independent research	Published in <u>British Medical Journal</u>
Henderson (1982)	Screening for open spina bifida	Economist	No	Scottish Home and Health Dept, indirectly	Published in <u>Social Science and Medicine</u>
MacGuire et al (1982)	Counselling after mastectomy	Clinician, economist	No	Independent research	Published in the <u>British Medical Journal</u>
Mowatt et al (1982)	'Hospital at Home	Clinician	No	Independent research	Published in <u>British Medical Journal</u>
Rogers et al (1982)	Miniaturisation of radiographs	Electrical engineer, economist	No	DHSS	Report published by DHSS
Badger et al (1983)	Incontinence nurse adviser	Economist, nurse, clinician	Yes	Age Concern	Published in the <u>Journal of Advanced Nursing</u>
Burchell (1983)	Mobile C-T scanners	Economist	No	DHSS/North East Thames RHA	Report to health authority
Culyer et al (1983)	Wound dressings	Economists	Yes	Independent research, financed by industry	Published in <u>Social Science and Medicine</u>
Mancini (1983)	Hospital dialysis, home dialysis, CAPD and transplants for renal failure	Economist	No	DHSS	Sent to selected NHS personnel. Also published in <u>Diabetic Nephropathy</u>