WORKING PAPER 366

COSTING SYSTEMS IN THE NHS

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1. Introduction

The NHS needs, more than ever, to have accurate and readily available information on the costs of the services it provides both for long term planning and the existing problems it faces in the current period of real reductions in public expenditure.

Attention in the past has focussed on the hospital sector's revenue expenditure which is the largest component of the health service budget and the one to which most effort in developing a costing information system has been directed. The first section of this paper examines the need for this information and the second section looks at the development of a costing system in the NHS since 1948. Finally, criticisms of the system as it currently stands are reviewed and an indication given of where future developments lie.

2. The Need for Costing Information in the NHS.

> "Health authorities not only have the responsibility for administering health services but are increasingly required to demonstrate their will and managerial competence to influence decisively the allocation, control and planning of scarce resources."
>
> (Körner Report, 1982)

In 1981-82 the health and personal social services sector of public expenditure in Britain amounted to £12½ billion, just over 12% of total public expenditure planned for that year and second only to social security spending. (Govt. Expenditure Plans, 1983-84). Nearly 60% of that figure, £7½ billion, went on revenue expenditure in the hospital and community health services with the hospital sector alone accounting for around 62% of that total (Health Services Costing Returns 1981/82).

Despite this magnitude of expenditure it is impossible to ignore the almost daily news of "health services under threat". Real expenditure on health by the government is still claimed to be increasing, but this is now at the rate where it is unable to match the increase in demand for health services let alone improve their quality and distribution. In this situation, and especially in the often emotive atmosphere of financial decisions affecting public welfare, it becomes imperative to hold detailed and accurate knowledge of how much constituent parts of the service cost. The Financial Information Project team at the W. Midlands Regional Health Authority set out the main questions that planners and finance officers

want to know the answers to (FIP, 1979). These include:

(i) What are the current costs of providing a given service and what might this be in the future?

(ii) What are the comparative costs of providing a given service at different locations?

(iii) What is the cost of providing treatment to population groups with particular socioeconomic and/or clinical characteristics?

(iv) What will be the cost of increasing the capacity of a given service or how much would an injection of cash increase that service by?

(v) In a similar manner what savings could be achieved by a service reduction, or what would the effect of an expenditure cut be?

(vi) What are the relative costs of treating similar conditions by different means?

The role of costing information has assumed a new and urgent significance. This has long been recognized in private industry where the calculation of costs and their usefulness in decision making is commonplace. It is only comparatively recently, however, that this recognition has spread to the area of public services planning. There are several reasons for this. In the main these services, health and education for example, have enjoyed widespread public and government support and a more or less uninterrupted real growth in resources since the war. The impetus for costing the services they provided was lacking from the financial quarter. Coupled with the difficult if not impossible task of measuring the output of the services, and hence obtaining useful or accurate cost information, this meant that enthusiasm for costing was not widespread in the health service. That this attitude prevailed was well demonstrated by a survey of 144 finance officers. (Montacute, 1962). Some 74% replied that costing had improved cost consciousness among hospital board and committee members and staff. However, 64% said that it had not helped in obtaining an equitable allocation of funds from the Regional Health Boards (20%; yes); 61% said that it had not helped them in distributing their authority's allocation over individual hospitals (21%; yes) and 54% said it had not assisted them in preparing their authority's estimates (24%; yes). Montacute rightly concluded that the costing system as it had been developed at that time was being seen merely as a financial exercise with little direct relevance

to other parts of the service. It had been naively expected that with the establishment of the NHS demand for health care would actually fall as the population became healthier as a whole and that expenditure would decrease in the years after 1948. However events soon proved this to be a fallacy; the total estimated running cost for the first nine months of the NHS was twice the original estimate (Rigden, 1983). From then on the government kept a close watch on expenditure.

By 1951 it was already decided to impose a ceiling on NHS expenditure and to introduce prescription charges. In 1953 a committee was set up (the Guillebaud committee) "to reveiw the present and prospective cost of the National Health Service" and to make recommendations on ways of keeping the costs down whilst maintaining the level of service (Report of the Committee of Enquiry into the Cost of the National Health Service, 1956). The difficulty in reconciling this desire to minimize costs on one hand with the principle of clinical freedom afforded to doctors on the other (in effect a blank cheque for resources) was pointed out by Richard Crossman when he was health minister (Crossman, 1972). This, incidentally, remains one of the more intractable problems yet to be solved satisfactorily for all sides. The periodic concern over spending by governments was never backed up with threats of a real reduction in funding, however, and so when this prospect became a reality in recent years suddenly the need for detailed information on costs has become of paramount importance. If another survey of finance officers were to be undertaken today it would be quite likely to show a dramatic difference in attitude to the utility of costing information. As the current system is still inadequate to cope with the demands for more and more detailed sub-hospital cost information (see Section 3 below) so an extensive literature has built up as researchers, outside the NHS, have attempted more precise modelling of costs at this level (eg. Ashford et al, 1981; Coverdale et al, 1980; Feldstein, 1967; Magee and Osmolski, 1979). The Royal Commission on the NHS also examined ways in making more information of this type available and recognized its importance (Royal Commission, 1978). Only with attention focussed on sub-hospital costs can the problems posed earlier begin to be adequately tackled.

3. The Development of a Costing System since 1948.

Since 1948 the NHS costing system has undergone four major changes with numerous, often annual, modifications in the form of presentation or the units of cost measurement - usually of a minor nature. Until the introduction of the current system in 1974, however, costing has always been something of a financial Cinderella. For many years the attitude prevailed that it was not worth its own costs of collection and its potential suffered because it was derived as a by-product of the annual financial accounts. These, being subjectively organised for each hospital, under such headings as salaries and wages, drugs and dressings, laundry, provisions, etc., were not geared to producing cost information which was relevant or easily applied to financial decision making. Although costing on a departmental basis was recommended almost from the start, it was not until the introduction of the Revised Accounting System (RAS) of 1974 that the first major attempt to integrate statutary financial accounts and cost accounts was made and cost accounting was given its proper recognition as a management tool. The RAS still has its weaknesses (see Section 4 below) but it makes a step in the right direction.

Before the nationalisation of Britain's health services in 1948, most hospitals were either voluntarily maintained or the responsibility of local authorities. With this fragmented and unco-ordinated management structure such costing systems as existed did so only in a limited fashion on an individual hospital basis. Most of the voluntary hospitals based their accounts on a scheme originally devised for the Queen's Hospital, Birmingham, in 1869 which had been revised in 1906 by the King's Fund and was known as the "Uniform System of Hospital Accounts". It was clear, however, that a national health service required much better accounting arrangements as central government funding became available on a large scale.

Acting under powers enabled by the 1946 National Health Service Act, the Minister issued regulations (SI 1414) in 1948 which introduced a system of uniform financial accounts to be prepared by each hospital authority (H.M. Govt., 1948). Provisions were also made for cost accounts to be kept, but this was vaguely worded:

> "Each Board of Governors and Hosptial Management Committee shall prepare annual cost accounts in such a form as the Minister may require..."

The reason was simple. A report was in preparation by a working group of treasurers of the Regional Hospital Boards (RHB) and Hospital Management Committees and the Minister was looking to them to provide a costing system which would work. An interim report was produced in 1950 which recommended that a simple form of costing should be introduced into all hospitals with a more elaborate system to follow at a later date pending further study and the intitial outcome of what now became known as the "interim system" (RHB, 1950). Accepting this report, the Minister introduced the Interim System via Circular 50(64) (Min. of Health, 1950). This was based on the uniform set of financial accounts which had been introduced by the 1948 statutory instrument. The accounts were organised subjectively; expenditure was listed under headings for each hospital covering all departments. The costing system followed this analysis and expenditure was summarized annually as "the average cost per week of maintaining a patient". There was a "notional adjustment" made to the total to allow for outpatients which was based on the somewhat arbitrary assumption that 5 outpatient attendances were the equivalent of 1 inpatient day in terms of the cost of resources utilised. Crude though this assumption was - and it was recognized as such - it remained in use until the introduction of the 1957 system. As Montacute (1962) noted the system had four main drawbacks:

(i) the arbitrary method of dealing with outpatient costs;
(ii) the impossibility of obtaining departmental costs;
(iii) the slowness in producing the figures;
(iv) their resultant unreliability as a basis either for action or comparison between hospitals, even those which appeared on the surface to be similar.

Meanwhile, outside of the NHS, the Nuffield Provincial Hospitals Trust (NPHT) had been conducting experiments in departmental and standard costing at Oxford and prepared a report on it for the Central Health Services Council. This council recommended to the Minister that the NPHT and the King's Fund should undertake further research in this area and report jointly on their findings. This the Minister invited both bodies to do so

in 1950 and in 1952 they published reports and a joint statement. The NPHT conducted its investigations in several provincial hospitals and concluded that:

(i) A national standard cost should be devised against which the costs of individual hospitals could be comapred.

(ii) Departmental costing should be introduced but limited to hospitals with more than 100 beds (because fewer than that number and the distinctions between departments become vague).

(iii) A suitable costing unit was the inpatient day - a statistic already routinely collected in the SH3 returns. (NPHT, 1952)

The King's Fund experimented with different types of costing systems in some London hospitals. Their main conclusions were similar to those of the NPHT:

(i) Replacement of the existing subjective cost system by a departmentally organised one, suitably modified for small hospital units.

(ii) Expenditure should be costed in terms of per unit of work performed.

(iii) The budgeting system should also be geared to run on departmental lines. (King's Fund, 1952)

In a joint statement they agreed on the basic principles of departmental costing (modified for small hospitals); that expenditure should be quoted on costs per unit of work performed; that budget preparation should also follow this approach and that normal accounting principles should be adopted in the health service. They differed, however, on the means and timing of implementing these ideas. The King's Fund preferred a gradual introduction of a departmental costing system to the NPHT's "straight in" proposal.

The distinction between prime and total costs was another area of difference. Prime cost differs from total cost for a hospital department because it does not include indirect expenses, i.e. services performed for one department by another. The NPHT considered that the use of prime cost, much easier to calculate, was sufficient to provide enough information for financial administration whereas the King's Fund argued that nothing short of a total cost approach would be satisfactory, especially when it came to

making inter-hospital comparisons.

Finally, they disagreed with the NPHT notion of "standard costs" as yardsticks of expenditure, preferring instead the idea of comparing actual costs incurred by a department against its budgeted costs.

These reports, regarded by both organisations as an "essential step" forward were published in the same year that the hospital treasurers followed up their Interim report with another - Hospital Cost Accounting (RHB, 1952). This envisaged a further extension of the interim report's proposals and while on one hand favouring departmental costing, ended up recommending continuation of the existing subjective cost classification scheme.

There was now gathering sufficient evidence that the existing costing system was seriously deficient and, as government expenditure on the health services continued to increase, that it would have to be replaced by a more accurate and informative system. The Minister consulted hospital organisations and concurred with their veiw that it "... would not be practicable to replace the present subjective accounting system by one based on departments and services of a hospital" (Min. of Health, 1955). Instead, a Working Party was set up in 1953 with the following terms of reference:

> "To devise a system of costing the departments and services of a hospital within the framework of a subjective accounting system ... with full regard to the present need to limit the cost in money and man-power of introducing and operating such a system to the minimum ..."
>
> (Min. of Health, 1955)

The Working Party reported in 1955 with proposals for a two-tier costing system; the "main scheme" for large acute hospitals and a modified scheme for the rest. This was in order to manimize the strain on hospital administration. The definition of large hospital hinged on annual expenditure. Those to be on the main scheme had >£100,000 expenditure per year (initially this figure was set at £150,000). When the scheme was introduced in 1957 there were 221 hospitals in this category. The intention of the main scheme was to produce costs combined over all wards (although it was recommended that a few non-teaching hospitals should be selected to experiment with more detailed ward costings). Hospital departments and services were divided into 3 main categories:

(i) Patients' departments - eg. wards, outpatient clinics;
(ii) Medical service departments - eg. physiotherapy, radiography;
(iii) General services - eg. laundry, administration.

Expenditure was classified along these lines but in addition clearing accounts were set up for the dispensary, cleaning and portering, and transport. In these accounts expenditure would be recorded prior to reallocation to other departments and services. Costs were expressed in various units of measurement. For patients' departments, for example, ward costs were expressed in per patient per week terms and also per case; while for outpatient departments per new outpatient attendance and per new outpatient were used (Table I). A costing committee was set up by the Minister to prepare a standard classification of expenditure on salaries, materials and services to ensure a uniformity in allocating expenditure, both direct and indirect.

For the other hospitals the Working Party regarded the introduction of full departmental costing schemes as a long term objective. In the meantime they would retain the subjective accounting system from which costs were derived. Where a hospital had a large outpatients department the split in expenditure between inpatients and outpatients was to be estimated locally. Capital and depreciation costs were decided as impracticable to account for in either scheme.

It was announced that the Working Party recommendations would be adopted and, with a few minor modifications to some cost units, the system was introduced by Circular (56)77 (Min. of Health, 1957). The experimental ward costing schemes were dropped, but hospitals were given the freedom to extend the main scheme where they thought fit. The idea of interim cost statements - another Working Party idea - was "strongly supported" by the Minister and it was intended that these would become fully operative by the end of 1957 "at the latest".

Montacute, in his review of the first 3 years of the 1957 system, surveyed 144 hospital management committees and examined not only the speed and frequency of preparation of these interim statements, but also the attitudes of the boards and staff involved in their preparation and analysis. With regard to frequency of preparation the Minister was encouraging quarterly, preferably monthly, statements in addition to the statutory annual returns. The survey revealed that only 33% of Boards completed quarterly statements and very few did them on a monthly basis. Similarly

disappointing was the speed at which they were completed. Only 10% were done within 4 weeks and only 2% of authorities attempted to link the costings in any way to department budgets. (As much as anything, Montacute noted, this was due to a lack of departmental budget systems.) A lack of time and commitment were the chief reasons given for not preparing the interim cost statements, but it was noticeable that amongst those Boards which did make the effort, 75% recorded the statements as having a positive impact on their management and planning.

He went on to assess the 1957 system in terms of its ability to meet the needs of the hospital service. One aspect of costing highlighted as being contentious was whether prime costing or total costing approaches should be used. The treasurers and the King's Fund preferred the latter; the NPHT, the former. The views of the 144 finance officers surveyed came down in favour of the prime cost approach (49% as opposed to 28%) for both annual and interim statements not least because the figures were easier to produce. In Montacute's opinion the 1957 main scheme and modified arrangements did not provide the right sort of information for management purposes because it failed to make sufficient distinction between treatment and non-treatment costs. This was especially true of the modified scheme. Total patient week and case costs were, it was argued, of little value for management efficiency studies and it was of more value to look at treatment and non-treatment elements separately. The distinction between fixed and variable costs which the 1957 system did not bring out was another criticism, as was the lack of integration between the financial and cost accounts. Montacute also commented in detail about the actual cost units employed. The need for accuracy of statistical recording, for speedy compilation of interim statements to be of use to management and for adequate presentation and dissemination of this information was stressed. Costing, he concluded, was at the crossroads. Initial enthusiasm had waned, but there were signs that given a more dynamic ministerial attitude and well trained hospital officers it could be made to succeed.

Several years forward from this exhaustive study, it was decided that further changes were necessary. Few authorities had been able to extend the main scheme to other hospitals and there was still a dearth of interim cost statements being produced regularly. "Systems failure was interpreted as a costing failure" (The Hospital, 1971).

In 1965 Circular (65)90 (Min. of Health, 1965) briefly reviewed the working of the two-tier system and introduced new proposals. The 1957 scheme was found "useful" for local hospital comparisons on an annual basis, but much less so for current control. The figures for "hotel" services had been the most reliable for inter-hospital comparisons. Despite these problems, however, more use was being made of costing figures in deciding the allocation of revenue funds and the general picture was one of "partial success". The new proposals were an attempt to correct some of the system's deficiencies which were listed as:

(i) The existence of two costing schemes
(ii) The inadequacy of the medical service performance indicators.
(iii) A failure to associate new hospital activities with suitable cost units and to show them separately in the expenditure analysis.
(iv) The "unnecessary complication" of reallocating indirect expenditure to certain departments.
(v) The division into ward and outpatient department costs only gave little contribution to the study of the consequences of alternative treatments.
(vi) The "lukewarm" reception to the system by management due to the technical difficulties and the feeling that it was just not worth the bother.

None of these problems was regarded as intractible especially with "the growing use of computers". The changes were to apply to all hospitals and, it was emphasised again, not to be used just for a financial exercise but as a basis for management decisions. Hospitals were encouraged to develop their own costing schemes over and above the national requirements. The intention was to improve internal control and forward planning by:

(i) Increasing the number of cost centres (eg. operating theatres).
(ii) Limiting of charges to these centres to staffing and major expenditure subject to control by a head of department.
(iii) Re-allocation of non-treatment services over treatment accounts was discontinued.
(iv) A reduction in the re-allocation of costs between non-treatment accounts.

(v) Modification in the method of allocating expenditure between inpatients and outpatients.

Explanatory notes, form of cost statements and standard analyses of salaries and expenditure (along the lines of the 1957 system) were issued and the new system came into effect in 1966. It was still regarded, however, as impractical to change from a subjective to a departmental costing system as the accounting system as a whole was still subjectively based. Despite some improvements, criticism of cost accounting continued in the late 1960s and early 1970s. Baddeley and Tagg (1968) examined these allegations which had changed little since the 1950s. Information was still arriving too late to be of use in current management; the breakdown of expenditure was too simple; and there were still the fears that producing the information would be too costly an exercise in its own right. The perennial plea was made for the link between financial accounting, cost accounting and budgetary control on departmental lines.

In the same year, the King's Fund organised a conference on "Better Management from Costing" and invited Baddeley and others to undertake an experiment in departmental management accounting. In 1970 the results were presented (Tagg, Beddeley and Hall, 1970). The old criticisms of the existing system were reiterated and the experiment regarded as a worthwhile exercise justifying the extra work entailed in organising the information on departmental lines.

In general, the trend of criticism began to move away from the costing system itself and look at it in relation with other aspects of accounting. The Hospital (1971) quoted the problem as one of "rationalising the total accounting system rather than one of sharpening the costing tool", and pressure for the merging of all aspects of financial management was beginning to emerge (King's Fund, 1973).

In 1972 the Committee of Regional Treasurers appointed a committee to examine the DHSS proposals for the forthcoming 1974 reorganisation of the health service. The Revised Accounting System (R.A.S.) as it was known was the first attempt at an all embracing cost and financial accounting framework aimed at departmental management within the hospital. A series of letters in 1972 and 1973 to treasurers outlined the details of the R.A.S. and a manual followed (DHSS, 1972). In 1974 a statutory instrument specifying the form of the annual accounts appeared implementing the R.A.S.

philosophy (H.M. Govt., 1974). Statutory accounts were not to be prepared on a functional basis with a distinction being made between those expenses expected to vary in accordance with the nature of patient care given and essentially under the control of medical staff, and general service expenses which, it was assumed, did not vary with the level of patient care provided. These accounts would be analysed by function and also by patient type for each hospital unit. They would serve as one integrated system of financial and cost information and were also intended to serve as a basis for locally prescribed functional budgets. To eradicate "cross-accounting" between functions the principle was adopted that each account would only contain such expenditure as was the direct responsibility of that functional head. In addition to the primary and secondary analysis it was also intended to introduce a teriary analysis with the patient care functions being analysed by main medical specialty group. It was recognized that this was something of a compromise (i.e. looking at groups of specialties rather than each individually) but it was considered that this would still be able to produce much useful management information and enable direct comparisons of relative costs of specialty groups at both local and national levels. It would also serve as a pointer for more detailed investigations of individual specialties on an ad hoc basis.

In fact tertiary analysis has yet to be implemented as a statutory requirement. A revised version of the Manual for Accounts (with minor changes only) was issued in 1977 (DHSS, 1977) and is the current basis for compiling the annual accounts. That manual does not mention tertiary analysis at all; it refers to work in progress in evaluating further stages of analysis but offers no general guidance. It does, however, encourage authorities to produce secondary analyses more frequently than the once a year statutory requirement if they see fit and encourages local initiatives to take costing further.

4. The Current Costing System

The current costing system is based on the 1977 Manual for Accounts and involves health authorities presenting an annual analysis by hospital to the DHSS. These figures are compiled and published as the annual Hospital Costing Returns series (eg. DHSS, 1982). There are two main headings which distinguish expenditure between patient care services and general services. Expenses under the former heading are regarded as being mostly determined by medical staff and related to the demands of the patient being treated. General services expenditure, assumed not to vary with the nature of care provided, represents the hotel costs of patient care and the non-medical services.

There are two forms of analysis. Primary analysis lists expenditure under each of the two headings by categories such as medical staff salaries, pathology, catering, etc. (see Table II). There is detailed advice given in the Manual for Accounts as to what expenditure should come under which heading. For example "medical staff services" includes the salaries and wages of all full-time and part-time medical staff except those who spend a "large proportion" of their time in the pathology or radiography departments and whose salaries are to be recorded under these headings respectively. The secondary analysis consists of the primary analysis by patient type where these are inpatients, outpatients, day patients, day cases and accident and emergency (A & E) cases. These figures come from the routinely collected SH3 patient statistics. The following units of costing are then available and are used in the annual Hospital Costing Returns:

(i) Per inpatient day, per inpatient case
(ii) Per outpatient attendance, per new outpatient
(iii) Per A & E patient, per new A & E patient
(iv) Per day patient attendance, per new day patient
(v) Per day case attendance.

In addition each hospital is required to produce memorandum accounts for certain functions which have different elements of their expenditure under the control of different functional heads. These are:

(i) Central sterile supplies and dressings (CSSD)
(ii) Operating theatres

(iii) Intensive care units
(iv) Staff housing
(v) Day nurseries
(vi) Staff residences.

Some of the categories already listed in the primary analysis have a further set of cost statements relating costs to measures of workload (Table III). The technical services account including laundries, boiler house, energy and utility consumption and building and engineering maintenance even requires weekly, monthly and quarterly returns in some instances.

For national and regional comparative purposes, all hospitals are classified into one of 19 official types. These categories range from single specialty hospitals to multi-specialty acute hospitals which are, in turn, divided into 4 groups according to bed size (Table IV).

A number of issues are immediately raised in terms of the accuracy of cost information derived from this method of accounting. To begin with these is the accuracy of the statistics. The SH3 returns are calendar year statistics but the financial year runs from April. Figures have to be juggled to allow for this, and there are also doubts cast on the accuracy of the SH3 returns themselves. The scope for coding errors in both the patient statistics and cost analyses is great and the guidance issued by the DHSS on classifying expenditure often leaves the final decision on an ambiguous point to local discretion. The broad classification of hospital types is another source of error. There can be great differences in case mix between acute hospitals in the same category; costs depend on a lot more than just a crude classification of hospital by the predominant type of patient. The same goes for the classification of patients within a hospital. All inpatients are recognized only as one group; of course there will be a great range of costs dependent on length of stay, course of treatment, etc., but this is not picked up. These unit costs are spread over a year and may not show variations in resource or treatment costs within that period. Allied with that is the concept of marginal costing. Some expenses vary considerably with workload, others are fixed in the medium to long term, but the costing system does not recognize these differences; producing instead average costs over a year which are not suitable for short-run planning. Finally, there is the question of

what is an appropriate cost unit. This has been a source of much of the criticism directed at costing in the past. Montacute (1962) reviewed the situation and found that on the whole the general service department cost units - hotel costs - were easier to define and use than those of administrative and medical service departments. Pathology was cited as a good example of the application of an inappropriate unit. The Working Party which was the instigator of the 1957 system had also suggested cost units which might be used. For pathology this was a unit on a weighted basis, but in 1958 this was changed to a "per request" basis making all examinations of equal value even if they obviously were not. This did nothing to enhance the credibility of costing in the eyes of financial and medical staff alike.

The particular problem of medical department cost units remains; more detailed investigation is still required for individual units and they need to be kept under constant review as techniques change. This in itself is a problem because not all hospital departments have the same standards of equipment or procedures which makes uniform application of a cost unit difficult over the whole country.

5. Future Prospects

In the introduction mention was made of research work being carried on, both within and without the NHS, into hospital costs at a sub-hospital level. It is at that level of detail that a costing system would be most beneficial for financial planning and management. The DHSS is monitoring progress in this field and has carried out some trials in certain districts of some of these techniques. This may lead to future long term changes in the existing system. Most of the work has concentrated on deriving specialty costs; i.e. the cost of treating an individual patient in a particular hospital specialty such as ophthalmology or general surgery, and there are two main approaches to the work. A more detailed review of specialty costing will be the subject of another paper (Forte, 1983) but a brief outline is presented here as an indication of the potential development of NHS costing.

There are two main approaches to establishing specialty costs; modelling techniques based on regression analysis and the cost accounting method. Of the former group there are those who adopt an empirical approach

with no prior assumptions as to the structure of the inpatient costs and those who have developed an "economic" model (Butts and Ashford, 1977) which assumes that costs are based on such an existing structure. Regression analysis is used in either case to establish a model which relates revenue expenditure of a hospital to the factors which are presumed to have an influence on that expenditure. Beds and/or cases are used as measures of resource use and the model tested on historical data to determine how much of the differences in total costs between hospitals can be explained by variations in workload or resources.

The other main approach, developed by Magee and Osmolski (1979) involves a detailed cost accounting exercise in individual hospitals with allocation and apportionment of costs by specialty in a much more exhaustive manner than the existing system works on. Although the technique is readily transferable to other hospitals, comparability may not be and it has been proposed that a series of average standard costs derived for different hospital types which hospitals could then compare their own costs with (Magee, 1981). Trials of this system have been done by the DHSS in several hospitals around the country, and several districts have carried out investigations of their own using these systems. A recent study (Beresford and Elliot, 1982) compared the two methods in one district over a month, concluding that regression models were useful for broad planning purposes but less so for management control and that cost accounting techniques might prove useful in refining regression estimates in the future.

A third method - patient costing - of analysing inpatient costs has been studies by a few researchers (Babson, 1973; Piachaud and Weddell, 1972). This takes us one step beyond specialty costing and examines the cost of treating an individual with particular clinical characteristics. One of its main drawbacks at present is the amount of information required regarding resource consumption by patients and detailed work measurements studies. Once that information has been obtained, however, it would be a relatively straightforward matter to group patients in different ways - not necessarily on specialty lines - and, with costs per unit established, "charge" to their account the resources they use. The advantage of a system like this lies in its flexibility. Costs could be portrayed not only by specialty but by consultant or by disease type or even by

individual patient. However, there are still problems to be overcome, not least the collection of the necessary data, before such a system could be employed widely.

Costing at the sub-hospital level depends as much on good quality patient statistics as on actual cost data and if this becomes available the potential for future costing systems which would be more effective for planning and day to day control would be enormous. The reports produced by the Körmer committee on information systems in the NHS could provide a major stimulus in this direction and the introduction of more advanced computer technology at the district level certainly will. With this in prospect a fifth generation costing system for the NHS may not be far off which would provide the most accurate picture of costs to date.

References

Ashford, J.R., Butts, M.S., Bailey, T.C. (1981) "Is there still a place for independent research into issues of public policy in England and Wales in the 1980s? - modelling hospital costs". J. Op. Res. Soc., 32, pp. 851-64.

Babson, J.H. (1973) Disease Costing. M.U.P., Manchester.

Baddeley, S., Tagg, T.A.J. (1968) "Better financial management in hospitals" The Hospital, Aug. 1968, pp. 272-76.

Beresford, J.C., Elliot, G.C. (1982) "Specialty costs at two general hospitals: "actual" v "regression" approach - a comparative study". Hosp. & Hlth. Ser. Rev., Nov./Dec., 1982, pp. 296-99.

Butts, M.S., Ashford, J.R. (1977) "A framework for planning hospital services". In: McLachlan, G. (Ed.) Framework and Design for Planning, O.U.P. for N.P.H.T., London.

Coverdale, I., Gibbs, R., Nurse, K. (1980) "A hospital cost model for policy analysis". J. Op. Res. Soc., 31, pp. 801-11.

Crossman, R. (1972) A politicians view of Health Service planning. Maurice Bloch Lecture 13, University of Glasgow.

DHSS (1972) The Reorganisation: Manual for Accounts System, DHSS, London.

DHSS (1977) Manual for Accounts, DHSS, London.

DHSS (1983) Health Services Costing Returns (1981/82), H.M.S.O., London.

Feldstein, M.S. (1967) "Economic analysis for health service efficiency", Contribution to Economic Analysis 51. North Holland, Amsterdam.

Forte, P.G.L. (198-, forthcoming) Specialty costing for hospitals: a review. School of Geography, Working Paper, University of Leeds.

H.M. Govt. (1948) National Health Service (Hospital Accounts and Financial Provisions) Regulations. Statutory Instrument 1414, HMSO, London.

H.M. Govt. (1974) National Health Service Financial (No. 2) Regulations. Statutory Instrument 541, HMSO, London.

H.M. Govt. (1983) Governments Expenditure Plans 1983-84. Cmnd 8789, HMSO, London.

King Edward's Hospital Fund for London (1952) Report on Costing Investigation for the Ministry of Health. K.E.H.F., London.

King Edward's Hospital Fund for London (1973) Accounting for Health. K.E.H.F., London.

Magee, C.C. (1981) "The potential for specialty costing in the NHS". Pub. Fin. & Acc., Mar. 1981, pp. 41-44.

Magee, C.C. and Osmolski, R.J. (1978) "A comprehensive system of management information for financial planning decision making and control in the hospital service". Technical Paper for the Royal Commission on the NHS, University of Warwick.

Ministry of Health (1950) Hospital Cost Accounting. Circular (50) 64, Min. of Health, London.

Ministry of Health (1955) Report of the Working Party on Hospital Costing. HMSO, London.

Ministry of Health (1956) Hospital Costing. Circular (56) 77, Min. of Health, London.

Ministry of Health (1965) Hospital Costing. Circular (65) 90, Min. of Health, London.

Montacute, C. (1962) Costing and Efficiency in Hospitals. O.U.P. for N.P.H.T., London.

Nuffield Provincial Hospitals Trust (1952) Report of an Experiment in Hospital Costing. N.P.H.T., London.

Piachaud, D., Weddell, J.M. (1972) "The economics of treating varicose veins". Intl. Jl. of Epid., 1, pp. 287-94.

Regional Hospital Board Treasurer's Committee (1950) Interim Report of the Costing Sub-Committee.

Regional Hospital Board Treasurer's Committee (1952) Hospital Cost Accounting.

Report of the Committee of Enquiry into the cost of the National Health Service (Guillebaud Committee) (1956) Cmnd. 9663, HMSO, London.

Rigden, M.S. (1983) Health Service Finance and Accounting, Heinemann, London.

Royal Commission on the National Health Service (1978) Management of Financial Resources in the NHS, Research Paper No. 2, HMSO, London.

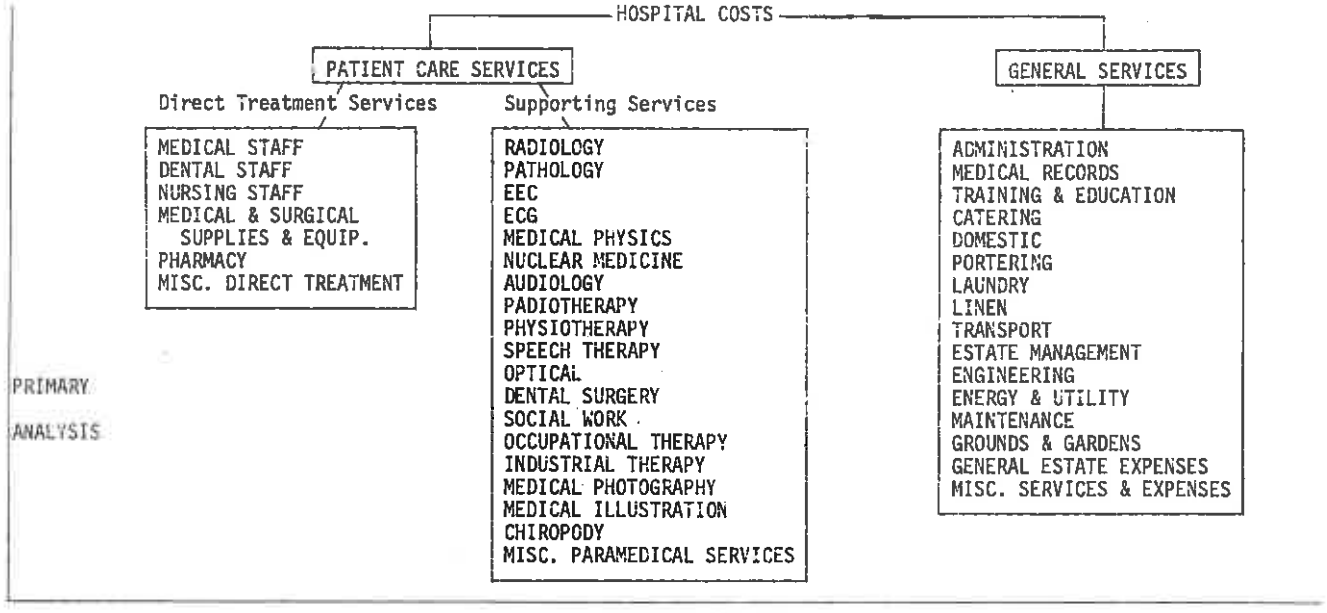
Steering Group on Health Services Information (Körner Report) (1982) First Report to the Secretary of State. HMSO, London.

Tagg, T.A.J., Baddeley, S., Hall, E.A. (1970) "Experiment in management accounting" The Hospital, Oct. 1970, pp. 341-46.

The Hospital (1971) Notes for Students : Hospital Costing. The Hospital, Mar., 1971, p. 101.

TABLE I: 1957 Main Costing Scheme: Cost Units.

Department	Cost Unit
Wards (inpatients)	i. Per patient per week
	ii. Per case
Outpatients (incl. casualty)	i. Per outpatient attendance
	ii. Per new outpatient
Radiotherapy	Per course of treatment per day
Diagnostic X-ray	Per 100 weighted units
Pathology	Per 100 requests
Physiotherapy	Per 100 weighted units
Operating Theatres	Per operation
Medical Records	Per weighted unit
Works and Maintenance	Per 1000 cubic feet of space
Boiler house (steam)	Per 1000 lbs steam raised
Laundry	i. Per 1000 weighted units
	ii. Per 100 articles laundered
Catering	Per person fed per week
Staff Residences	Per resident per week
Administration	i. Total expenditure
	ii. Proportion relating to inpatients
	iii. Proportion relating to outpatients



SECONDARY ANALYSIS OF EACH ELEMENT BY

IN-PATIENT DAY IN-PATIENT CASE	OUT-PATIENT ATTENDANCE NEW OUT-PATIENT	A/E PATIENT NEW A/E PATIENT
DAY PATIENT ATTENDANCE NEW DAY PATIENT		DAY CASE ATTENDANCE

TABLE II: Current Costing System: Primary and Secondary Analysis Headings.

	Function	Cost Unit
	Catering	Per patient fed per day
	Laundry	Per 100 articles processed
	Boiler House (steam)	Per 1000 lbs of steam raised at 212°F
	Boiler House (high and medium temp. hot water)	Per 1 million BUTs
	Energy and Utility	Per 100m³ of heated buildings
	Maintenance	Per 100m³
	Radiography	Per 100 weighted work units
*	Operating Theatre	Per operation/per operating hour
*	Intensive Care Units	Per patient day/per available bed day
*	Staff Accommodation	Per resident weeks/per available place week

* Separate memorandum account

TABLE III: Additional Cost Analyses, Current Costing System.

TABLE IV : NHS Hospital Classification.

All hospitals are classified for costing purposes into one or other of a series of standard types which reflect the principal use to which their beds are allocated. The types currently in use and the corresponding definitions are shown in the following table.

Type of Hospital		
1	Acute	Hospitals with not more than 15 per cent of their beds allocated to the "excluded departments".
2	Mainly Acute	Hospitals with more than 15 per cent and up to 40 per cent of their beds allocated to the "excluded departments".
3	Partly Acute	Hospitals with more than 40 per cent and up to 60 per cent of their beds allocated to the "excluded departments".
4	Mainly Long-Stay	Hospitals with more than 60 per cent and up to 85 per cent of their beds allocated to the "excluded departments".
5	Long Stay	Hospitals with more than 85 per cent of their beds allocated to the "excluded departments".
6	Geriatric	Hospitals with 90 per cent or more of their beds allocated to that one function.
7	Preconvalescent	Hospitals with 90 per cent or more of their beds allocated to patients who have already received elsewhere the most intensive part of their treatment but who still require active nursing care and medical oversight.
8	Convalescent	Hospitals with 90 per cent or more of their beds allocated to patients recovering from a disability who no longer require active medical supervision or nursing care in bed though they may need such simple nursing procedures as renewal of dressings or the administration of medicines.
9	Rehabilitation	Hospitals with 90 per cent or more of their beds allocated to patients who no longer require nursing care in bed and who, with or without the aid of appliances, can get about and attend to their own needs with occasional assistance but who require remedial and re-educative treatment with a view to their attaining the maximum degree of recovery of use of functions.
10	Isolation	Hospitals with 90 per cent or more of their beds allocated to infectious diseases.
11	Maternity	Hospitals (including General Practice Maternity Hospitals) with 90 per cent or more of their beds allocated to obstetrics.
12	Psychiatric (Mental Illness)	Hospitals with 90 per cent or more of their beds allocated to mental disorder and 50 per cent or more of the psychiatric beds allocated to mental illness.
13	Psychiatric (Mental Handicap)	Hospitals with 90 per cent or more of their beds allocated to mental disorder and more than 50 per cent of their psychiatric beds allocated to handicapped and/or severely handicapped patients.
14	Orthopaedic	Hospitals with 90 per cent or more of their beds allocated to traumatic and orthopaedic surgery, including bone and joint tuberculosis.
15	Tuberculosis and Chest	Hospitals with 90 per cent or more of their beds allocated to tuberculosis (both respiratory and non-respiratory) or diseases of the chest (including thoracic surgery) or both.
16	Tuberculosis and Chest and Isolation	Hospitals with 90 per cent or more of their beds allocated to tuberculosis (both respiratory and non-respiratory) or diseases of the chest (including thoracic surgery) or both, and infectious diseases.
17	Children's (Acute)	Hospitals with 90 per cent or more of their beds allocated as in Type 1 but for children only.
18	Eye	Hospitals with 90 per cent or more of their beds allocated to that one function.
19	Other Hospitals	This group covers a variety of hospitals not clearly falling into any of the foregoing types and average costs are not calculated.
20	Day Hospitals	Hospitals with no residential facilities.
30	Hospital Clinics	Hospital-based clinics with no facilities for resident or day case patients.

Notes 1. "Excluded departments" referred to in the above definitions are those used for mental illness, child psychiatry, adolescent psychiatry, mental handicap, diseases of the chest, units for younger disabled and convalescence (including rehabilitation but not pre-convalescence).

2. In the tables that follow, acute hospitals have for greater accuracy been sub-divided into 4 size bands, viz: Over 300 beds, 101-300 beds, 51-100 beds and 1-50 beds.