COST INFORMATION AS AN AID IN DECISION-MAKING:

WITH PARTICULAR REFERENCE TO HOSPITALS

BY

A M RAGAB

A thesis submitted for the degree of

Doctor of Philosophy

in the

University of Kent at Canterbury

Accounting Department
1975

TO MY WIFE

PREFACE

My greatest debt is to my supervisor, Professor P A Bird. His frequent help and his careful reading of the entire thesis greatly improved the work and saved me from a number of errors.

My thanks to Mrs J Cox who has supervised me in a period of my study.

Thanks to a wife usually come after all other acknowledgements. I express my great debt to Ekram for her great assistance.

I have received some information from a number of people in the Health Centre at the University of Kent.

Finally, I am happy to thank Mrs E van de Hurste for typing the thesis with speed and accuracy.

A M RAGAB

ABSTRACT

The absence or the ineffectiveness of input-output information for the activities of the public sector is always recognized as a serious problem. This is because it represents a solid obstacle facing the application of effective control and preventing access to a significant aid for policy decisions and the choice between alternatives. The reason for this problem is the absence of a costing system or the ineffectiveness of the reported information. Since the first years of the National Health Service (NHS) and till very recently, different costing systems were introduced respectively for the hospital. Unfortunately, none of them has succeeded in providing the information which enables meeting the requirements of effective control and planning. It is a fact that the decision involving resource allocation is a political decision, and the choice of the decision-maker is between benefits. But in order to assist the decision-maker in general, and in relation to the health sector, for instance, it is essential to have costing information on the activities producing the intermediate outputs which comprise the final output. The hospital has a particular significance, because the hospital is the consumer of the lion's share of the NHS budget and it comprises different activities in achieving many of the health programmes. In spite of the importance of the information on the performance level of these activities for the internal manager, the programme manager and for preparing the planner's requests, that should not be oversold or provided at the expense of other essential types of information, such as that required for vote accounting. Therefore, in designing an accounting system for the hospital, the system should provide the information which is regularly demanded. Chapter 1 deals generally with the factors affecting the decision of resource allocation, pinpointing the problem of public expenditure, and gives brief of the possible contribution of hospital costing system by shedding light on the big decision problems outlined. A social and political background of health services is the concern of Chapter 2. An example of decision analysis in the public sector is introduced in Chapter 3 by presenting an analysis of the issue of reorganising the NHS. The question of performance budgeting in the non-trading activities, explanation of the past misunderstanding of its real role and the obstacle in the way of its implementation are the concern of Chapter 4. In fact, the importance of performance

budgeting has been increased (and therefore the importance of adequate costing system) by the introduction of Planning Programming Budgeting System (PPBS). The importance of adequate costing system, for establishing performance budgeting, which is a prerequisite for the implementation of PPBS for facilitating the analyst's role and for achieving the accountant's objectives, is presented in Chapter 5. The same chapter is concerned with the components of PPBS and focuses attention on some problems in cost-benefit studies. Chapter 6 deals with an application of the principles of PPBS to a health problem, and shows the effect of a lack of costing information, particularly for hospital activities, which stands as a real obstacle in making cost-benefit analysis. Chapter 7 deals first with the analyses of the shortcomings and advantages associated with different costing systems introduced for the hospital; secondly, with the analyses of the costing methodologies used in three researches in the area of disease costing; thirdly, with answers to the following two questions: What should hospital costing systems report for achieving effective control ? and What decisions is the information from a hospital costing system supposed to assist ?

CONTENTS

1 RESOURCE ALLOCATION AND THE PROBLEM OF PUBLIC EXPENDITURE

1.1 Introduction

Choice is an essential notion which is experienced in taking a specific decision either by a simple individual or by a complex institution. Also it occurs during the selection of the procedure necessary to put the decision into action. This is not a once-and-for-all occurrence, but has an almost continuous nature. Choice is not only related to the unmet needs of individual groups and their possible alternatives, but also to needs being met, and their possible alternatives. Needs and related actions, both in quantity and quality, must be considered as dynamic systems, because of the available degrees of knowledge, information, technology and social behaviour. To ensure that a choice is rational, in the relative sense, it seems preferable to look at the field of choice incrementally rather than revolutionarily. A plausible plan which is cyclic and iterative should be based on lessons learned from past experience and on a proper study of the foreseen future environment. The availability of alternatives is a condition for the working of the choice process. The choice between public and private sectors for the provision of an output is an example. Another example is the choice between current expenditure, which leads to consumption, and capital expenditure, which leads to investment, i.e. the choice between the flow of benefit in short and long terms.

Government activities can be classified into the three following categories:

a Public Output concerns goods or services with an "unrivalled" characteristic; their enjoyment by an individual does not reduce the amount available for enjoyment by others. Because of the nature of their common benefits, they cannot be provided in a market through pricing mechanism. They are provided under the public sector and this is due to the ability of a government to coerce individuals in paying contributions through the tax system.

Defence, Law and Order, Public Health and Environmental Control are examples. Every individual has the right to enjoy the same benefits of each service or group of services, regardless of his contribution to their cost. This does not mean that each individual attaches the same value to a specific service. It is easy to find an individual who undervalues such benefits and is less willing to pay than others.

b The Quasi Public Output concerns goods or services rendered to individuals free of charge or on a basis not fully related to the rendered service. In spite of the feasibility of pricing mechanism system, it would not be adequate to produce the required quantity and quality of such output. The government may decide to provide such an output for the purpose of re-distributing income, and/or to reduce the size of externalities associated with the private sector producing that output. The National Health Service in the United Kingdom is mostly under this category.

c Private Output, which is publicly financed, concerns goods and services provided for individuals as in the case of privately owned business. The criteria of business are usually applied except when social factors are considered (e.g. the distribution of railway fares in the UK). The consumer may register his preference in a market, a situation which was lacking in both a and b.

Section 1.2 deals with the choice between the private and public sectors in different systems. The difference between the unwillingness and inability of the private sector with regard to the production of an output is analysed in section 1.3. Section 1.4 deals briefly with the question of externalities. The problem of public expenditure is defined in section 1.5.

1.2 Tendencies in Different Systems

The choice between the private and public sectors is a fundamental problem without a general solution. In fact the dominant political ideology

is always the basis on which the size of both the public and private sectors will be determined. Capitalism and Socialism are two relatively modern phenomena (last 500 years at most), and both are versions of a material advancement cult. Believers in capitalism consider private enterprise operating in a market economy, as the most efficient means to meet individual desires, or most of them. Accordingly, governmental role should not extend beyond what was later regarded as the lgitimate or genuine public outputs, e.g. defence, law and order. If the government wishes to make changes in the actual distribution of income, a promising means without causing any distortion in the process of resource allocation is income transfer through taxes and subsidies systems. Believers in socialism consider public enterprise, operating in a planned economy, as the most efficient means to satisfy public interests or most of them, and thus most of individual desires will be met. Accordingly, the private sector, or a great part of it, has to be abolished completely, with the result of a great reduction in private ownership. Then public ownership of the means of production would be the fundamental principle.

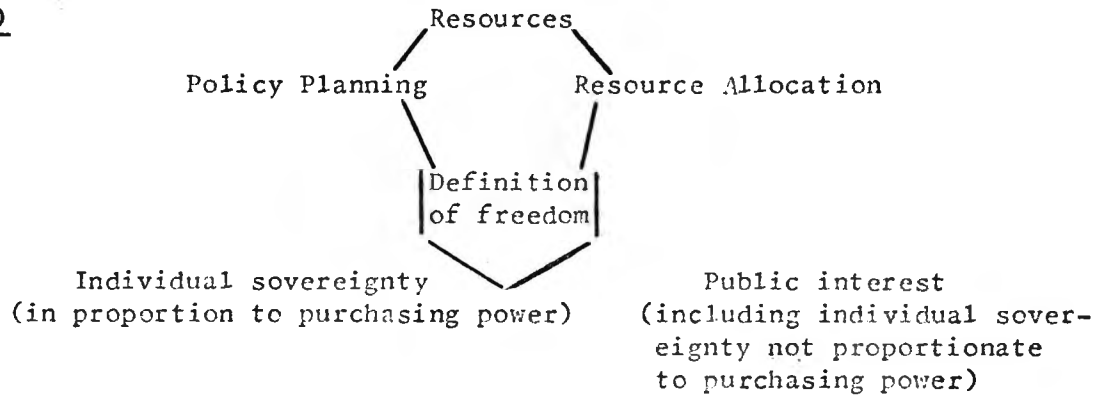
Nevertheless, it is difficult to find a country where the principles of capitalism are applied in all its entities. For the role of governments guided by capitalism has extended in recent years far beyond strictly "public goods" into output to which it is quite possible to apply the exclusion principle (which states that a person could be excluded from being a member of the beneficiary group of an output when he does not pay the price). The recent increase in government intervention may be justified by one or more of the following reasons: unwillingness of the private sector, bias associated with unregulated private monopoly, the consideration of externalities, and as a way of achieving government objectives like income redistribution. The recent increase in government intervention takes different forms in different countries. In the industrial field,

public provision guided by the principles of private management is mainly the case in the UK, but in the USA private industry controlled by government regulation is mainly the case.

For governments guided by socialist principles the private sector has never been abolished completely; even in the USSR permission is given to some minor private activities e.g. marketing small percentages of a few products in collective farms and limited home products. Besides, retaining the means of production in public ownership by such governments, some management principles of the private enterprise are already applied. For instance in the USSR there were two economic reforms, in 1965 and in 1969.[1] The use of sales volume, profit and profitability in measuring enterprise efficiency instead of gross output and cost reduction was introduced in 1965. The principle of discounted cash flow for investment appraisal was introduced in 1969.

"Public Output" alone does not raise any question of choice between the public and private sectors. The government has to secure, in respect of the decided level, the satisfaction of the consumers' common unrivalled needs, free of charge. The open question is about the other two types as shown in figure (1), assuming that the location of "Public Output" is outside the picture. In spite of the growing tendency to increase the govern-

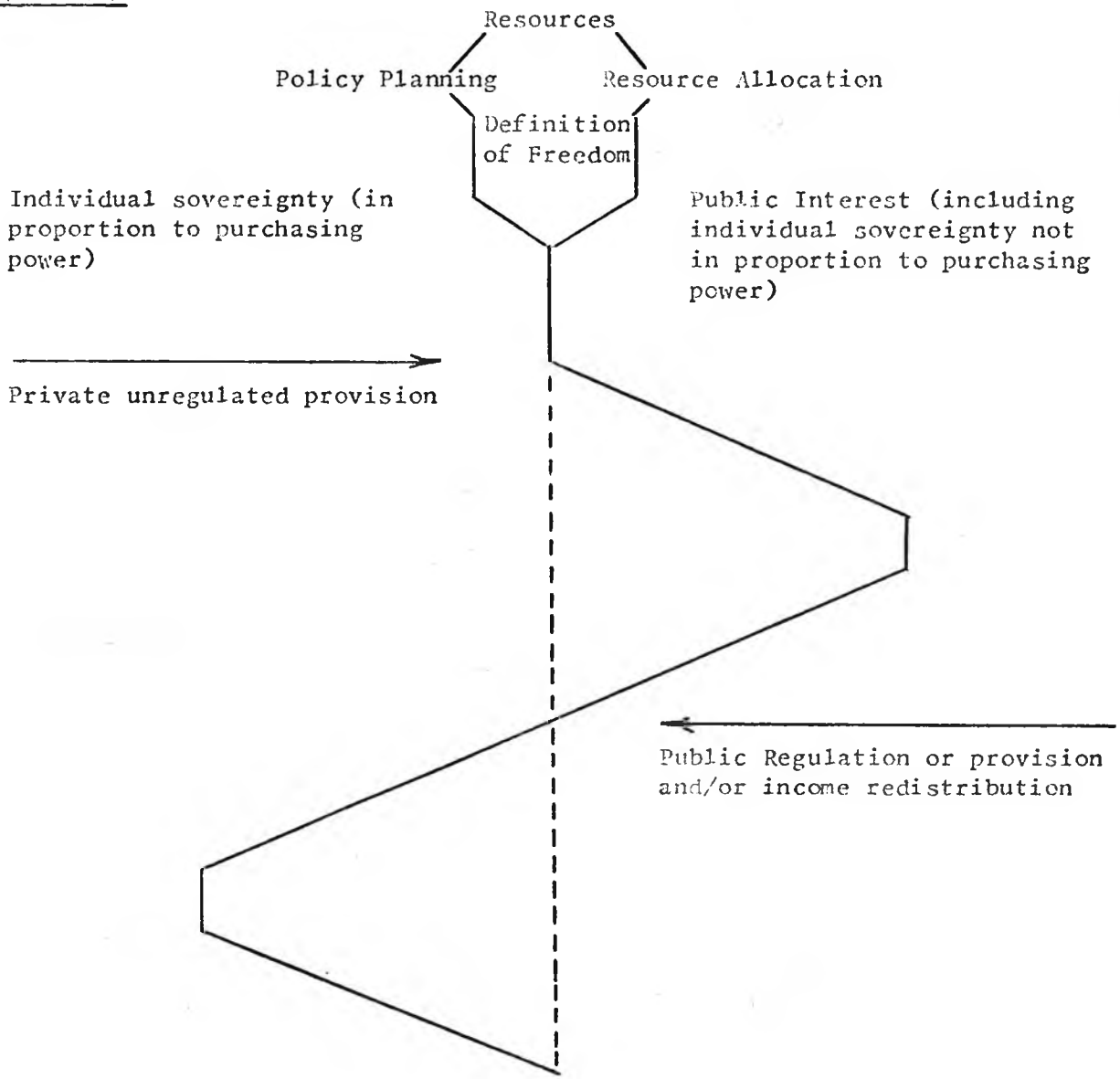
Figure (1)



1 K T Maunders, Financial Management in the Soviet Industrial Enterprise, Accounting and Business Research No. 8, Autumn 1972.

ment's role in relation to quasi-public output, we cannot generalise here; we can only state the indication of the tendency. (In this regard, in the second chapter we will analyse the situation of the health service under a) a private unregulated market, b) an insurance system, and c) the NHS system.) Where the line is drawn is a matter of political ideology. When it is decided to reduce the role of the government, the line will move to the right and when the role of the government increases, the line will move to the left (Figure (2)). When political ideology decides to take a mixed view, the line will be near the middle.

Figure (2)



1.3 Private Sector - The Unwillingness and Inability

It is difficult to discuss the private sector in terms of perfect competition or an ideal pricing system (i.e. output produced at the level where price equals marginal cost), or the freedom of choice by individuals. In practice, competition is reduced drastically and in some cases is fully replaced by a private monopoly. The artificiality in the pricing system makes the situation far from ideal. Free choice becomes only a theoretical condition when the consumer's complete knowledge and his rational approval of the market are greatly reduced. The inability of the private sector to produce a "public output" is due to the unsuitability of the pricing mechanism for an output with unrivalled characteristic. For other outputs, where there are no obstacles in applying the pricing mechanism, inadequate information, high administrative costs (e.g. roads and parks charges,[1] the high risk factor (e.g. atomic energy) and the time factor are reasons which contribute to the unwillingness of the private sector. The private sector, with its motivation of "maximising net cash flow" and applying the discount procedure to the future streams of costs and benefits,[2] would be to a great extent unwilling to shoulder long-term investments. If in addition, for long-term projects, a high-risk factor is considered, the unwillingness of the private sector would be greater (i.e. since high risk could lead to an increase in the discount rate). Thus the myopic policy of the private sector is responsible for its unwillingness. For the whole economy or for a particular section of it, public investments may be found to be a necessity to ensure maintaining the balance between consumption and investment.

---

1 Peter O Steiner, The Public Interest, in Public Expenditure and Policy Analysis, ed. R Haveman, 1971

2 This is an area still without an agreement as to a suitable method for identifying the rate of discount. For a survey of the point, see Henderson, Investment Criteria for Public Enterprises, in Public Enterprise, ed. R Turvey, Penguin Modern Economics Readings 1971

1.4 Externalities (spillovers or neighbourhood effects)

Externalities, favourable and unfavourable, are effects of productive or consumption activities on parties other than their generator. The first appearance of externalities as "external economics" was in Alfred Marshall's Principles in connection with a competitive industry downward-sloping curve. The relevant costs for a marginal firm due to the expansion of an industry equals cost of the additional output minus the total reduction of cost for all other firms of the same industry (reduction in average cost).[1] The pollution generated by a factory at the upper-stream of a river and affecting the downstream users is a classical example of "external diseconomics". In general, the size of the externalities is a function of the way decisions are taken. In the case of separate decision making by the decision units, the size of externalities is greater than that in the case of co-ordination. A separate decision made by one unit may be justifiable when only its own target is considered, but it may be inconsistent with the targets of other units. The inconsistency may be reduced considerably, if co-ordination in decision-making is maintained at the middle level of the administration. The significance of some types of externalities generated by the private provision of some outputs (e.g. health service) is recognized by the authorities to the extent that such outputs are supplied to individuals free of charge, or with charges not fully related to the benefits directly received. For the supply of such outputs, it seems that there are three alternative procedures: a) through public production, b) through provision by the government by private production, c) a mixture of a) and b). The hospital services in the UK form an example of the first procedure. The services of general practitioners and pharmacists are example of the second procedure. The third procedure

---

1 E J Mishan, Cost-Benefit Analysis, Unwin University Books, 1971.

is actually practised by the British National Health Service as a whole.

1.5 The Problem of Public Expenditure

Public receipts are not limitless but the list of what are thought to be desirable items (e.g. the strengthening of the defence system, the improvement of the individual's health and of his educational standard) are limitless. From the available resources, the amount of funds authorised to defence or health or education in the coming year would represent benefits foregone to other public areas. On the same lines, within a particular function, health for example, the sum directed to treatment services would be a benefit lost to others, such as the service of preventive medicine. The problem is not just in authorising a specific sum in the next annual budget for each function. These next budget expenditures are the result of decisions taken, the consequences of which (i.e. in terms of cost and benefit) could extend for years into the future. This would mean that government and parliament, because of decisions already taken and for the accomplishment of those decisions, would have commited themselves for a longer period than the budget period. As a result, they would have very little room in which to decide on a year-to-year basis the utilization of future budget increase. As early as 1961, this was recognized in the Plowden Report, "Public expenditure decisions, whether they be in defence or education or overseas aid or agriculture or pension or anything else, should never be taken without consideration of (a) what the country can afford over a period of years having regard to prospective resources and (b) the relative importance of one kind of expenditure against another".[1] Resources are allocated to current and capital activities and between both. These activities are a means of achieving the required final output, taking into account the time factor related to the stream of benefit and cost in each type. Final outputs meet the needs of different individual

---

1 Control of Public Expenditure, Cmd. 1432, HMSO 1961, paragraph 7.

groups and without doubt the priority decisions related to them are a political issue. The political decision-maker during resource allocation is really choosing between benefits. In fact, finding a replacement to this political role would be an impossible task. The task would be different and probably reasonable when it was in terms of providing the political decision-maker with information related to the available alternatives for achieving the stated policy. This would be within the downward guide lines and budget constraints. In order to know or present information about benefits that could be bought by a determined level or levels of funds, it is essential to have a functional costing system. When we have £x million, we cannot know how many units of different benefits (i.e. within policy guidelines) could be produced or rendered, using for each the total sum or a portion of it, unless there is costing information on the activities producing the relevant benefits. Each programme consists of sub-programmes, and each of the latter consists of programme elements (programme levels depend on programme structure). Programme element is the output of a function (i.e. intermediate output) or part of it. Programme output (i.e. final output) is the result of previous combinations of intermediate outputs produced by functional activities not essentially under the same administrative structure. The problem is: how to accomplish the programme output (i.e. operational objective) at the cheapest possible cost, or how to utilize the available resources to accomplish the largest possible output of a determined programme? In the case of the National Health Service, if we have information related to each operational function (e.g. the diagnostic X-ray department, the catering department and the health-visitor activity), in terms of the work unit and its relevant cost, it would be a great aid to planning and control. For a more specific case, that is, the hospital, which represents the major consumer of the NHS budget and consists of several functions, differently contributing to several health programmes,

there is a great need for an adequate hospital costing system for planning and control purposes.

2 AN ANALYTICAL STUDY OF THE PROVISION OF THE HEALTH SERVICE

2.1 Introduction

Medical services can be provided in a market using a pricing mechanism or be the subject of a collective provision. Our aim is not to look for a criterion on which a choice has to be made between the private and collective provision of medical services. The decision of choice is far from being technical; it is a political issue depending on what the political authority believes to be a good society and how it can be achieved. Section 2.2 discusses why the private sector is not adequate to produce oil. In section 2.3 we analyse the reasons of regarding the medical service as a peculiar commodity. Accountability of the medical profession is discussed in section 2.4. The results of providing medical services in a free market are analysed in section 2.5. Section 2.6 amlyses the results of providing medical services by insurance methods. Section 2.7 concerns the analysis of the effectiveness of the different methods used in financing the NHS.

2.2 A Peculiar Commodity between Private and Public Sectors

It is a fact that food, clothes, housing and fuel always are considered as peculiar goods because the survival of a race depends on their sufficient and adequate supply. These commodities are usually supplied in a market through pricing mechanisms mainly because of the following reasons: 1) divisibility of their benefits and costs; 2) the level of the consumer's knowledge is reasonable, a) because of consumption-frequency, b) because almost all the benefits of these commodities are tangible and c) because producers always advertise the advantages of these commodities;[1] 3) the supply of each of these commodities is in several forms and provided by several producers.

---

1 Sometimes advertising is associated with unfavourable effects, e.g. encouraging smoking.

The consumer, according to his income-level, taste, knowledge and the price of commodities, can predetermine his needs and allocate his budget in advance. In spite of what was said on the private provision of these peculiar commodities, let us look carefully at one of them. That is, fuel.

It is a fact that oil is a commodity vital to world-welfare, in the short and medium terms at least. Two constraints related to oil, apart from the short-term political constraint, should be carefully considered in planning the use of this scarce commodity. Limitation of the quantity of oil in the ground is one constraint, and lack of an adequate and sufficient equivalent alternative is the other. Therefore the use of oil should be organized to prolong its life as long as possible, and sufficient capital investment should be directed toward finding an equivalent alternative. Oil companies represent an international private monopoly and their policy is inconsistent with what should be done. The policy of oil companies towards increased net cash-flow and using the discount procedure (i.e. transferring the future net revenues at different points of time to the present value, using a chosen discount rate) would lead to the shortening of the oil's life and only a small amount of resources would be devoted to the required type of investment.

Government intervention through a tax system could prevent the oil companies from achieving excessive profit, but this is not the problem concerned. The problem is related to the feasibility of private monopoly policy in achieving a policy objective for the country. In this case it seems not to be feasible. From one side, production and consumption of oil would be increased in the short term at the expense of long-term users, in short, a premature death of oil. From another side, the oil companies would not invest sufficient resources to enforce and speed up the research for an adequate equivalent alternative to oil because the application of

the discount procedure would weaken the position of such projects in comparison with the investments in short-term projects.

By applying cost-benefit analysis, the question would be: is the benefit of the incremental use of oil to the users in the short term equal to, or more or less than, the forgone benefits (because of the decremental use of oil or its premature death) to the users in the long term? It seems selfishness itself to worry about our own welfare regardless of what kind of life our children and their children would face, particularly when the worst consequence of the latter is a result of our own action.

The private sector is not always the most efficient choice to secure consumers' sovereignty. This is in contrast to the view: "The supply of goods and services, including medical care, should as nearly as possible be based upon individual preference".[1]

In the next section we will analyse the characteristics of medical service and what the results would be if we followed the maintenance of consumer sovereignty.

2.3 Is Medical Service a Peculiar Commodity?

Peculiar goods are not only the four types stated above; medical service is a peculiar commodity too.[2] The reason for this is that the sudden event of illness or injury is associated with a drain on the individual's budget but not only concerned with medical costs. In addition there are the personal and impersonal worry and discomfort. Consumption frequency and externalities are other characteristics related to medical service, as well as those items regarded as peculiar commodities and other

---

1 D S Lees, Health through Choice, in Freedom or Free-for-all? Hobart Papers, Vol. 3, 1961. For a similar view see John Jewkes and Sylvia Jewkes, Genesis of the British National Health Service, Blackwell 1961

2 F Roberts, The Cost of Health, Turnstile Press, London 1952

commodities, e.g. education. The individual is not only ignorant about the required service before his illness, but he is still likely to be so after the event because of his lack of medical knowledge and experience due to infrequency of consumption. The exception is the individual who regularly uses a specific service, e.g. that of the dental and/or optician service. Therefore, and with particular reference to the several medical specialities, the patient cannot determine which medical service he needs, or choose rationally between the medical services rendered in the market. The event of illness is associated with the external effect at the national level, that is, output forgone because of absence from work during the period of sickness.[1] The size of such external factors could be increased if the patient did not get the required service in time. Diseases could spread, causing more absence from work and more decrease in the Gross National Product; treatment and period of convalescence could be prolonged, which would have a negative effect on GNP. Treatment would not reach completion because of not getting the required service until the later stages of the illness, e.g. syphilis, which would also have a negative effect on GNP because of inability (i.e. partial reduction of productive power) and disability (i.e. reducing productivity).

2.4 Accountability

In looking at the supply of medical services, we find that the physician is not accountable to an outsider for the two types of resources entrusted to him (i.e. the patient and the medical services). His accountability is only that of accepted professional ethics. This situation is different from that of other professions. For example:

> "every steward is held accountable to the person or body which entrusted resources to him, whether the latter is a 'superior steward' or the ultimate owner. Accountability places two obligations upon a

---

1 Assuming that the value added by worker force equals at least the Paid Wage.

> steward; he must render an 'account' of his dealings with the stewardship resources, and then he must submit to an examination (usually known as an 'audit') of that account by or on behalf of the person or body to whom he is accountable. This means that he must not only allow the audit to take place, but that he must provide the evidence from which the auditor can verify the account produced". 1

The inequality of medical knowledge between the physician and the patient makes the latter delegate to the former the right to choose on his behalf between the several medical services. Ideally, the physician has to look after the patient's welfare regardless of his self-interest.[2] This would require the physician to choose the most effective method with the lowest level of cost which would meet the needs of his patient. It is not strange to find that these types of resources are entrusted to the physician, because this is what happens in practice in any profession, e.g. the legal profession. What is strange is the absence of sufficient auditing of the performance of the physician and his reluctance to provide evidence of his performance. Now we are going to analyse the situation in a free market.

2.5 Medical Services in a Free Market

Individuals are born equal in freedom but unequal in natural characteristics. Through the incremental processes of life in a world where wealth and ownership have been distributed on unequal principles, we have grown up in different environments. It is a fact that the market rewards output rather than effort. This:

> "implies that persons whose productivity, in value terms, is low will earn little regardless of whether the low productivity is attributable to lack of effort, lack of skill, or low demand for the skills". 3

---

1 Peter Bird, Accountability: Standards In Financial Reporting, Modern Finance Series 1973, Ch. 1.

2 Kenneth J Arrew, The Welfare Economies of Medical Care, in Health Economies, ed. by M H Cooper and A J Culter, Penguin Books 1973.

3 B A Weisbrod, Collective Action and the Distribution of Income: A Conceptual Approach, in Public Expenditure and Policy Analysis, ed. by R Haveman 1971.

Therefore the market, even when it is perfect (i.e. perfect competition) would generate class-differences between individuals in terms of income and position, in which individual responsibility is greatly limited. When the medical services are provided in a market assumed to be in perfect condition, a group will certainly be left without medical services because of its income level. We think that a larger group would not be able to get medical services if they were rendered in a market where administered prices)i.e. professional pricing system based on qualifications) are actually being used. Neither market pricing nor administered pricing would be suitable to public health services because of the common benefit characteristic associated with the public service rendered. The political authorities always consider the importance of the indivisible benefits usually associated with the public health service, and the danger of leaving the decision to get such service to individual preference. Therefore, public health services are provided by collective action.[1]

There are two descriptions which could be applied to a medical service in relation to a specific disease; that is, effective or ineffective. This selection should be done and would be done by applying a randomised controlled trial.[2] When there are two methods of treatment with equal effectiveness, the choice should be that of the cheapest method. The reason for the reluctance of the "Medical Kingdom" to establish medical standards seems to be the refusal of the medical profession to be evaluated rather than the inability to establish standards. The road for such standards would be easier than that in relation to other professions, with particular reference to the known steps in medical text books (i.e. in relation to a general or special case). If such standards are established, two important

---

1 B A Weisbrod, Economic of Public Health, University of Pennsylvania, 1968.

2 A L Cochrane, "Effectiveness and Efficiency", The Nuffield Provincial Hospital Trust, 1971.

results in relation to the use of medical resources would follow: a) eliminating or greatly reducing the use of medical resources in activities or functions with zero-effective efficiency[1] (i.e. using medical functions to achieve a target but finding them ineffective, regardless of the levels of their activity efficiency)[2]; b) eliminating or greatly reducing the use of costly effective activities (i.e. the functions utilised are effective in relation to the target, but cheaper activities with similar effectiveness are available). The physician, as the chooser of medical service on behalf of his patient, by using the effective method with the lower level of performance, could lead to an increase in the demand for expensive medical services (e.g. expensive prescriptions, private nurses and longer hospitalization). This, from one side, could increase the number of groups left without medical services (i.e. the increase would be in terms of those who could pay the physician's fee but not the expensive cost of treatment). From the other side, this could lead to misuse of medical resources through the use of expensive services by those able to pay the bill.

The point here is related to the utility of medical resources when the medical service is rendered in a free market. The satisfaction of consumption-needs of individuals for health services is usually regarded as the aim of using medical resources. We have already shown to what extent and at what cost this aim would be achieved when the medical service is provided in a free market. Medical resources should not be utilized only for consumption purposes (e.g. treatment services and services for patient care), but for investment purposes too. A reasonable amount of medical resources have to be spent on medical investment projects like those aimed at discovering the causes of diseases and research for

---

1 Effective Efficiency is the efficient performance of an activity which is medically effective.

2 Activity Efficiency is the level of efficiency of the performance of activity; this will often be referred to simply as "performance" hereafter.

effective methods of treatment. The flow of benefits of these projects would be started after a long period of time. Because of the myopic policy of private enterprise, a small amount of medical resources, if any, will be utilized in investment projects.[1]

2.6 Medical Service and Insurance System

Insurance is an action against the risks of the future. In the case of medical service the insurer pays a premium to the insurance agent and in return the insurer at the occurence of illness or injury to himself will receive particular benefits, in kind, prepayment, or in cash. The cost of medical service is the subject of insurance. In the prepayment method the insurer will receive the complete medical service prescribed by his physician, and the insurance agent will pay the costs. In the cash method the insurer will receive in cash a complete coverage of medical costs or a predetermined fixed sum (i.e. the fixed pay method).[2] Increases in the prices of medical services after the insurance date will be a disadvantage only for the insured by the fixed pay method because the cost of the medical services will be greater than the fixed sum. In this situation, the subject of insurance is not the total cost of medical service. Below we will analyse the possible changes from the previous picture by applying the private health insurance system.[3]

1 A group will also be left without medical service because of income level (i.e. probably the size of the group left without the service will be similar to that in the previous picture) and the unfavourable external effects will continue as in the previous picture. In addition, other groups (e.g. the aged, the disabled and those who contracted chronic diseases)

---

1 A similar situation exists in the provision of oil in a free market, see section 2.2 above.

2 K J Arrew, ibid.

3 The non-marketable service (i.e. public health service) is not discussed here because it usually provides publicly.

would find reluctance on the part of the insurance agents to accepting them as clients, because of the high risk of their medical condition.[1] It seems worthwhile to describe the practical method used by insurance agents in determining the amount of premium, which is different from that of the theoretical method. The latter relates the amount of premium to the price of medical services and the probability of medical risk on different individuals. This means that the amount of premium should change according to the risk stage, but the practical method used is in identifying an equal premium for all.[2] This would lead to the redistribution of income from the insurers with low risk to those with high risk, regardless of income level.

2 To control the expensive use of medical resources by physicians in a situation where medical standards are not fixed, the insurance agents will be persuaded to use supplementary methods (e.g. co-insurance and deductible methods). This means that the insurance does not protect completely the insured from an extra burden on his budget (i.e. medical costs) at the time of illness or injury, because the choice was made by the physician not the insured.

3 There will be no change in the physician's accountability (i.e. professional ethics only) or in the ignoring of the long-term considerations (i.e. utilizing of medical resources for investment projects).

4 The health insurance system is always criticized for the associated high administrative costs as experienced in the UK and the USA[3] (i.e. with particular reference to individual policies).

---

1 H M Somers and A R Somers, Doctors, Patients and Health Insurance, 1961.

2 M V Pauly, Medical Care at Public Expense, 1971.

3 H M Somers and A R Somers, ibid.

2.7 NHS in Practice

Since 1948 the British Government has taken the responsibility of providing the health service free of charge for all, except for prescriptions, dental and opticians' charges. The private sector still exists but with a very limited role. The health services were undertaken by the Ministry of Health until 1 November 1968, when the Department of Health and Social Security was established by amalgamation of the ministries of Health and Social Security a) to co-ordinate the activities of services provided separately, b) for integration of research and the development of central planning. The DHSS continued to supply the health services through three bodies separately administered (i.e. hospital services, GPs and local health authority services) until the 1st April 1974, when a new structure, aimed to integrate the three bodies into a comprehensive health service system, was put into force. In Chapter Three we will discuss the claimed and the real objectives of the new structure. The next section deals with the different methods used in financing the NHS and their effectiveness.

2.7.1 Methods of Finance

The NHS is financed by two methods: first, unrelated to the service rendered, that is, from general taxes and health service contributions; second, partly or completely related to the service rendered, drugs for hospital out-patients and GP patients and outside the exemption groups (e.g. children, groups with incomes below a certain level, and groups with chronic diseases). Dentists' and Opticians' services represent the former amenity and pay beds represent the latter. It is worth noting that in 1971-72 70.4% of the total NHS budget was financed from general taxes and 8.3% of the same total from the NHS contribution.

2.7.2 Prescription Charges

Prescription charges were started years after the passing of the NHS Act.

The charge at first was a flat rate on each prescription, and, following several changes, it now rests at 20p per item. The two aims of the introduction of prescription charges and the later changes were a) a method of financing the NHS and b) an action to counter or reduce the abuses of drug consumption. This practice shewed that prescription charges were not an effective means of achieving the aims. The revenue from the prescription charges was less than 1% of the total budget of the NHS in 1971-72.[1] This revenue would be further reduced if we deducted from it the related administrative costs. For the same period, the revenue from the charges (which included the effect of the recent increase of the rate) did not exceed 10% of the expenditure on drugs.[2] The second aim has had no better luck than the first, because the introduction and the increase in the rate of prescriptinn charges are penalizing the consumer who is not responsible for the abuse of drugs consumption. Since the recent increase in the rate per item in 1969 and until 1972, the cost per prescription increased by more than one third.[3] Moreover, prescription charges cause discrimination between hospitalized patients (i.e. getting complete treatment free) and other patients who pay the prescription charges. Probably the main reason for increasing the cost of used drugs is an absence of medical standards. The position of general practitioners (GPs) as private contractors without a real accountability for their performance makes the possibility of countering the abuses much more difficult. The incentive coercive method was introduced to fight such abuses, but it did not work because of the great difficulties of making it work. This method requires the identification of a limited list of drugs and the GPs would be surcharged on the total

---

1 DHSS, Health and Personal Social Service Statistics for England 1973.

2 DHSS, Health and Personal Social Service Statistics for England 1973.

3 DHSS, Health and Personal Social Service Statistics for England 1973.

cost of items prescribed but not on the list. In the absence of a medical standard, it is very difficult to identify such a list. The persuasive method is in force but its outcome seems not to be adequate. The idea of this method is to advise physicians on how to prescribe economically by providing them with a number of advisory publications, e.g. the drug tariff. Once again medical standards should be the real grounds for practising a real accountability. It seems worthwhile stating that the nationalisation of pharmaceutical industry appears not to be a viable way of countering the abuses of drug consumption. Physicians determine the quantity and quality of demand on drugs, and the availability of medical standards rather than the nationalisation of the pharmaceutical industry seems to be the most effective means to counter abuses of drug consumption.

2.7.3 Amenity and Pay Beds

Amenity beds represent some kind of private accommodation for those who would need privacy on social grounds. Pay beds are a completely private medical service within the nationalised hospitals. There would be no objection to having both types if their existence had no effect in terms of other real needs not being met and waiting lists being lengthened. In a recent white paper[1] concerning this matter, the Committee noticed that the existence of private practice may sometimes have a marginal effect on the waiting lists, but the conclusions are essentially due to other reasons and the number of private beds always represents a very small percentage of the total available beds. Therefore no adverse effect would be expected.

We have here some reservations; first of all, the users of pay beds, by buying the service, are jumping the queue. In addition, there are other abuses which could be overcome by some sort of managerial arrangement, e.g. the use of NHS equipment for private work by removing it out-

---

1 Private Practice in National Health Hospitals, HMSO, Cmd 5270, 1973.

side hospital premises. Moreover, pay beds disturb the principle of equality on which the NHS was established. We are not convinced that the existence of amenity beds provides some sort of consumer choice, because that privacy is available to all free of charge, only on medical grounds. Private practice could not be regarded as a significant source of financing the NHS. It represents less than 1% of the total budget. From the other side it causes unfavourable externalities to those on the waiting lists and the DHSS in terms of slack capacity. In the table[1] below, we illustrate the affected parties (i.e. cost and benefit) and the result from the national aspect, caused by the existence of pay bed types. A lost opportunity in the waiting list group in getting earlier treatment would be reflected in economic and social cost attributed to them. An assured opportunity of the private group (who jumped the queue) would be reflected in economic and social benefits for them. When the former is less than the latter (i.e. by measuring economic output and assuming the equality of social gains and losses), the existence of pay beds would be backed by national economic interest. But that would be at the cost of opportunities of social equality. A choice between the preferable

1 Cost-Benefit Statement by Parties and Nation affected

Cost or benefit elements	Waiting list group	Buyer's group	DHSS	Nation
Economic & Social	Cost <	Benefit > Cost	= Benefit > Cost	Cost < Benefit
Economic				
Underused capacity				
Forgone benefit or loser group				
Received benefit by gainer group				

trade-off in favour of one or another is a political issue.

2.7.4 NHS Contribution

When the NHS Act came into action it was estimated that the revenue from the NHS contribution would cover 20% of the total budget of the NHS. For 25 years the cover was around 10%, except for a few years (i.e. the highest level of contribution was 14.2% in 1963-64). The flat rate basis is the main constraint in enforcing the rate of the NHS contribution. Any increase in the rate would lead to an increase in the burden on the low-income group. Changing the basis of contribution from the flat to a progressive rate, or abandoning the contribution method completely and depending on the revenue from general taxes, are two alternatives to overcome the shortcomings of the actual NHS contribution.

A progressive rate would increase the effectiveness of contribution methods by a) retaining the flat rate basis up to £x per week income level (i.e. exemption from payment would be for incomes below a certain level), b) contributions would be on a progressive rate (i.e. the rate of increase with the increase of income level) over the £x income level. Such a change would not make the NHS contribution into a tax on disease, or relate the contribution to the service rendered. The revenue from the progressive contribution system would still be automatically directed to finance the NHS without any competition from other functions. Individual participation in financing the health service according to the principle of the ability to pay would be the only change. There is more than one point of argument in relation to the progressive rate method; they are as follows:

a individual groups whose income is within the progressive area could regard their contribution as a tax levied on health and could use their judgement on the quality of the benefits received to evaluate the efficiency of the system;

b a separate progressive rate system would generate incremental administrative costs in designing and running the system (i.e. the separation of tax systems is normal in British practice).

2.7.5 Exchequer Money 100%

This would require a change in the actual income tax system, for example, to include at least the revenue at present obtained through the NHS contribution. Incremental administrative costs would be required also in designing the change, but no incremental costs would be expected in running the system. There is probably one disadvantage in this alternative. That is, what the people would pay for the NHS would be hidden under the unified income tax rate. In fact the actual present contribution system fails to show this adequately, but the progressive contribution system would have the advantage of showing such information.

3 RESOURCE ALLOCATION IN THE NATIONAL HEALTH SERVICE

3.1 Introduction

Central taxation imposed by Parliament is almost the entire source of financing the National Health Service (NHS). This is related to both revenues obtained through NHS contributions and general taxation. The actual attached payment for minor items is too trivial to change the fact of central finance. Therefore the Ministry of Health (later the DHSS - Department of Health and Social Security) is a competitor among others for the limited funds of the Exchequer. The distribution of funds between various functions is a political issue. The shortcomings of money as a tool for valuation are presented in section 3.2. Planning of resource allocation under different systems is discussed in section 3.3. Section 3.4 shows briefly the role of the Secretary of State for Health and Social Security as an example of the role of political power in the United Kingdom. The real objective of the reorganisation of the NHS is discussed in section 3.5. Reasons and suggestions in relation to the NHS problems are shown in section 3.6.

3.2 Limitation and Danger of Monetary Valuation

There is no available method for the measurement, comparison and classification according to cost-benefit ratios of different benefits (e.g. M persons with university grade and N persons screened against chronic diseases) by using a uniform dimension. The present general dimension is money, but benefits consist of two types: quantifiable and unquantifiable. The quantifiable type may be subdivided into two categories: (1) benefits which can be valued in terms of money, (2) benefits which cannot be valued likewise, e.g. probable number of averted deaths due to accidents or a specific disease. If only values accessible in money

terms or in quantifiable terms were considered during a resource allocation process, the allocation would be biased and would involve us in some situations which may oppose traditional beliefs. Economic measurements could be feasible for some programmes, partly feasible for some and not feasible for others. Since we have a case of competition between various programmes, unfair conditions would be created if we regard the economic measurements as the dominant factor.

Social, humanitarian and religious values should also be considered during resource allocation. Such values should be expressed in a qualitative statement to avoid the possible danger of neglecting them completely in the computation or underestimating their real weight. The project of a third airport for London illustrates the danger of attaching economic values to an old church which the project required to be removed.[1] Facing the problem of population growth, a recent view[2] suggested the encouragement of abortion on the ground that it demands less resources than childbirth and could be made safer by diverting extra research to the subject.

Quantitative values of the second category would be in danger when money is regarded as the dominant measure. Evaluation of human life, using economic terms, is an example of such dangerous tendencies, besides neglecting the qualitative values. There is currently a contrasting view (to ours) suggesting the use of economic calculation in valuing benefits of health service projects so that the projects with the highest discounted values have to be chosen.[3] When money is regarded as the dominant measure, the danger is great. Programmes with more amenability to monetary valuation would be in a better position than programmes with less amenability. Thus the advocate of the former would be in a stronger position to gain the lion's

---

1 G H Peters, Cost-Benefit Analysis and the Third London Airport, in Lessons of Maplin, Occasional Paper, IEA 1974.

2 A L Cochrane, Effectiveness and Efficiency, Nuffield Provincial Hospital Trust 1972.

3 H W Jackman, Financing Public Hospitals in Ontario: A Case Study in Rationing of Capital Budget, Management Science, Vol. 20, No. 4, December 1973.

share of the Exchequer money.

During the choice process, the available information about all the related values has to be introduced; otherwise we have to shoot all those over 65 years of age, and possibly this would not be enough on economic criteria as the only ground for judgement.

3.3 Planning under Different Systems

The general tendency of different policies is to increase the welfare function. Politicians usually express this in general value terms and ambiguous objectives like improving the individual's health. It is difficult to find a policy which does not include programmes orientated to this value. The crucial issue is in translating this value as well as others (e.g. enforcing national security, improving environmental conditions and improving the level of education) into meaningful objectives, taking priority decisions and choosing among alternatives.

There are two known approaches: rational-comprehensive planning and successive-limited planning. The former requires the clarification of objectives and the identification of priorities in advance (as a separate step), which is followed by the analysis of alternatives to select the most efficient (as a separate step). The second approach does not distinguish between the two steps but regards them as one step.[1] For the rational-comprehensive approach, the availability of a specific theory (e.g. Marxism-Leninism) from which a planning framework is derived would be a requirement. Some of the theoretical principles of the theory could be reformed in time. Probably the reform would be very limited in the early stages and a long interval must elapse before the next reform.

For the successive-limited approach, resources are allocated among chosen programmes as political decisions without clarifying the objectives

---

1 C E Lindblom, The Science of Muddling Through, Public Administration Review, Vol. 19, Spring 1959, pp. 79-88.

and this is recognised by the divergent political groups as a necessary political wisdom. The dynamic planning during moderate intervals associated with periodical reviews at shorter intervals for chosen projects (programmes) would seem to be conducive to the gradual increase of understanding of complex social problems.

The task of resource allocation, in the case of rational-comprehensive planning, supported by a planned pricing system, would seem easier than in the case of successive-limited planning. This false situation is due to partial concealment of the real issues. It may be stated that for the second approach no extra difficulty appears, unless the gap between the political parties is wide enough to cause such difficulty, and even then it is expected to be temporary. An essential criticism to the comprehensive approach is the unadaptability to change in both objectives and means during a reasonable period. The human mind is unable to know all the causes of a specific problem, nor is it able to discover all the related external factors through one comprehensive analysis and reach an optimum solution. As it is stated by Harley H Hinrichs:[1]

> "To arrive at a solution one must simplify reality and assume the Aristotelian word, the same things are in, the other things are out, but to make certain that the solution is correct one must not forget the Milton world, things are not in boxes but in process".

In other words, a border has to be identified now and a new one could be found in the future through more knowledge and learning lessons.

3.4 NHS and Political Power in the UK

Since the first day of the NHS Act, health services were rendered through the "tripartite structure", that is, Regional Hospital Boards or Boards of Governors, Executive Councils and Local Authorities. The larger portion of services is financed centrally and a considerable portion is

---

1 Harley H Hinrichs, Government Decision and the Theory of Cost-Benefit Analysis, in Program Budgeting and Benefit-Cost Analysis, ed. Hinrichs and Taylor 1969.

financed locally. Each body in that "tripartite structure" had, until April 1974, a separate administration and all three are under the direction of the Secretary of State for Social Services, who is assisted by several committees with respect to planning and control.[1]

The estimates approved by parliament are then allocated to the departmental agencies. The immense authority of the Secretary of State covers every detail in the service and this facilitates his role as a co-ordinator of all activities of the service in conformity with his responsibility concerning the taxpayers'money. The Secretary of State approves the agencies' estimates in the light of budgetary policy, identifies the total annual estimates of capital expenditure for each agency, approves capital projects and the transferring of savings.[2] In spite of the constant complaints from the agencies about overcentralization, the effective power of the Secretary of State seems to be decently limited.[3]

3.5 Problems within the NHS and System Structure

A real problem which appeared from the start was the need for a co-ordination between the three bodies of the "tripartite structure". For about a decade or more, the argument against the "tripartite structure" increased. There was almost an agreement between the different political parties about the need for an integrated structure for the health service on the grounds that the "tripartite structure" is responsible for every shortcoming in the NHS.

3.5.1 Three Documents for Reorganizing the NHS

The first Green Paper on the subject was issued in 1968.[4] Later,

---

1 The local health authorities were the county councils and county borough councils. They perform their function under the general direction of the Secretary of State for Social Services, but they are integrated into the local government system.

2 S. I. 1948, No. 60, section 4.

3 Harry Eckstein, The English Health Service, Harvard University Press, 1958.

4 Ministry of Health, The Administrative Structure of the Medical and Related Services, HMSO 1968.

two other documents were issued, the second Green Paper[1] and the Consultative Document[2]. The three documents agreed on the general policy, i.e. asking for the change of the current system to the integrated service associated with the change in the organisation of the hospital and community health services at each level of management.[3] The difference between the three documents lay in clarifying the responsbilities for planning, management and control at different managerial levels.

The first Green Paper asked for the decentralization of planning and managerial responsibilities to the area boards.[4] From the beginning, the required structural change in terms of the removal of Regional Hospital Boards and their planning role was considered ineffective.

The second Green Paper has taken into account the shortcoming of the first Green Paper and suggested the establishment of 14 Regional Health Councils for planning, evaluation and priority decisions related to the three integrated bodies. Nevertheless, there were two shortcomings: 1) the direct relation between the DHSS and area health authorities with regard to monitoring performance and measuring their effectiveness; 2) the establishment of committees to control the work of general practitioners, which means the continuity of the administrative separation of GPs and their professional isolation.

The Consultative Document removed the first shortcoming by enforcing the role of the regional councils through increasing their responsibilities on the area health authorities (i.e. allocation of resources to the area health authorities, co-ordination of their activities and monitoring their performance to ensure that national and regional objectives are

---

1 DHSS, National Health Service: the Future Structure of the NHS, HMSO 1970.

2 DHSS, Consultative Document, 1971.

3 DHSS, Consultative Document, 1971.

4 DHSS, National Health Service: the Future Structure of the NHS, HMSO 1970.

achieved and that the standard of services is provided.[1]) Neither the Consultative Document, nor the other two documents, took any further step to end the unique position of general practitioners. This unique position is a response to the private situation of the general practitioner, i.e. as contractors who are administered and financed through a direct relationship between the DHSS and the GPs' committees. This position has always been surrounded with criticisms since the early days of the system. The continuation of this position would make the word "comprehensive" inadequate to the proposed integration of the three bodies of the "tripartite system".

3.5.2 Two Suggestions

A recent report (the Hunter) stressed two requirements for the proposed change in system structure. The first is the need for a "community medicine specialist", rather than a medical administrator; the second is the need for a management information system.[2]

It is difficult to give a complete view on the new function of community physician because it is still in its childhood. The question raised is as follows: does the present medical qualification coupled with two years experience produce a physician sufficiently capable of controlling the functions of the post? A community physician will work as analyst, auditor, manager and professional co-ordinator.[3] We have doubt about the possibility of performing all these functions with the present qualification. We think that the establishment of the new post is not foreign to the general tendency of members of the medical profession, that is, rejection of evaluation or interference by an outsider.

---

1 DHSS, Consultative Document, 1971.

2 DHSS, Report of the Working Party on Medical Administrators, HMSO 1972.

3 For a full statement about the community physician's role, see DHSS, Management Arrangements for the Reorganized National Health Service, HMSO 1972.

It is true that information on the needs and performance of each health function is badly needed. Information on needs can be obtained by regular surveys and yearly schedules of population projection and with some assumption on health tendencies. Performance information is important and almost wholly lacking; the lack of performance information in hospitals is a clear example. We need micro-costing studies to identify the work unit and its relevant cost for each function.

3.5.3 Analytical Framework in Deciding about Reorganization of the NHS

We can say that there are some administrative problems under the tripartite structure, but this should not be regarded as a justification for reorganizing the structure. Reorganization of the structure would require the spending of public funds that are prevented from being used in accomplishing another target. The issue here, as well as in other aspects that require the spending of public funds, is to weigh the costs of the project (i.e. reorganization) against the related benefits. Specific analysis seems to be required before taking a decision and during the implementation of the chosen alternative, as follows:

1 Identify the shortcomings of the NHS (i.e. before the reorganization);

2 Clarify the objectives of the proposed new structure in terms of saving of shortcomings and additional benefits;

3 Estimate the relevant costs of the reorganization, i.e. incremental costs expected to be spent on the preparation of the reorganization and putting the new structure into force. These costs are not only those that can be evaluated in terms of money but also those that cannot be so evaluated, e.g. increasing bureaucracy;

4 Match costs with benefits related to the reorganization and compare the results with those of other available alternatives;

5 Judgement would be needed to choose the alternative which is believed to be the most efficient;

6 After taking a decision about a specific choice, a follow-up procedure

will be needed during the implementation of the chosen alternative. During the follow-up period, the actual costs and benefits will be examined in comparison with what were estimated and variances have to be identified. The variances could be related to the cost or the benefit factor. Cost variance will be in terms of overestimation or underestimation. Benefit variance will be in terms of achieving more than we planned to achieve, or less. When the latter is the case, we need to ask the question Why? Have the objectives (i.e. related to the chosen alternative) been exaggerated at the start? In other words, are the shortcomings which need to be eliminated not all the responsibility of the tripartite structure, but for other reasons like inadequate information systems and health programmes.

7 Identify the real objective of the new structure and the real reasons for shortcomings not being eliminated by the chosen alternative. Decide whether to continue implementing the chosen alternative or not, and direct the attention to other reasons. If continuing with the chosen alternative is rejected, does that mean returning to the basic situation or moving to another situation and another analysis?

During our study we could not get any figures on the relevant costs of the reorganization of the NHS tripartite structure into the "integrated" structure started in April 1974.

By examining the stated objectives of the reorganization[1] of the tripartite structure, we found that the stated objectives had been exaggerated. The objective of reorganization, it seems to us, is no more than demographical.

We think that several steps have to be taken which do not in themselves require reorganization for their implementation. These steps are

---

1 DHSS, Management Arrangements for the Reorganized National Health Service, HMSO 1972, pp. 9-10.

aimed at accomplishing objectives which were exaggeratedly given as objectives of the reorganization of the tripartite structure. We intend first to give a comment on the reorganized NHS. The next section will show some reasons for problems within the NHS and present what steps we think are required.

3.5.4 Comment

In the tripartite structure there was the Hospital Management Committee (HMC), which was responsible for the day-to-day hospital services of a group of hospitals. In the new structure the District Management Committee became responsible for hospital daily services and all the health services in the district. Accordingly, the hospital is getting for its daily services less effort than was the case under the tripartite structure. In this regard, we suggest, that for each hospital there should be what we would call a 'hospital team' of three members, supervising the hospital's daily work. These three members would be a medical consultant, a senior nursing officer and an administrative officer. The medical consultant would be responaible to the District Medical Committee (DMC) for medical and paramedical services. The senior nursing officer would be responsible to the District Nursing Officer (DNO) for nursing services. The administrative officer would be responsible to the District Administrator (DA) for administrative services.

3.6 Some Reasons for NHS Problems - and Suggestions

a - Although the NHS Act gives the right for every individual to have equal accessibility to the health service,[1] the difference in quantity and quality between local authority health services seems to justify attention. For example, in the last report on maternity services,[2] it stated that the activity of Local Health Authority (LHA) clinics varies widely from providing

---

1 We mean by equality that an individual with a health problem has the right to the same quantity and quality of health service as is provided for any individual with the same health problem.

2 Domicilary Midwifery Report, DHSS 1968.

antenatal and postnatal care on the one hand, to the provision of only the educational aspect of the service, on the other.

From another angle, there is evidence of the uneconomic use of costly institutional beds, at least partly because of the lack of or shortage of substitutional and complementary services in the community, e.g. hostels, home nursing and home help services. In a related study it was found that 25% of male and 42% of female medical patients did not require hospitalisation on medical grounds alone.[1] In another study it was found that between one fifth and one third of patients staying longer than thirty days in hospital are there for social rather than medical reasons.[2] It is worth stating that the use of institutional beds as a substitute for community facilities reduces the accessibility of the hospital to other patient groups, which leads to an increase of the waiting list problem for in-patient services. The difference in the degree of shortage between local authorities uncompensated by centrally-financed services would add a case of inequality between local areas.

The supply of local health services depends on the size of the budget and the priority decisions of each local authority. Budget size varies from area to area according to the local rates and rate support grant. Priority decisions also vary because it depends on the person taking the decision.

We think that the central financing of the health service should be coincident with the central administration of the service, thus eliminating the shortcoming resulting from using two methods of financing the service, i.e. centrally and locally.

b - The available hospital facilities are not sufficient nor are they

---

1 G Forsyth and R F L Logan, The Demand for Medical Care, Nuffield Provincial Hospital Trust, Oxford University Press 1968.

2 J R Buttler and M Pearson, Who Goes Home?, Occasional Paper on Social Administration No. 34, George Bell & Sons, 1970.

fairly distributed between regions.[1] Historical events (i.e. pre-NHS situation) are partly responsible for such conditions. The relatively small capital expenditure on building and furnishing of hospitals and related facilities during the past two decades is responsible for the shortage of hospital facilities in total terms (i.e. for the country). The method of funding hospitals used since 1948 and until the introduction of the new scheme of allocation by the DHSS in 1971, is the factor responsible for the continuation of large discrepancies between regions. The formula of the new scheme seems to be ineffective with regard to the degree of removing or greatly reducing the discrepancies between regions after the planned period of the new scheme.[2]

c - Since 1935 the underdoctored areas remained almost without significant change in 1967. This resulted from a combination of variations in the total number of GPs and from the resistance of GPS. The attitude of general practitioners is supported by their unique position, i.e. private contractors, and it may be that the latter has a perpetuating effect on the distribution of general practitioners across the country. During the past seven years, in spite of the increase in the number of GPs, we would not expect a dramatic change in their distribution, because their unique position remains unchanged.

d - The nationalisation of the health service was not followed by health programmes. The only indication in the Act about this lies in the words stating the equal right of every individual to the required health and related services. This in itself could be regarded as a general objective (objective) aimed at removing the barriers between the individual and the service he requires. The achievement of equal accessibility to health and related services would require the introduction of operational programmes

---

1 D A T Griffiths, Inequalities and Management in the National Health Service, The Hospital, 1971, pp. 229-33.

2 P A West, Allocation and Equality in the Public Sector: the Hospital revenue allocation formula, Applied Economics, 1973, pp. 152-66.

(operational objective) for the aim of distributing the country's health resources between regions and areas of each region. This equality could be represented, apart from the problem of quality, by the similarity between regions, areas and districts of, for instance, hospital beds per head of population and GP list. For this, factors like limitation in the NHS budget and the methods used in allocating both capital and current funds by the DHSS, local circumstances and professional attitude have to be overcome, or at least reduced in their effect.

The above operation is within the area of planning resources. Resources or functions represent one dimension for resource allocation in general and for the NHS, as the example shows (see figure (1)). The other two dimensions are programmes and operational objectives. For example, reducing the perinatal mortality rate could be regarded as an operational objective. Four programmes would be related: detection, prenatal care, delivery and postpartum care, and postnatal care and family planning. The ultimatum is how can we achieve the highest pay-off (i.e. reduction of perinatal mortality rate because of health service activity) of the operational objective by using the available resources of the maternity division (i.e. functions financed centrally and locally). In other words, the achievement of needs (decided to be satisfied) at the cheapest possible cost is the end. This end would be identified by knowing the outcome of the chosen programmes.

The achievement of this ultimatum would require us to overcome the actual shortage in both the financial and environmental information. Environmental information through surveys and annual schedules is badly needed. We have to identify the present lack or shortage of health resources across the country. The change in demand in the future for each region can be estimated through a demographical planning at regional level, estimating the effect of migration and making some assumptions on the

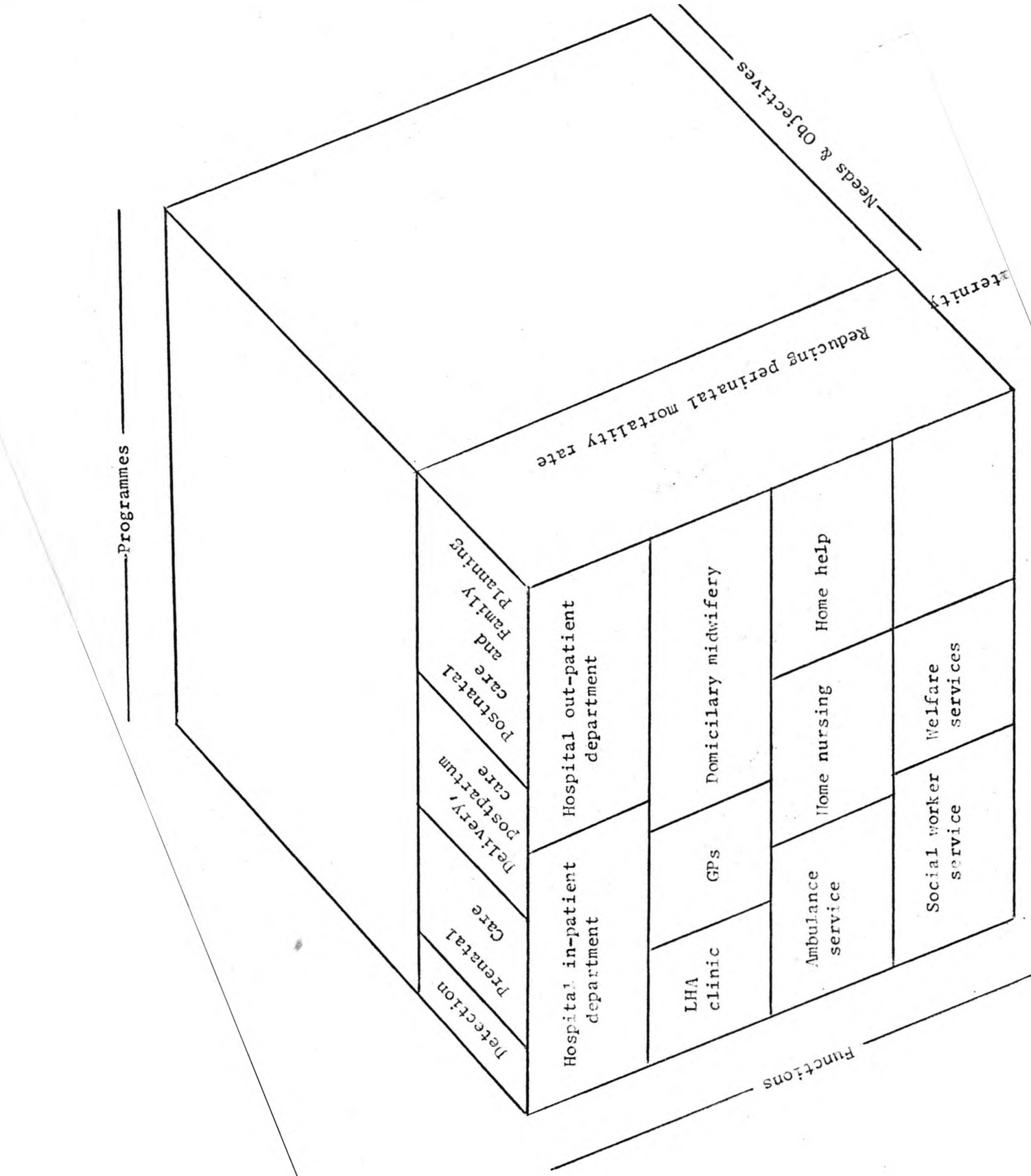


Figure (1)

Three dimensions for Resource Allocation

health tendency in the future.

Information about health programmes is another type. This would be related to working programmes (e.g. antenatal care, and screening service for pre-school children) and programmes suggested by policy guidelines. For this the following steps would need to be taken:

1 Construct a flow chart which describes the functions used or suggested in or for implementing the programme concerned within each region. Choose from the several flow charts related to a specific programme, the master flow chart including all functions that may accrue.

2 Classify the stated functions in the master flow chart for each programme as follows: no alternative (e.g. maternity ward under the policy of 100% hospital delivery), substitutional (e.g. GP supervision, midwife's visit and health visitor's visit, and these in sum as a substitute for the maternity ward for part of the usual stay after delivery - i.e. the usual stay is ten days), and complementary (e.g. socio-economic services for early discharge after hospital delivery).

3 List substitutional functions according to effectiveness criteria of the two types: same effectiveness and different effectiveness (e.g. would community health services provided for the mother after delivery for part of the usual hospital stay after delivery have similar or different effectiveness, i.e. in terms of the mother's and her baby's safety, in comparison with the situation in a full hospital stay).

4 Try to find a possibility for raising the effectiveness related to a substitutional function through a change in the size and type of associated complementary functions (e.g. increase of socio-economic

services for early discharge after delivery).

5 Present a summary of the previous steps for each programme in terms of an effectiveness index of possible alternatives (i.e. working and suggested alternatives).

The need for a functional costing system is a fundamental requirement. We cannot choose the alternative with the highest effectiveness regardless of the cost factor; resources are limited. We think as a reasonable start that the statutory accounts should be established on a functional basis. The work unit of each function has to be identified and costed. Therefore, for each programme, we could present the cost of related alternatives, which is fundamental information needed to achieve the stated ultimatum. It is worth stating once again that non-financial benefits and costs related to the alternatives have to be presented also.

4 FUNCTIONS OF THE BUDGET

4.1 Introduction

Since the first-known use of the word "budget", derived from the old French word "bougette", meaning "small bag or pouch", its concept has passed along a lengthy evolutionary road. It is probably true that the increment of budget functions was and still is far less practised by the government budget than it should be in theory. In spite of the original use of budgeting, which was started in the central government of Great Britain, the credit for the development of budgeting practice with specific respect to two of its functions (performance control and planning) goes to private business. There is more than one reason for this; a) the nature of government activity and its adaptability to measurement, b) availability of necessary techniques, e.g. computer and electronic data processing, c) expected costs from implementing these two functions thought not to be outweighed by the expected benefits, and finally, the subjective view of those having the authority to develop the budget functions. Section 4.2 deals with financial control as the conventional function of the budget. The lack of planning function and the associated shortcomings are the concern of section 4.3. A brief on trading activity is the subject of section 4.4. Definition of the performance budget, its significant role and the reasons preventing its implementation are presented in section 4.5.

4.2 Financial Control

The original use of the budget was as an Authorization, which started in Great Britain as a result of parliament's struggle to obtain control over the finance of the Crown. As early as 1217, this was declared in the Magna Carta:

> "no scutage or aid shall be imposed in the Kingdom unless by the common council of the realm..." 1

---

1 R S Edwards, J S Hines, Budgeting in Public Authorities, George Allen & Unwin Ltd, 1956.

Later, based on the revolution of 1688, Parliament obtained full rights as a supreme governing body by regarding the budget as an authorization in the hands of a supreme body, by whom revenue is sanctioned (through taxes, duties, insurance contributions and borrowing), and the incurring of expenditure to finance the policy of the government is approved; this means the control of Parliament over the executive. That is the constitutional dimension of budgeting and in itself is the legitimate right of the representatives of the nation.

Parliament wanted the assurance that the approved fund had been spent on the authorized purposes during a future period of time, usually one year. (If more, there should be a separate figure for each year.) The authorized purposes were not and still are not objectives or programmes or functions, but are in terms of "votes", each of which covers the activity of a department or small part of it, and, in turn, each vote is divided into sub-heads according to input categories, e.g. staff salaries, fuel and rent. Parliamentary assurance has been met through two procedures. First, each Accounting Officer of a department has to prepare the appropriation accounts of his department according to Treasury instructions.[1] The Treasury controls expenditure by approving the annual estimates of the department, scrutinizing items of expenditure to ensure that there is no overspending for any item beyond the estimate, and by examining each new item. Secondly, by the establishment of the Committee of Public Accounts, the function of which was restricted at first to the legal aspect as:

> "The guardian of financial propriety and the auditor of financial administration". [2]

Because of the tremendous size of departmental accounts and the restricted number of Committee members, the Committee, in examining the appropriation

---

1 Exchequer and Audit Department Act 1866.

2 House of Commons Standing Order No. 90.

accounts and any other accounts it requires, is greatly dependent on the auditing of the accounts by the Comptroller & Auditor General (C & A G) and his staff, which is presented to the Committee in the form of reports. The C & A G is independent from the executive; he is appointed by Parliament and receives his salary from it. The duty of him and his staff begins with the auditing of the legal aspect of accounts according to parliamentary approval.[1] Then, beside the legal aspect, his work extends to the questions of waste and extravagance, the encouragement of sound practices in estimating, contracting, financial administration, and the need to obtain equal value for money spent.[2] The subjective basis[3] used in budget and accounts only emphasizes financial control as the budget function, but does not give any idea about the level of effectiveness and efficiency of the achieved policy objective.

Probably, that would be subject to less criticism in the conditions which existed in the nineteenth and very early twentieth centuries when:

a the government's role was limited to a few functions (e.g. defence, law and order) and the derived benefits of public expenditure in terms of social values were very small. In addition the attitude of both public opinion and political authority was to keep the size of the budget as small as possible.[4] The size of public expenditure was 4% and 6% of the GNP of Great Britain in the years 1870 and 1910 respectively;[5]

b the urgent need to establish effective control over administration (e.g.

---

1 Exchequer and Audit Department Act 1921.

2 Select Committee on Procedure, 1968-1969, op.cit., Evidence pp. 85-87.

3 This use of the term 'subjective' is within the British context, which differs from the American, where, in the same place, the term 'object of expenditure' is used.

4 Basil Chubb, The Control of Public Expenditure, Oxford University Press 1952.

5 Plowden Report, The Control of Public Expenditure, HMSO, Cmd. 1432, para. 10.

personnel and purchasing control) because of the unreliability of internal control. This could be regarded as an additional motive beside the essential one, which is the function of control by Parliament to encourage the desire for central control. But this should not be interpreted as: if we had reliable internal control there would be no need for central control, nor would central control restricted in the financial aspect be preferable under any conditions. Performance control and planning are absolutely vital budget functions;

c with a small budget reflecting few social interests, there would be some doubt as to whether the required costs for additional functions would be outweighed by the estimated benefits.

If the conditions specified above were completely changed, criticism would be great if the budgeting system stood as it did a century ago. The amount of public expenditure, for more than one reason, became over 40% of GNP in recent years, the increase in defence spending, population growth, economic growth and in government functions reflecting great doubts about the claim of the competition doctrine as the inevitable requirement for the efficient allocation of resources (the Lausanne School view). Now, there are reliable accounting systems and adequate controls which could direct attention towards additional budget functions. With such a huge budget and the great social values attached to the benefits derived from government activities, it would be difficult to accept that the cost factor involved in implementing the other functions would not be outweighed by the expected benefits in terms of a greater effective efficiency level of resource utilization.

A word of caution seems to be required here: the rational starting point for reform would reduce the size of costs and meanwhile reduce the period of time after which the benefits would be derived. It is possible, as it has been in the early stages of implementing Planning Programming Budgeting System to misdirect attention to the identification of objectives

and the build-up of programme structure for each department. But after all that, the real problem is one of absence - that is, of a functional information system. If this is not available, then the choice between alternatives is lost because of the lack of this essential condition, and all that has been built up would seem a complete or partial waste.

4.3 Annual Budget not within a Planning Framework

Since the post Second World War period, as the result of policies introduced to maintain full employment and to manage demand in order to achieve this purpose, the annual budget, unlinked with a medium- (up to five years) and long-term (ten years or more) planning budget, was the subject of growing criticism.[1] The issue is how to gear the management of public expenditure to the management of the economy, which is similar, but with differences in scale and complexity, to the situation between the management of a department or division and the whole enterprise. For the latter, the existence of profitability as a measure of success, and of demand as a regulator to outputs and their prices, would make the issue less difficult. This is the case for trading activities which have occupied a sound place in the public sector: a) publicly-owned trading undertakings like the nationalized coal, gas and electricity supplies, b) local authority-owned, like the water supply, c) owned by central government, like the Crown Agents. For non-trading activities, there is no pricing mechanism, the demand factor loses its revenue forecast indication and, in addition, it reflects the conflict and competition between different activities. The benefits derived from non-trading programmes cannot be compared by using one dimension, and, finally, non-trading functions are used to accomplish programmes orientated to problems which have a long- or medium-term characteristic in respect of pay-off and the required resources. An example of the latter is the pay-off of programmes of prevent-

---

1 Plowden Report, Cmd. 1432, HMSO 1961; Public Expenditure: A New Presentation, HMSO 1969; Third Report from the Estimates Committee 1970-71, HC549, HMSO 1971; and for an analytical study on this matter in the UK see Peacock and Wiseman, The Growth of Public Expenditure in the United Kingdom, Oxford University Press 1961.

ive medicine, which extends over several years in the future, and the required spending on educational training and constructive programmes for several years before commencing the provision of the service (i.e. the argument here could extend to the provision of health services in general). In addition, for the solving of any health problem there are different activities other than health which play an essential role (e.g. social and economical aid in relation to the perinatal mortality problem, school-children's education in relation to the smoking problem at an early age).

The annual budget works in terms of : a) authorized votes and sub-heads on a subjective basis, b) the relationship between appropriations and organizational units which exists - but the important relationship between functional activities and programmes is lacking, and c) the incremental tendency of forecasting next year's estimates is unrelated to programmes, nor is it based on evaluation of past performance. All this reflects the tactical rather than the required strategic planning.

It is true that the size of public expenditure on non-trading activities has been increased, also the benefits derived from it, but it is also true that the change in the pattern of allocation between functions (e.g. health) each year is on a very small scale, because the commitment to current and prior decision (e.g. legal, economic and moral) consumed a large part of the yearly budget increase.

4.4 Brief on Trading Activity

In the private sector, the size of revenue is a market determination with particular reference to the firms working in a competitive market. The revenue stated in the budget is a result of the forecasting process rather than its being sanctioned by an authority. The forecast revenue is the result of researches devoted to exploring the consumer's wants and his willingness to pay to satisfy each of them. In addition, a careful follow-up is applied to discover what is going against the forecasts,

related to the demand or the costs of production. In such an environment, the firm can have a long- and a medium-term plan transferred into the financial plan, and within the framework of the latter the annual budget would work as a plan and as a yardstick; in short, budgetary control would work within the financial plan. The usefulness of budgetary control lies in providing top management with information about the results expected from the proposed plans as an aid in the choice process, in regarding it as a management tool, to co-ordinate the execution of the approved plan according to the defined managerial responsibilities, and in measuring the aditivity efficiency of each division or department or function. In the government sector, the dominant authority, also, wants to know what community needs are and how the resources required to satisfy some of them in a period of time could be obtained. The differences between this and trading activity are in the size factor, the indirect relationship between who pays the cost and who gets the benefit, and the authority of the dominant government to fix the revenue in advance for the budget period.

It is difficult to claim that the private sector is in a perfect condition, in spite of the build-up of the organization structure of the firm on function or division basis, the identification of responsibility at each managerial level, and the existence of an adequate management information system to provide the information required for different purposes. There are the conflicts between the objectives of different departments, and between the objectives of a department and of the firm. As far as the objective of the firm is concerned, there is a turning away from the traditional economic theory of the firm's expressing its objective as the maximisation of profit, assuming optimum rationality and perfect knowledge. The traditional economic theory is neglect of natural factors (e.g. the limitations of the human mind), and practical factors (e.g.

planning as a learning cycle). It denies the balance required between different interest groups[1] and the difficulties surrounding its application to investment decisions.[2] Maximising is replaced in the administrative approach by satisficing.[3] But in the modern theory of financial management, in relation to wealth or net present value of the entrepreneurs/owners, maximising once again is used.[4] In addition, the measurement problem is not yet eliminated, e.g. expenditure on basic research. In spite of this, control is always regarded as a vital function of management; the stress is always on control through standard costs or budgeting or establishing the latter on the former, to the extent that management and cost control are regarded as synonymous:

> "Nearly all companies pay about the same price for the tools and services they buy: metals, shipping, machine tools, labour, benefits. Thus with a ceiling on prices and with everyone paying roughly the same price for goods and services, the manufacturer is forced to compete on the basis of sound management of his resources. In fact, we expect that a good portion of the yearly increase in the cost of goods and services will be borne by improved management of resources - in short, cost control". 5

The problem here is, how could it be known that the resources entrusted to a manager were utilized to implement the planned target and measure the level of performance of his function or activity. The establishment of a management information system showing the predetermined results and the

---

1 Frank Abrams, quoted from Adrian Buckey and Eugene McKenna, Budgetary Control and Business Behaviour, Accounting and Business Research, Spring 1972.

2 Diran Bodenhorne, Goals of Business Finance: The Coincident Profit, Hypothesis in The Theory of Business Finance, ed. S M Archer & C A D'Ambrosio, The Macmillan Company 1967.

3 Herbert A Simon, Administrative Behaviour, The Macmillan Company 1960.

4 Ezra Solomon, The Theory of Financial Management, Columbia University Press 1963.

5 J D Staley, The Cost-Minded Manager, American Management Association, New York 1961, p. 22.

actual performance at regular intervals is an essential condition in this concern. The comparisons between the predetermined standard and the actual performance of responsibility centres would be made to identify and analyse the differences and their causes - in short, to enable a feedback process to operate and guide the progress of the firm. The measurement problem, of relating costs to functional outputs, was recognised by F. Taylor more than eight decades ago, in his time and motion study of the leather operation actions to identify the most efficient sequences of actions. Through the passage of time, great developments have been achieved in control systems up to the time of cybernetics, which is the management terminology of control systems - which simply means self-regulatory systems or automatic control. It is an urgent need to have a feedback process which operates and guides for the progress of government activities. The use of the availability of electronic systems (e.g. the electronic card system) would remove some of the previous difficulties by classifying the same information into several classifications according to requirements. Thus, the information could be provided at great speed to the different managerial levels - the planner, the manager and the financial officer. The clear definition of responsibility lines within government activities and the great attention which needs to be devoted to the measurement problem are two lessons derived from the experience of trading activities. Otherwise the effectiveness of the guidelines of the feedback process would be weak. Moreover, great doubts would surround the operation of the feedback process.

In the practical implementation of corporate planning in the long and medium terms, the planning decisions from the centre are preferred, in order to avoid conflicts between the objectives of different departments and the inconsistency of department objectives with those of the firm. Thus, such conflicts would be expected in the government sector, if planning

decisions are taken using the decentralization principle. A promising approach is the preparation of the proposed programmes of the firm or the nation at the departmental level and within the downward guidelines. These proposed plans would move upward to the decision-making level, from which an operational plan, in terms of programmes consistent with the firm's or the nation's policy, would be chosen. Thereafter, the chosen plan would be translated into the language of the departments in the short-term budget. An essential requirement for this is the availability of the input-output information of each function or activity within the control limits of each function's head.

4.5 Performance Control in the non-trading activity

The question of performance control in the non-trading activities within the Public Sector was raised more than fifty years ago. In 1907, the New York Bureau of Municipal Research recommended a threefold classification of expenditure: by organizational units, by activities, and by objects of expenditure (subjects of expenditure in the British use).[1] In 1912 in the UK the Estimates Committee was established to act as the House instrument towards efficiency by examining government departments' estimates. But it faced two basic shortcomings: lack of input-output information for activities and the absence of long-term planning. The result from the effectiveness point of view was a near-failure. In 1918 the issue was raised by the Select Committee on National Expenditure, to change the form of estimates to the functional form or objective basis.[2] The recommendation of the Committee to extend the functional form, started in the Army accounts, to other departments was rejected. Moreover, the experiment itself stopped after a period of time on cost grounds.[3] By the end of the second world war

---

1 Cited in Allan Schick, The Road to PPB, in Politics, Programmes and Budgets, ed. James W Davis, Prentice Hall 1969.

2 Peter Else, Public Expenditure, Parliament and PPB, 1971.

3 Peter Else, ibid.

the old cry of activity budgeting was raised again under the label 'performance budgeting'. In the USA, the Hoover Commission called for the change from the traditional budgeting to the performance budgeting.[1] There were disagreements about the name of the new concept; some would not move from its original name - functional budgeting, some went so far as to call it programme budgeting, and others used the new label - performance budgeting. It is a common matter in social science, to have such a dilemma. When the disagreement does not stop at labels, but extends to concept, the matter can be really serious, leading to a difference in implementation.

4.5.1 What is Performance Budgeting?

Performance budgeting is planning the use of resources, in the short term, to produce or render the outputs of an approved set of activities (intermediate outputs) at the highest level of activity efficiency.

Performance budgeting entails showing in the budget document the classification of proposed expenditure according to activities at the departmental level of aggregation and the expected achievement within the estimated expenditure for each activity.

Performance budgeting requires the employment of responsibility accounting to define the controllable boundaries for each activity or department head, the application of micro-costing studies for measuring the output of an activity, the use of work measurement methods and the introduction of an adequate management information system for the provision of performance information regularly through performance reports to the different managerial levels.

Where performance budgeting is in use, the planned performance will be used as a yardstick for evaluating the activity efficiency of the departmental manager by comparing it with the actual performance. Moreover, by show-

---

1 Cited in Allan Schick, The Road to PPB, in Politics, Programmes, and Budgets, ed. James W Davis, Prentice Hall 1969.

ing the performance level of the activity, it could provide a significant aid in the choice between effective activities to: a) the department head in the preparation of proposed programmes within the downward guideline, and b) the manager of the chosen programme. Finally, working within the actual knowledge about the effectiveness of the activities in relation to the targets, performance budgeting would be the only way for the improvement of effective efficiency level of the authorized resources - in short, performance budgeting is an essential step on the road towards effective efficiency of utilized resources and the only way to its improvement in the short term (see Figure 1).

We have used some terminologies - below we will define their meanings.

Effectiveness: it is the success of the chosen activity in accomplishing the related target, that is, programme objective.

Activity efficiency: it is the level of performance of an activity.

Effective efficiency: it is the product of activity efficiency level and effectiveness, in relation to the accomplishment of a target. This would be zero, when either of the components is equal to zero; although this is most unlikely for activity efficiency, it is quite possible for effectiveness.

4.5.2 An Illustrative Example

Suppose we have two programmes for immunization against disease 'X'; the first would be by vaccination and the second by tablets. There would be four groups for each programme respectively, and the type of vaccination or tablets used differ between each programme group. The capacity of each group in the first programme is to vaccinate 100 patients per working day, and 500 patients per working day for the second. Assume the similarity of quantity and quality of inputs among groups; the total cost/day would be similar for each group under the related programme, and the total cost of each group under the second programme would be five times that under the

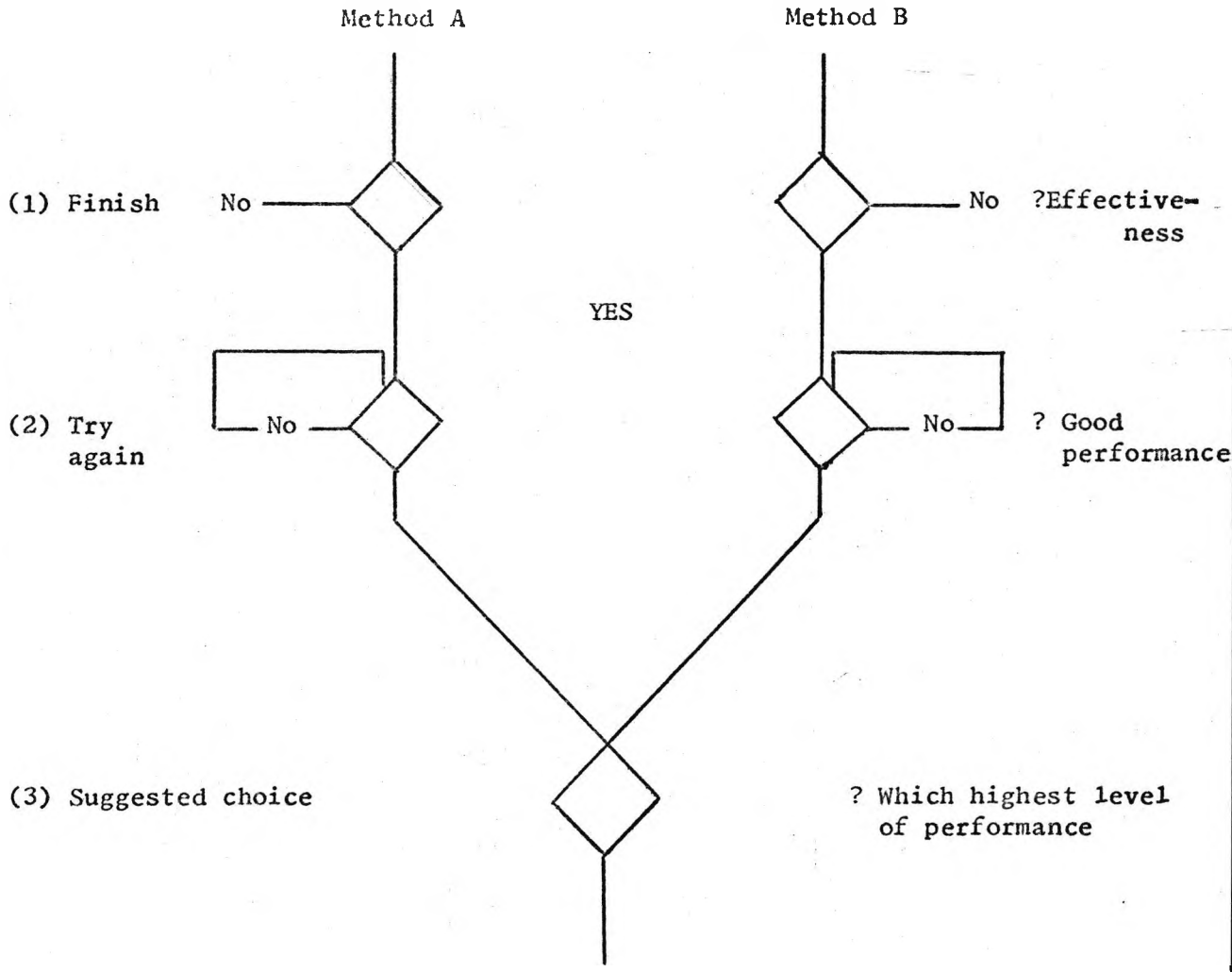
first programme (the planned cost/patient day is equal in all groups, assuming the use of full capacity). Assume fixed characteristic of target group. After an experimental period the following results would be derived; note that groups 1, 2, 3 and 4 come under the first programme and 5, 6, 7 and 8 come under the second programme:

1 groups 1, 2, 5 & 6 proved to be ineffective; the vaccination and tablets used would not bring immunization against disease 'X'. Meanwhile, their actual performance levels were 50%, 95%, 50% and 90% respectively, measured in terms of cost/work unit.

2 groups 3, 4, 7 & 8 proved to be effective according to the above line. Meanwhile, their actual performance levels were 50%, 95%, 50%, 90% respectively, measured also in terms of cost/work unit.

From these results, it could be stated that the effective efficiency of groups 1, 2, 5 and 6 is zero; and of 3, 4, 7 and 8 is 50%, 95%, 50% and 90% respectively.

Then comes the question of accountability - what is it for each manager group? Each manager group is accountable on the level of its performance, regardless of the signs of effectiveness. Therefore, we can rank their levels of performance as follows: 2,4 (95%), 6,8 (90%), 1, 5, 3 and 7 (50%). Note that in spite of the proved effectiveness related to groups 3 and 7, and the ineffectiveness of groups 2 and 6, the former could receive penalty or blame for their low performance (50%), and the latter could receive a reward or gratitude for their good performance level (95% and 90% respectively). For activities with a bad performance level, the resulting variances will be studied to take corrective action. Now, assume the change of one of the previous assumptions, that is, the quality of resources related to group (3) would be less than the other groups (e.g. the attached manpower would have different training level). Therefore, the manager of group (3)



/unless 'standing order' to meet this need irrespective of other choices/ or /interim review with no change in expected cost per unit of output/

Figure (1)

Steps for the Choice between two Methods

should not be held completely accountable for achieving such a bad performance, because part of it would be caused by the new assumption. The same type of argument could be used by one or more of the original assumptions.

4.5.3 What was wrong in the past?

The first problem of the implementation of performance budgeting was the required change of budget classification from the subjective basis to the functional or activity basis. Such a change in the budget classification would mean the sacrifice of the central control over public expenditure through the appropriation system. The presentation of the budget according to the two different classification types could be achieved either by using electronic techniques or the government organization structure being built on functional structure. Neither of these conditions were feasible at the time when performance budgeting first appeared.

The second problem was (and still is) the measurement problem in relation to governmental activities. It is an easy task to measure the subject of expenditure, but it is not easy to measure the output of an activity (intermediate output). In this concern some steps are required: a) the identification of the managerial accountability of an activity head in terms of the controllable items of expenditure, rather than the total costs of an activity or function - in short, applying responsibility accounting; b) the search for the appropriate work unit (or units) for an activity and the definition of its cost; c) the establishment of (adequate) management information system including predetermined standards for each activity under different volumes.

There were two types of confusion in relation to the concept of performance budgeting:

1 The information derived from the implementation of performance budgeting is an essential requirement for the government;[1]

---

1 [illegible]

should not be held completely accountable for achieving such a bad performance, because part of it would be caused by the new assumption. The same type of argument could be used by one or more of the original assumptions.

4.5.3 What was wrong in the past?

The first problem of the implementation of performance budgeting was the required change of budget classification from the subjective basis to the functional or activity basis. Such a change in the budget classification would mean the sacrifice of the central control over public expenditure through the appropriation system. The presentation of the budget according to the two different classification types could be achieved either by using electronic techniques or the government organization structure being built on functional structure. Neither of these conditions were feasible at the time when performance budgeting first appeared.

The second problem was (and still is) the measurement problem in relation to governmental activities. It is an easy task to measure the subject of expenditure, but it is not easy to measure the output of an activity (intermediate output). In this concern some steps are required: a) the identification of the managerial accountability of an activity head in terms of the controllable items of expenditure, rather than the total costs of an activity or function - in short, applying responsibility accounting; b) the search for the appropriate work unit (or units) for an activity and the definition of its cost; c) the establishment of (adequate) management information system including predetermined standards for each activity under different volumes.

There were two types of confusion in relation to the concept of performance budgeting:

1 the information derived from the implementation of performance budgeting is an essential requirement for the government;[1]

---

1 Harold D Smith, The Management of Your Government, New York 1965.

2 programme budgeting is a prerequisite for performance budgeting.[1] The type of information needed for the government is the benefit types. The government needs to know the different benefits expected to be attained from spending a specific budget, according to a particular policy. Performance budgeting provides information on activities and their level of performance. Therefore the outcome of performance budgeting will not satisfy the government requirement, but this outcome has an indirect relationship to such satisfaction. We cannot have information on the expected benefits within the indicated outlay unless the input-output relationship of activities used in attaining such benefits is known. Probably, exaggerating the expectations from performance budgeting led to the underestimation of its real potential uses and prevented the efforts from being directed to the required steps for its implementation.

The second confusion is probably the result of misunderstanding or overlapping between the concept of performance budgeting and programme budgeting. In the next chapter, we will define the concept of "planning programming budgeting system" and present an opposite view, that is, performance budgeting is a prerequisite for PPBS.

---

1 Gladys M Kammerer, Program Budgeting: An Aid to Understanding, (Gainesvill) 1959; Arlene Theuer Shadoan, Preparation, Review, and Execution of the State Operating Budget, Lexington 1963.

5 PLANNING PROGRAMMING BUDGETING SYSTEM

5.1 Introduction

When the Planning Programming Budgeting System was first introduced in the Department of Defence in the USA, the gap between the proponents and the sceptics of the reform was great. Probably, this was due to exaggerated expectations of the reform by the proponent groups, and an underestimation of the valuable changes in the budgeting system which could be derived from the implementation of PPBS by the sceptic groups. Some of the proponent groups went so far as to regard the PPBS as the most significant management improvement in the history of American government. On the other hand, the sceptic groups stood strongly against the claims of rationality and efficiency espoused by the proponents of the reform. The views of the sceptic groups were affected by the actual conditions which were adequate only in achieving a few expectations. Information about community needs, the activity efficiency of government organization units, and the effectiveness of activity outputs in relation to programme objectives were mostly lacking. In course of time, lessons were learned from the practical implementation of the PPBS in the Civil Services, which led to a narrowing of the gap, reflected in terms of more moderate claims by the proponent groups and a more moderate challenge by the secptic groups. Nevertheless, there is no uniform shape for the implementation of the PPBS centrally, locally or for all areas. Nor is there any agreement on a specific definition of the PPBS; it means different things to different people. A definition of PPBS is presented in section 5.2. Section 5.3 examines the components of PPBS and some of the problems facing the implementation of cost-benefit analysis. Why a performance budget is a prerequisite for PPBS is explained in section 5.4. Misconceptions about the implementation of PPBS are presented in section 5.5. The analyst's role is presented in section

5.6, and the accountant's objective is identified in section 5.7. Conclusions are presented in section 5.8.

5.2 What is PPBS?

PPBS is: a comprehensive system gathering analytical tools, previously known and used but each as an independent technique rather than as a component of a system, and putting them into an ongoing learning process.

PPBS aims to link the decision-making and budgetary processes, seeking more rationality and effective efficiency in allocating and utilizing resources.

PPBS requires: a) the allocation of resources in the one-year budget between programmes and activities to be guided by cost-benefit or cost-utility studies and to be integrated into a medium-term (five-years) or even a longer-term planning period; b) an effective feedback process, that is, comparing what is achieved with what was planned, identifying the variances, taking corrective actions required and pointing the issues requiring further analysis. We regard PPBS as all steps of the revised budgetary process, though all areas may not receive the full PPBS treatment because of the nature of area activity or organizational-informational obstacles, or both.

5.3 The Components of PPBS

PPBS consists of components which together represent it as a system. These are as follows: (see figure (1))

Identification of objectives

Programme analysis

Multiyear planning

Measurement, evaluation and feedback.

It seems essential to state before any further analysis that the stated components of the PPBS are working in a cyclic pattern. From each cycle, lessons would be derived about the problem in hand, as well as the effect-

ive application of the PPBS itself.

5.3.1 Identification of Objective

A statement about objectives is a statement about what is intended to be achieved without which there would be no need to raise the questions of effectiveness and effective efficiency. The only retained issue would be on the level of performance, which would not be sufficient for resource allocation. In such a situation, the tendency would be toward the incremental growth of all activities according to specific proportions. This would be a misleading concept because it would concern the means rather than the ends(or operational objectives). This, with a very few doubts, would be associated with a waste, and probably a great one, of resources.

The words objective, goal, value and target are used interchangeably in the literature. To avoid confusion we are going to use three terms: 'objective', 'operational objective' and 'target'. The first will refer to the vague definition like the improving of individual health. The second will refer to a specific definition, which would contribute to the achievement of the vague objective, like reducing perinatal mortality rates. 'Target' will refer to the output of a programme, sub-programme or programme element. Objective, by definition, usually indicates nothing in specific terms. Therefore, without a further downward link, it seems to be useless for the planning and resource allocation process. For instance, when we refer to the improvement of an individual's health or his level of education, these would not provide much help in resource allocation. The related meaning would mean different things to different people. Objectives need to be translated into meaningful concepts, that is, into operational objectives. Operational objectives would be derived from and established to resolve some of the community problems. In this concern, it seems that a distinction is required between basic problems and non-basic problems. This view is built on the belief that every individual as part of

a group and the group as part of the community has basic needs which should be satisfied. Meanwhile there would be the basic needs of the community as a whole, e.g. defence. An initial approach to that would lie in regarding the community as consisting of beneficiary groups; in addition, there is the national interest. Age structure seems to be a sensible basis for group classification because the differences among members of the same group would not be great.

For each considered problem, identified as basic or otherwise, having gathered information about its actual and prospective tendency, an analytical framework seems to be required, to give information about: what actual actions are being taken? how? for whom? and what innovations have appeared on the horizon. Flexible budgets could be drawn up showing the estimated incremental benefits under different increases in budget size, or an upper and lower limit could be identified to avoid ambitious demands. The question here seems to be: which problem should be considered and subjected to analysis? It doesn't need saying that analysis consumes resources and analysts themselves, now and probably in the medium term, are in physical scarcity. For this question there are three possible answers, as follows:

a problems to be considered could be those which have a political priority; this means that the analytical framework would extend to these areas only. The ground for this would be that, unless there is a political interest, there is no need for the analysis. The authorisation of an operational objective, subject to priority and the latter, is a political function.

b problems to be considered could consist of two types, one related to basic needs (which depend on the definition of basic needs) and the other related to government interest (this could include part of the former). By no means should this be interpreted as disregarding the political role, nor are the operational objectives imposed on them. No operational objective would be authorised unless it had the agreement of the political structure.

The analytical results of the problems considered would present different estimated benefits for different beneficiary groups and for the nation as a whole. In other words, the proposed operational objectives would represent a yardstick for selecting alternative policies by the political structure. Each policy consists of operational objectives, the background of which is probably the political ideology of the party concerned.

c A broader approach would be to add to the previously over-basic problems those that have not already gained government priority.

In choosing any of the three ways, it seems worthwhile to state that analysis is a means rather than an end, and to repeat that analysis consumes resources, sometimes becomes expensive, and that analysts are physical constraints. Accordingly, if there could be a definition of the basic problem, and the political structure were interested in its solution, the second way would seem sensible. Otherwise, the first way would be accepted, because the second would be a step in the direction of the third.

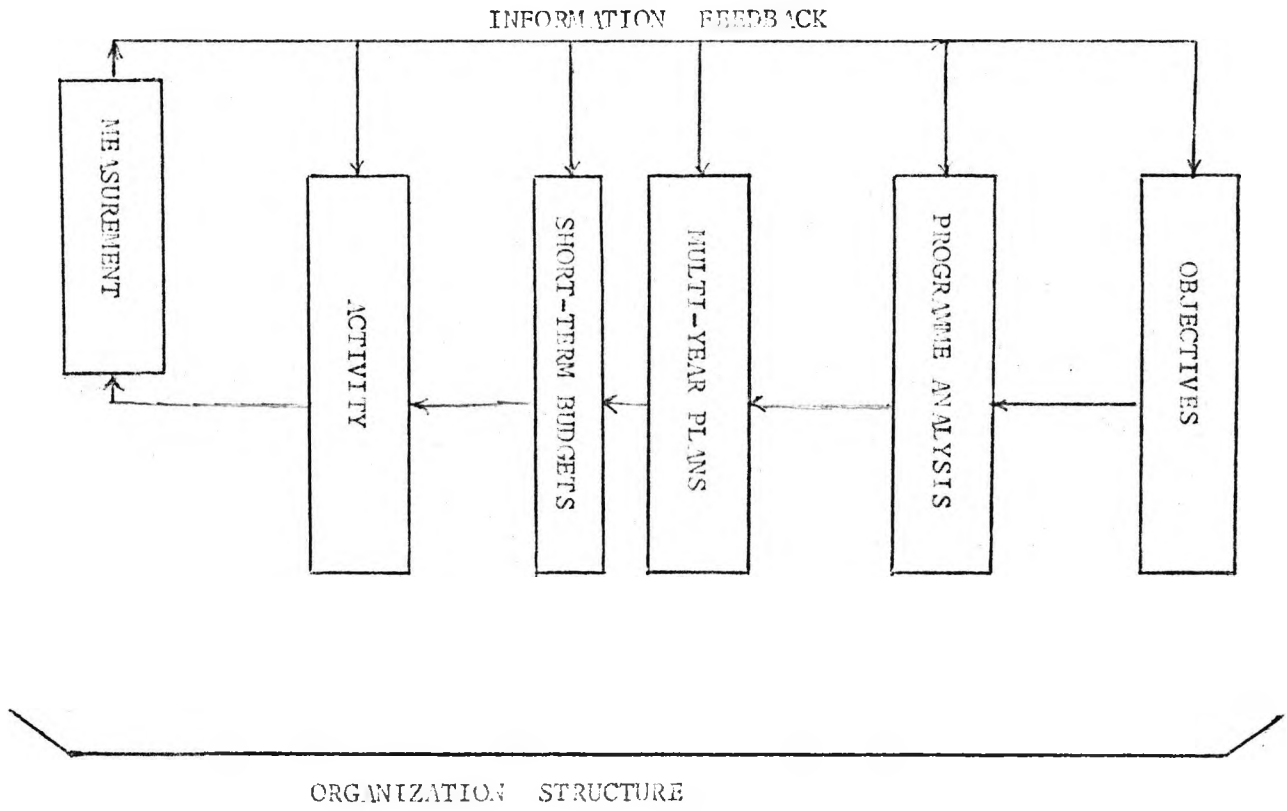


Figure (1)

[illegible] Components

There are two approaches in relation to the issue of operational objectives and the results derived from each are not identical as regards their effectiveness. The departmental approach is the first and the problem approach is the second. The departmental approach is mainly concerned with the department operational objective. Thus it seems that it is means-orientated rather than end-orientated. The opposite is the case with the problem approach, which is concerned with a problem as a reflection of needs, at present and in prospect. Notwithstanding, information about the output of a department is significant in the choice process, seeking effective efficiency in utilizing resources rather than as a basis for building up the operational objectives.

The treatment of a problem element could be the concern of more than one organization unit's (or part of its) target; the latter could as well be utilized in the treatment of more than one problem element type. The resources used in achieving departmental output would be wasted unless they are, at least, effectively used in treating a problem element.

5.3.2 The Analytical Role of PPBS

Since the explicit use of analytical aid in military decision-making in the Second World War, the role of analysis in solving the problem of choice has expanded to more complex problems within and outside the defence area. The dilemma of labels appears, as usual. Several terms have been used to describe different things by different people with respect to the analytical role: operations analysis, cost-benefit analysis, cost-effectiveness analysis, cost-utility analysis and systems analysis, are just examples. Confusion occurs in using as reference one label, and assuming the identity of a concept of another label. For instance, using cost-benefit analysis as a synonym for systems analysis.[1] The question we raise

---

1 Roland N McKean, Efficiency in government through systems analysis, RAND 1958.

is: where does the analytical role of PPBS stand - is it in systems analysis?

Operations analysis (research), as the first label used, was applied to a problem in the immediate future, where the severity of factors associated with the actual complex problems did not exist. These factors are the interrelationship among variables and problems, uncertainty, long-term time phase, externalities and widening the criteria problem. For example, these factors did not exist in the bomber formation operations analysis done in the Second World War.[1] If the operations analysis had provided effective solutions to the simple problems, it seems unfair to attack the progressive analytical techniques and scientific methods used for not being on the same level of success. The complexity of the actual problems is far greater than the ability of the available techniques. In spite of this, the contribution of the analytical techniques is useful in the present and probably in the future. It seems worthwhile to state that the complexity of the problems is a function of time which started well before the first use of analytical techniques. Moreover, to solve or design approaches and choose from them to solve a complex problem, the analysis is extended into the unknown future and sometimes fifty years beyond the present time. We should be grateful for anything which would positively contribute to dispelling some of the clouds of uncertainty, but with a careful eye on its cost - that it should not be greater than the expected pay-off. It seems worth repeating once again that as we are trying to find a solution for a complex problem in the future, we have to work within a cyclic framework to learn and re-learn from the output of each cycle and each step within a cycle.

---

1 Charles Hitch, An Appreciation of Systems Analysis, in Systems Analysis, ed. Stanford L Optner, Penguin Modern Management Readings, 1973.

It is such a cyclic framework which one could label systems analysis, and probably any other analytical framework or technique which is less comprehensive would not be adequate to be labeled likewise, e.g. cost-benefit analysis. Alain Enthoven defines systems analysis as: "a cycle of definition of objectives, design of alternative systems to achieve these objectives, evaluation of the alternatives in terms of their effectiveness and costs, a questioning of the objectives and a questioning of the other assumptions underlying the analysis, the opening of new alternatives, the establishment of new objectives, etc...".[1]

It seems to us that Planning, Programming, Budgeting System satisfies the condition of the system approach.[2] (This view is different from that regarding cost-benefit analysis as a system analysis.[3]) Their components are in a cyclic shape with a closed loop, and each component could be regarded as a stage with timely inputs. The output of each cycle would be the input of the next cycle and some or all of its stages through feedback, which would be a continuing process (see Figure (2)). Operational objectives result from the translation process of the general values (objectives) in terms of the alternative policies subjected to priority decision. Programme analysis, which contributes to the move from implicit to explicit thought, is concerned with: the identification of alternative programmes in relation to the achievement of an operational objective, the examination of alternatives with respect to costs and benefits, and the presentation of reports to the decision-maker including the recommendation of the analyst on the most effective efficient alternatives. Decisions

---

1 Quoted from Charles L Schultze, The Politics and Economics of Public Spending, 196

2 P G Thome and R G Willard, The System Approach, System Analysis, ed. Stanford L Offner, Penguin Education 1973.

3 Roland N McKean, Efficiency in government through system analysis, RAND 1958.

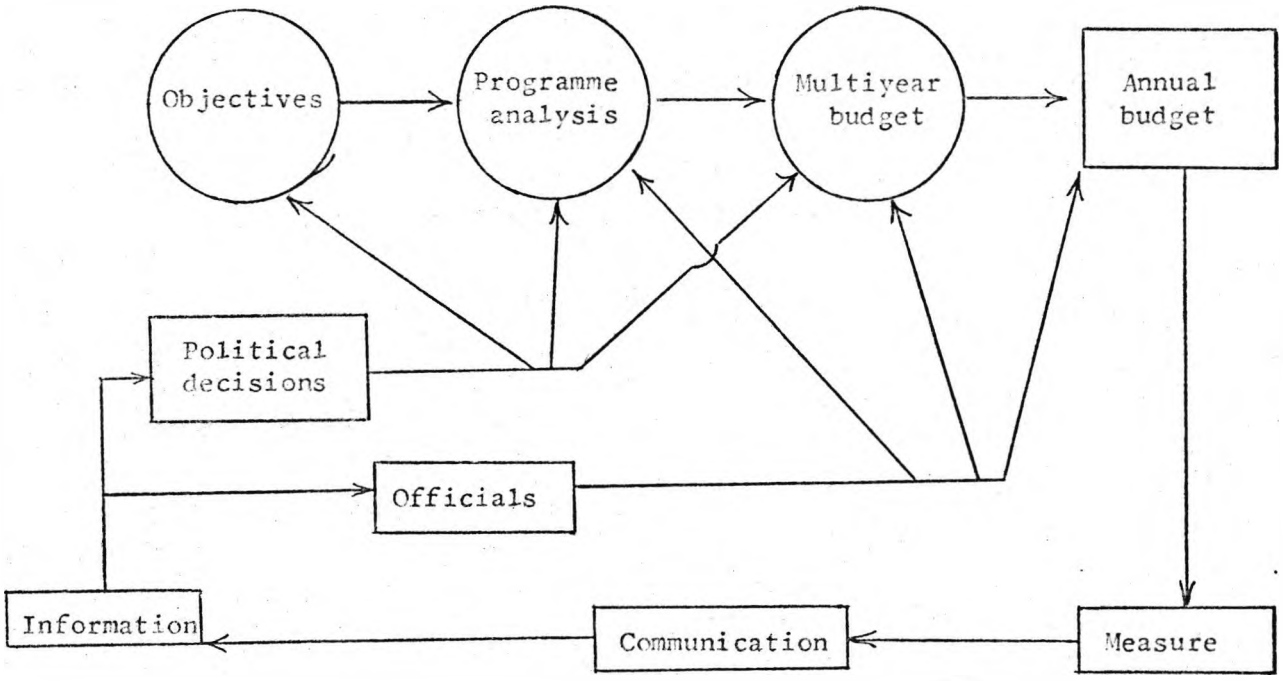


Figure (2)

would be taken to draw up the multiyear budget[1] in detail for the next annual budget and in gradual aggregate for the following years. Information on the accomplished results would be communicated through reports to officials and the political structure. The feedback of this information is very important because in the light of it and of additional environmental conditions, the new cycle would start. Nevertheless, the implementation of programme analysis, as well as of the PPBS as a whole, would not make the decision-making process easier or cheaper than without them. But probably the potentiality of more effective efficiency seems to be greater than without them.

The time factor, the choice of the analyst and the analytical starting point are three points of programme analysis. The presentation of the analytical summary should come before the decision date, with a sufficient period left to the decision-maker for examination, consideration and judge-

---

1 For more explanation, see section 5.3.4.

ment; otherwise the benefit side of the analysis could be greatly reduced or could have a zero effective efficiency value. From another point of view, the time period covered by programme analysis depends on the nature of the relevant area, which could extend for years into the future (e.g. health programmes). By regarding the annual budget as working within medium- and long-term planning (and the use of analytical techniques in the government sector is not so far developed), it seems that in present conditions, selected analytical studies are faced with the time factor constraint related to the budget period, the extensive work within it and insufficient guidance from previous studies.

People who are involved in analytical work need to have technical, and managerial, skill, and knowledge about the investigated area or problem. The latter, probably, could be acquired through statistical information, interviews and discussion with those in the field. The former seems to be a pre-requisite qualification. The point here is, is it preferable to choose the analyst team from the department concerned (i.e. subordinate within the executive hierarchy of the department), or to contract with an outside organization. The advantage of the former could be of working in the field, being close to the environmental condition of the field, and of having a respectable knowledge of it. There are more than one disadvantage: analysis should not respect organization structure (probably knowledge about activities in more than one department is required); the danger of overestimating the expected benefits of a project which is carried out wholly or mostly by a specific department interested in the project for its outcome or wishing to expand its budget (i.e. in the experience of water resource projects, this has been discovered in more than one case).[1]

---

1 Irving K Fox and Orris C Herfindah, Attainment of efficiency in satisfying demand for water resources, American Economic Review 54, No. 3, 1964; for further discussion, see Charles L Schultze, The Politics and Economics of Public Spending, 1968, who suggests the establishment of 'Partisan Rationalizers' as experts in the respective fields.

Programme analysis does not start from the abstract (zero-base budgeting) but from what is accomplished in relation to the stated operational objective through working activities. There is more than one obstacle in starting from the zero-base for each established programme. Legislation, political, time and cost are just examples.[1] Probably the incremental type is preferable. Recently in the UK a great argument has rated about the completion of the Concorde project. It seems interesting that the cost factor of scrapping the project merely equals the cost required for its completion, apart from the issue of unemployment which would result from scrapping the project.

5.3.3 Problems of applying Cost-Benefit Analysis

The analyst, in examining the alternatives, is looking mainly for two pillars - cost and benefit. Because of the character of the government sector, the analyst is forced by the existence of externalities and the shortcomings of market prices to move away from the conventional techniques usually used in the private sector, and use instead other analytical techniques. Cost-benefit analysis[2] is probably the best of these, first applied in the water resource project in the USA and later extended to many other fields. There are two main problems in applying cost-benefit analysis - what cost and what benefit should be included and how can they be evaluated under the conditions of uncertainty and risk? For social problems, which are mainly the concern of the government sector, the definitions of cost and benefit are wider than the traditional ones used in private business. Both economical and social cost and benefits would

---

1 For further discussion, see Merewitz & Sosnick, The Budget's New Clothes, Markham Series in Public Policy Analysis, 1971; John Garrett, The Management of Government, Pelican Books 1972.

2 For an interesting article, see A R Prest and Turvey, Cost-Benefit Analysis: A Survey, Surveys of Economic Theory, Vol. III, 1972; Robert Dorfman, Measuring Benefits of Government Investment, The Booking Institute 1965; M G Kendall, Cost-Benefit Analysis, The English University Press 1971, include various practical studies.

be concerned in government activity. In examining any alternative, we are not just looking for the direct costs and benefits, but for the favourable and unfavourable externalities. In other words, for each alternative course of action we ask what is the incremental effect of that course of action, from the cost and benefit points of view, directly and indirectly related. In this concern, the search would not be only for those elements which could be evaluated in money terms, or even which could be presented in quantitative terms. A vast number of benefits derived from government programmes would fall short of being feasible for monetary evaluation. The case for quantification does not seem a likely one; however, there are reasonable elements which could only be stated qualitatively. The problem of attaching value to the benefit side according to a unified dimension seems to be an impossible task; it is better to consider it as a matter of judgement. In that regard, Professor Alan Williams says:

> "Attempts have been made to derive the value of saving a life from compensation awards by the courts, since these are made in the name of the community at large. But in my view it is the task of our elected representatives to determine what this figure should be. That is, they should solemnly debate on issues such as "how much of the community resources it is worth devoting to extend the expectation of the life of the average citizen by one year".[1]

The choice is probably between benefits, and as far as the latter are demonstrated by more than one dimension, so the decision-maker, in allocating resources, wants to know the opportunity benefit of using a specific resource in a particular project with a different type of benefit.

The second problem is the evaluation of future cost and benefit under conditions of uncertainty and risk, in short, the discounting problem. In this regard, there are two cases, the first when the benefit side is

---

1 The Economic of Public Expenditure, Memorandum to the Select Committee on Procedure, 1968-9, p. 111.

demonstrated in more than one dimension, and the second when only one benefit is concerned. In the first case, assuming that there are two projects, A and B, and the associated benefits of the former are assumed to be under dimension X (e.g. number of students graduated) and the latter under dimension Y (e.g. number of persons screened against chonic diseases), the cost stream in the future for each project is different but equal in total. What seems to be possible is the presentation of a statement for each project, showing the yearly expected net cost (i.e. the incurred costs minus any expected monetary benefits) and the estimated benefits (i.e. X or Y). When there are qualitative benefits, these should be presented in the statement. Should the discount method be applied? It seems that we cannot use the discount for the net benefit value because benefits could not be subject to monetary valuation. In applying the discount procedure to the cost factor only, what discount rate should be used? Assume that in one way or another a rate is chosen. The result would be the translation of the cost stream of its project to its present value. At the same time, the benefit stream in the future would not be touched. Does that help the decision-maker much in his choice? Or is the decision closely related to choice between benefit-types? The second case to be considered is where one benefit-type only could be accomplished by different projects and the difference concerns the cost factor and its future stream. The search is for the cheaper project. Assume here that Project A would require more capital expenditure in the earlier years than that required for Project B, and the total costs for both are equal. Assume for the moment that the expected quantitative benefits from both projects annually are similar. It would appear, using the discount procedure, that Project B is cheaper than Project A in the sense that the potential foregone benefits of the difference in capital expenditure between Project A and Project B by choosing the former would be greater than the potential foregone benefits of the differences in yearly expenditure between Project A and Project B

by choosing the latter. There are two points here which are related: the first is related to qualitative and quantitative costs attributed to each project, which cannot be valued in money terms. How can we take them into account? Is it not possible that the monetary figure presented could reduce their importance in a debate? The second is, can the foregone benefits in choosing either of the two projects (as a result of different cost streams) be evaluated when it would not be feasible to subject them to monetary evaluation? In addition, when the previous assumption about the similarity of yearly benefits is relaxed, the difference of benefit stream between the two projects would seem to be a further point against the use of discount procedure. In the preceding discussion we do not intend to oversimplify the problem of time factor; our intention is to raise a question rather than give an answer in relation to the use of discount procedure; that is, what is the cost and benefit of using the discount method?

A final point, but a dangerous one, is double counting. In cost-benefit analysis, the analyst is usually faced with transferable effect (i.e. cost for one party and benefit for another); when this is not discovered and treated correctly, the final statement of cost and benefit will be exaggerated. However, we do not mean that a correct final statement presenting the value gained from the project concerned would be sufficient. On the contrary, that would be misleading, since it would ignore the distributional effects on the parties concerned. In fact both statements are required for the recognition of economic efficiency and social equality as the two principles considered, and the trade-off between them will be decided by the judgement and beliefs of the decision-maker.

5.3.4 Multiyear Planning

Planning is a term that refers to something in the future. Something 'ought to' or 'can' or 'will' happen. These are the three planning

levels, respectively: normative planning, strategic planning and operational planning. Unlike the characteristics of most public programmes which require forward planning, the introduction of meaningful planning in the government sector is made by PPBS. In the UK the issue was recognized some years earlier than the appearance of PPBS, and led to a recommendation in the Plowden Report.[1] Since 1963 several developments have occurred in this sphere in terms of public expenditure surveys covering five years, then in much more detail, and later linking the long-term surveys to the annual estimates and appropriation.[2] Nevertheless, some shortcomings still exist, which could be avoided by the implementation of PPBS. Some of them are: a) no inclusion of an explicit statement about objectives; b) analytical studies of alternative programmes seem to be inadequate; c) lack of post-audit of the results of past expenditure; d) lack of effectiveness and performance criteria.[3]

The significance of meaningful planning introduced by PPBS seems to lie in regarding it as a component of a learning system, with respect to the effective relationship with the other components, and the cyclic nature of the system itself, which would continuously increase the effectiveness of the multiyear (five-year) plan. There is little argument about the period of the plan[4] - a five-year period. Nevertheless, many government programmes and projects for evaluation purposes would require analysis over a longer period. It seems that the period identified for the multiyear plan amongst all programmes represents the required unification. For this period, the

---

1 Control of Public Expenditure (Plowden Report), Cmd. 1432 1961, para. 7.

2 Peter Bird, Accountability; Standards in Financial Reporting, Modern Finance Series, 1973, Ch. 2.

3 John Garrett, The Management of Government, Pelican Books 1972, Ch. 4.

4 Some treasurers in British local government prefer the 3-year period as more realistic. At the same time that could be criticized from the comprehensive effect resulting from a longer period. K E Rose, Programme Budgeting, IMTA 1969.

multiyear plan would show the proposed costs and output in programme terms and its sub-classifications, related to the future consequences of past and current decisions of the department. It is worthwhile mentioning that the detailed type of information included in the plan is not the same over the whole period. The most detail would be related to the first year and, in aggregate terms, increased over the rest of the period.

The multiyear plan is not a rigid one; it is subject to yearly review, not as a whole but in the parts where circumstances have changed. There are essential steps, as a result of which the plan would be established. These are forecasting the future, information feedback displaying what has been accomplished, identification of operational objectives, and chosen alternatives as the outcome of programme analysis. A selective approach would be used in the yearly review of the plan. This would be in terms of selected issues, related to a continuing programme or any new major proposals which would require new legislation, which would be subject to in-depth analytical studies for a period of years in the future. The results of this would be summarized and presented in the programme memorandum as a feeding instrument to the annual cycle of policy review. The preparation of the selected issues for further studies is something to be done yearly, through co-operation between the Treasury and the department concerned.

The Multiyear Plan, as it is commonly understood, does not really represent multiyear planning. The Plan includes proposed decisions for the first year budget only, and the future consequences of both current and prior decisions. In other words, it shows the outcome of the planning process. The planning process is concerned with answers to the three following questions:

Where we want to go;

What we have to do;

How much can we achieve?

The answer to the first comes from the political ideology of the dominant authority. The second answer is the result of the choice process between different operational objectives. The answer to the third question is the outcome of programme analysis related to the programmes - orientated to the chosen operational objective within the total five-year budget. Thereafter, the dominant authority will choose and allocate the incremental resources between the different targets (programme objectives), the outcome of which would be shown in the first year of the multiyear plan. During the execution of the first year budget, through the feedback process information on the achievements of the working programmes would be obtained by the managerial levels concerned. By taking account of resource prospective, programme-achievement, and analytical reports, the new priority would be shown in the budget in terms of continuity on the previous rate, expansion, reduction or postponement of the working programmes and the proposed new decisions.

In this concern, the existence of operational objectives is an essential part of the planning process. They represent the inevitable link between the first and the third questions (above); otherwise, rationality in planning would almost disappear. Operational objectives originate in community problems, but preparing them does not commit the decision-maker. The usefulness of their existence would be as follows:

1 an essential yardstick for choosing between alternative policies;

2 they could explain the direction of the organization unit under a specific policy;

3 they clarify the available options for each specific area;

4 they are the source for:

   a the derivation of the proposed targets included in the multi year plan,

   b an extraction which would be made to determine the hierachy of

targets at different responsibility levels in the organization for performance control.

As a possible situation in trading activity, it is of great use in the government sector to have long- and medium-term planning on rational grounds, the outcome of which is shown in the multiyear planning or budgeting.

5.4 Performance Budgeting is a Prerequisite for PPBS

PPBS really has opened the door to the choice between activities, for the achievement of a target or programme objective, across the organizational boundaries. This choice is concerned with both effectiveness and activity efficiency, regarding the general aim in resource utilization as being the achievement of the highest level of effective efficiency. For the achievement of a target at the lowest costs, an essential step is to choose the effective activity with the highest level of performance. This really requires the availability of information on the performance of activities, a shortcoming always recognised in non-trading activities, which demand the establishment of performance budgeting.[1]

There are two views concerning the relationship between 'performance budgeting' and 'planning programming budgeting system'. The first view was the erroneous claim that PPBS is a prerequisite for performance budgeting, which was the result of overselling the usefulness of performance budgeting. Where performance budgeting is in use, the departmental manager will be evaluated and a significant aid will be provided for the achievement of effective efficiency in resource utilization. It is true that performance budgeting did not open the door to the choice between activities regardless of organizational boundaries, nor did it relate the activities of an organization unit to objective base. It is also true that these are not, and should not be, considered as shortcomings of performance budgeting,

---

1 For a definition and the requirements of Performance Budgeting, see section 4.5 above.

simply because these are not within the concern of performance budgeting. Measuring the cost of an activity output (intermediate output) does not require that the cost accountant should know the programme objective to be achieved. He is simply provided with the chosen intermediate output. Measuring the cost of the output of a hospital ward, out-patient clinic, diagnostic X-ray department, laundry or health visitor requires the identification of output-unit or units of each activity and relevant costs. Whether an intermaediate output is utilized in achieving the objective or objectives of health programmes (i.e. prevention, treatment and cure, or treatment and/or care) is of no concern during the measurement process.

The second view is that performance budgeting is concerned with the process of work (what method should be used?), while PPBS is concerned with the purpose of work (what activities should be authorized?).[1] We do not disagree with this view; rather we are going a little further to clarify the point that performance budgeting is really a prerequisite for PPBS. The point is, which type of information the political decision-maker wants for the purpose of resource allocation, and by which approach this will be satisfied. The political decision-maker needs to know the different benefits which could be bought by £X million. One approach is to provide the political decision-maker with information, related to the demand of each department for extra funds, built on a subjective basis. This approach does not provide the requisite information. Another approach will show the intermediate output expected by spending the proposed outlays, such as number of hospital beds, number of health visits, number of places in new schools and teaching time. Such outputs are the result of the first transformation of input into intermediate output, and in themselves are not final

---

1 Allen Shick, The Road to PPB : the Stages of Budget Reform, Public Administration Review, XXVi, 1966, pp. 243-58.

outputs (benefits). The benefits will be derived after the second transformation, that is, by utilizing intermediate outputs in achieving programme objectives. Once again, information on intermediate outputs will not satisfy the requirements of the political decision-maker, but it is a prerequisite in obtaining that information. Benefits or final outputs are the result of utilizing a combination of different intermediate outputs. Therefore, a lack of cost information of the intermediate outputs will represent a real obstacle to obtaining information on how many different benefits would be bought by spending the proposed outlays. In a recent enquiry on postgraduate education, the committee was forced to extract from the DES round-figure approximation of the annual current costs of postgraduate education and of the maintenance grants made to postgraduate students, because the accounting systems do not permit the extraction of the required information. The committee expressed their view on the value of the extracted figures as: "...useless for public expenditure scrutiny and control. We also find it difficult to comprehend how policy decisions can be taken without the basic data from which comparison can be drawn and trends observed. We think it essential that a suitable accounting system for postgraduate education should be introduced in both the university and further education sectors".[1]

When the accounting systems provide us with cost information on the "process of work", the requirements of the political decision-maker can be adequately met and an essential step on the road to achieving the "purpose of work" at the highest level of effective efficiency of the utilized resources, will be accomplished.

5.5 Misconceptions about PPBS

PPBS and the requirements for its effective implementation are surrounded

---

1 Third Report from the Expenditure Committee, Session 1973-74, Postgraduate Education, V. 1, HMSO.

by more than one misconception. One dangerous argument lies in regarding a specific component as more important than the others. For example, regarding the presentation of budget in programme terms as the most important and contribution of PPBS. PPBS is a comprehensive system consisting of several components, working together in a learning cyclic pattern and the importance of each component is derived from being a part of the cycle, rather than from its own importance. Another misconception is to regard PPBS as a rigid system which would require a uniform implementation for all departments. In the D O D, in which PPBS was first implemented, full treatment is still far from being achieved. Another misconception is that the effective implementation of PPBS would require organization of governmental activities to match the chosen programme structure. Programme structures are not fixed, but are flexible according to changes in circumstances, and the intermediate output of each activity could be utilized for the achievement of more than one programme objective.

5.5.1 Differences in Implementation

Defence is not a good example from which to generalize on the implementation of PPBS. A large part of defence programmes deals with equipment, which is not the case in the civil departments. Financial and administrative problems have less weight in the defence area than in the civil. Planning and financing programmes of national defence require the involvement of political power at its highest level only; but civil programmes, concerned with individual groups and associated with effects on income distribution or redistribution, require the involvement of political power at central and local levels.

The size factor is recognized as a cause of differences in implementing PPBS. Difficulties are found to be greater in central than in local government. The sensible approach is to implement something in an area of minimal difficulty, since the expected net marginal benefits would be greater.

Accordingly, the implementation of PPBS would be more promising at the start in local government than in central government.

The universal implementation of PPBS for all government activities at the same time seems to be a very difficult task in spite of the prospective co-ordination between the different activities opening the door for a larger number of alternatives and avoiding the imbalance of forces resulting from the one-area approach. A long period for planning and introduction is required - can we afford that luxury? The universal approach would require an examination of the adaptability of each area to PPBS as a system, clarifying the feasibility of the contents of PPBS, and considering the resources needed for such a comprehensive approach. Probably, resource constraint is the principle disadvantage against the universal implementation. A second major disadvantage could be the treating of PPBS as a revolution causing the loss of lessons derived from its incremental implementation. In addition, the cost created by the failure of implementation on account of the nature of an area activity (e.g. international affairs), the actual weakness of the organization structure and the lack of performance information, could be attached to the PPBS. This cost could be great, but its total attribution to PPBS would certainly be unjust, and could jeopardize the continuation of the reform.

On the other hand, the one-area approach is adequate when the boundaries of the problems involved are identified and the necessary resources and information are available. But disadvantages also exist, such as the difficulties surrounding the open-problem and the overlap of objectives between the activities examined.

The implementation of PPBS would be more fruitful, less costly and safer if the incremental rather than the universal approach were followed. The benefits would also be greater if we applied the incremental approach to the contents of PPBS, starting with the component showing the highest

expected net marginal benefits. This should not mean that there is only one starting point in implementing PPBS. For instance, the measurement process represents a general problem in governmental activities, but this does not mean that the expected benefit from directing specific resources to improve the process outcome will be similar in different areas. The nature of area activity in estimating the possible improvement should be considered. In an area like international affairs, there is always a substantial element of uncertainty, which increases the difficulties of predicting the outcome of a certain policy and expressing it in final output terms. The basic difficulty probably lies in recognizing and understanding all the basic forces at work and the free choices of the individuals involved. Here, it seems that the corporate strategy of the nation derived from the dominant political belief is the cornerstone. Any relevant decision would need the wisdom of the politician more than the possible situation in other areas, where the role of information and analysis would have more promise, such as health, education and agriculture.

5.5.2 PPBS does not ask for reorganization

Government activities were set up under major functions like defence, health and education. The inconsistency between organization and function structures is well known. At the same time, needs are not fixed but a function of the quality of life and of individual desire. It is a fact that complete satisfaction is an endless objective, better say impossible, even if resources were available, since attainment of needs would create others in this world of relativities. To improve life in the future, three essential processes need to be considered: knowledge and information about needs and ways of achievement; learning and experience; improvement and progress. If the first process is in a poor condition, then it seems worth making an extra outlay on this process than on others because the effectiveness of the others would greatly depend upon it.

PPBS is an objective rather than an organizational orientation, but there is a view advocated by a group of authors which requires the reorganization of the activities to match the programme structure. Professor Aaron Wildavsky, a great sceptic of the feasibility of PPBS, regards reorganization of the actual structure of government activity as a condition for effective implementation of PPBS.[1] His view may be split into two elements. The first is the desire for more centralisation of authority, the second is the desire to change the actual organization structure (e.g. expenditure on health in USA is distributed among at least twelve agencies and six departments outside of health, education and welfare) to avoid "the multiple jurisdictions and overlapping responsibilities (which) do violence to the concept of comprehensive and consistent programs".[2] In fact, Wildavsky presents the two elements as one view, the centralisation element being a consequence of reorganization. We agree on the requirement for centralisation in planning and resource allocation, but not with regard to the second element, and prefer the use of cross-over networks to translate programme budgeting into conventional budgeting. Our view is in agreement with that of British local government, which seems to have led the challenge against the issue of reorganization as a necessary accompaniment to PPBS. The IMTA states: "By the same token an organization structured to conform to a particular programme structure would by its own rigidity threaten the flexibility inherent in programme structure and should on that score be avoided".[3] The same view is shared by another author: "the program

---

1 Aaron Wildavsky, The Development and Consequences of PPBS, Public Administration Review, XXVI 1966, pp. 292-310.

2 Ibid.; see also William M Capron, the Impact of Analysis on Bargaining in Government, in Politics, Programs and Budgets, ed. James W Davis 1969. Capron agrees with Wildavsky on the need for reorganization, but without centralised authority.

3 IMTA, Report No. 6, November 1970.

structure will not necessarily reflect organization structure. It will be appropriate and desirable in many cases to have the basic program categories cut across bureau lines to facilitate comparison and suggest possible trade-offs among elements which are close substitutes".[1]

The disagreement on the requirement for reorganization to implement PPBS has been expressed differently as "the mistaken notion",[2] "one of the dangers as a possible outcome of recosting the entire budgets",[3] and as "harmful practice in some cases" and "the effectiveness of PPBS doesn't depend on reorganization".[4]

To reorganize departmental structure to fit the designed programme structure would not be the end of inconsistency between programme structure and activity structure. There would be no permanent programme structure, as there would be no permanent policy. The establishment of adaptable programme structure depends, on one hand, on policy priority decisions and, on the other, on derived information which pinpoints the effective efficient ways for policy achievement. Policy programmes (decisions) represent operational objectives which ought to be achieved, or needs which it is decided to satisfy. Thereafter, the alternatives would be exposed through programme analysis processes, the conclusion of which - information about the effective efficient proposal - would be provided to the decision-maker to help him in the choice process. It is hard to say that a particular organization

---

1 Bulletin 66-3 by the Bureau of Budget, Sec. 5, 1965, quoted from M Tylor, 'Designing the Program Structure', Program Budgeting and Benefit-Cost Analysis, ed. Hinrichs and Tylor, 1969.

2 Ibid.

3 R H A Armstrong, "The Approach to Planning, Programming, Budgeting System in Local Government", IMTA, Vol. 73, No. 11.

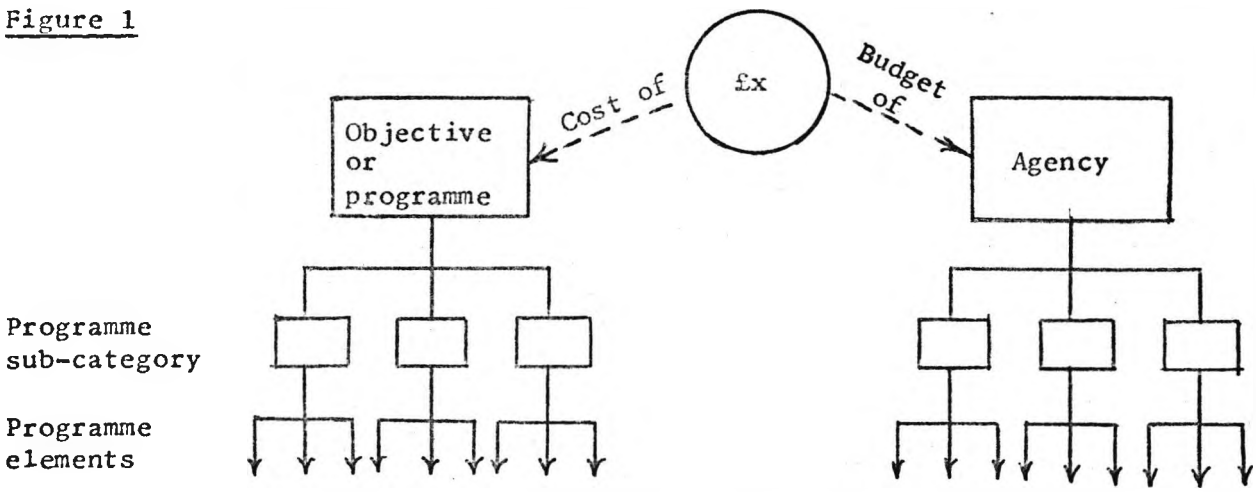
4 Charles L Schultze, The Politics and Economic of Public Spending, 1969.

structure should conform to a particular programme structure, since that would mean that the flexibility of programme structure would be reduced, leading to harm in terms of decreasing effective efficiency as a consequence of the restriction of alternatives by the established organization boundaries.

Some authors rightly stress that the original problem was not the build-up of government agencies according to functional organization, but then give the view, with which we disagree, that the organization of functional activity must be tied up to programme structure:[1]

> "An important conclusion follows, if government agencies were organized according to function, conventional accounting would be program accounting (and would simultaneously be object - of- expenditure accounting). Classification of outlays by agency would be the same as classification by program or purpose. The total outlays of an agency would represent the amount of money being spent for the program element, program sub category or program category administered by that agency. For example, if there were an agency (perhaps named the Farm Income Division) in the U.S. Department of Agriculture that contained every activity designed to raise income of farmers, and only such activities, then the budget of this division would represent the amount being spent for the purpose of raising farm income".

Figure 1



1 Merewitz and Sosnick, The Budget's New Clothes, Chs. 1, 2, and the Summary, Markham series in Public Policy Analysis, 1971.

In Figure (1) we illustrate the authors' view of avoiding the need for the third classification (programme accounting) by means of the tie-up of the agency activities to the programme structure. Therefore, agency budget would be programme budget, because agency activities are only directed to achieve the programme objective, and there is no other activity outside the agency's jurisdiction involved in programme achievement. The authors stated two reasons for their view:

a the reliability of derived information from the third classification is doubtful in the face of problems like the allocation of joint costs;

b there is great doubt that cost factor for third classification would be outweighed by the benefit derived, particularly in the long term.

In Figure (2) we illustrate how the authors' view is impracticable, by showing an example from the DHSS. At the best aggregate level, by relating all activities required for the all-maternity programmes, regardless of the joint use of the same activity between several programmes, more than half of the activities concerned are serving other health programmes. Moreover, there are unshown activities serving maternity programmes, and in the meantime other health programmes like the ambulance service, that is apart from any other activities outside the DHSS jurisdiction which could be found as relevant alternatives with respect to the programme objectives concerned. It is difficult to believe that a maternity division could be established that contained all activities required for the achievement of its programme objectives. At the same time, such activities would contribute to the achievement of other health programme objectives. Therefore, the budget of this division would not represent the amount being spent for the achievement of its relevant programme objective.

Regarding programme accounting as our operational objective, reorganization as an alternative would not promise more reliable information than

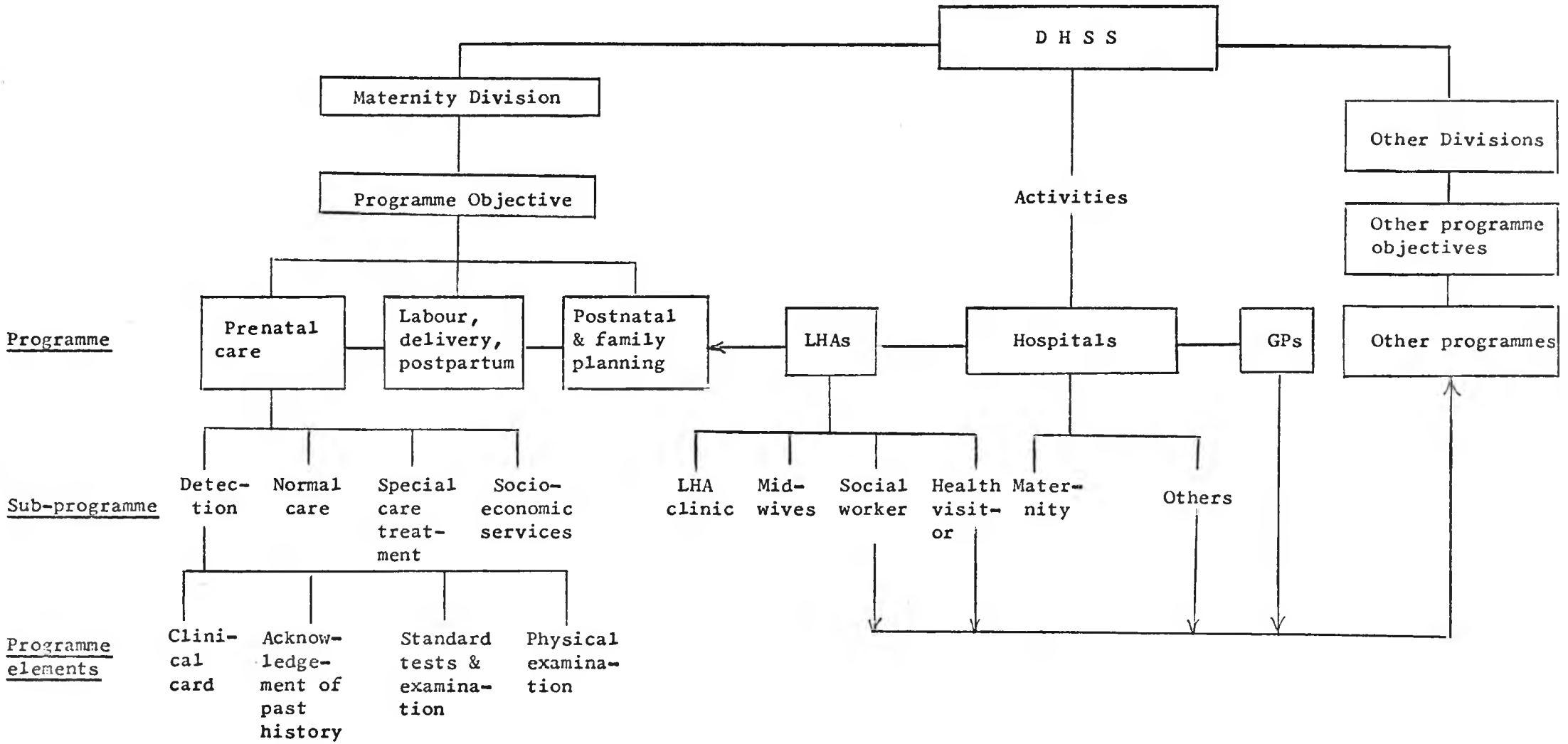

D H S S
Maternity Division
Programme Objective
Activities
Other Divisions
Other programme objectives
Other programmes
Programme
Prenatal care
Labour, delivery, postpartum
Postnatal & family planning
LHAs
Hospitals
GPs
Sub-programme
Detec-tion
Normal care
Special care treat-ment
Socio-economic services
LHA clinic
Mid-wives
Social worker
Health visit-or
Mater-nity
Others
Programme elements
Clini-cal card
Acknow-ledge-ment of past history
Standard tests & examina-tion
Physical examina-tion

Figure 2

the other alternative - third classification. The problem of joint cost still exists, and there is no evidence which could support the view that the expected costs would be outweighed by the promised benefits. The practice described that by reorganization old boundaries would be replaced by new ones, and besides what would have been spent on reorganization an additional spending would be required on the third classification, because the new boundaries would not be consistent with the flexible programme structure.

5.6 The Analyst's Role

In the preparation of a programme for the decision-maker, the analyst will begin by searching for answers to the questions: what are the actual working programmes, their associated targets and the effective efficiency level of their achievement? The result could be one of the following:

1 The target or programme objective achieved with

   a) a good performance level, or

   b) a bad performance level.

2 The target or programme objective is partly achieved, because

   a) the target is unattainable,

   b) the ineffectiveness of the chosen activity output due to reasons outside the control of the activity manager.

3 The target or programme objective is completely unaccomplished.

In 1a no further analysis would be needed unless the issue is to expand the programme size. The analyst would analyse the alternatives available to satisfy the incremental demand by securing, at least, the actual level of performance. This could be obtained at the expense of other programmes in terms of foregone benefits, actual or planned. In another situation, physical constraint could prevent the supply of the same type of resources, but there are other types - with less effectiveness which could be utilized. This may require some change in the target itself.

In 1b, the question would be how the performance level could be improved. At the start, the causes of low performance should be stated. It could be because of utilizing costly activity outputs (uncontrollable by the activity manager), or because of misuse of the internal resources of an activity reflected in high cost of unit work (controllable by the activity manager). For the former, the analyst would try to find a cheaper alternative with a similar level of effectiveness. In this concern, a statement would be needed to show the possible benefits from the realized costly activity output, and the benefits foregone to the other programmes as a result of the new utilization of the cheaper alternative. Physical constraint related to the cheaper alternative could prevent total substitution and lead to the use of both alternatives, and through planning the utilization could be gradually changed to the cheaper. For the latter the search would be devoted to presenting corrective actions to improve the actual level of performance.

In 2a, a change of target would be necessary, unless the top management consider that by leaving the actual situation as it is, it would provide an incentive factor. A word of caution is needed here, that the target should not be so high as to distort the aim.

In 2b, either the target would be changed to match the possible level of effectiveness attributed to the previously chosen alternatives, or the target would be kept as it is and alternatives with the required level of effectiveness chosen. The analyst would make further examination of the reasons for the problem, which the programme concerned is orientated to solve, and the availability of activity output with the required level of effectiveness. The result of such examination would be the basis of the analyst's recommendation: to change the target or choose other alternatives. When the recommendation is the utilization of new alternatives, a statement

similar to that described in 1b above would also be required.

In 3, the result is zero effective efficiency of the utilized resources in relation to the target concerned, regardless of the performance level of the utilized activity outputs. The reason could be that a target was given, but another target was achieved, or the chosen activity outputs were completely ineffective (i.e. choosing ineffective methods for a screening programme). The analyst would have to make in-depth analysis of the problem, its causes, the availability of effective alternatives and the cost of each. A statement would be required to show the effects of the analyst's recommendations for the achievement of the target, on the actual and planned utility of the same resources.

More than one type of information is required for the analyst. These are as follows:

a Information on the problem concerned, in the present and its tendency in the future. This would require regular surveys through intervals accompanied by schedules showing the yearly changes;

b Statistical information on the performance of the working activities in relation to the programme objective concerned. This requires knowing what it is meant to achieve, expressed in meaningful definitions,at the different levels of the programme. During the analysis process, such definitions could be reached through the dialogue between the analyst and the decision-maker;

c Cost information on the outputs of the utilized activities. This would require knowledge of the work unit or units for each activity and the possession of an adequate costing system for the regular extraction of this information.

It is true, at least at present, that analysts' time is a scare resource, which should be used in an effective manner. The existence of cost information on the activity outputs within the management information system

would certainly help the analyst in concentrating on the question of effectiveness; otherwise a significant part of this scarce resource would be wasted in deriving such information, or in awaiting its derivation through special micro-costing studies. The analyst's function is to illuminate the road of the decision-maker by providing him with information on the most effective efficient alternatives for achieving the policy objective, rather than the effective alternatives only. Effectiveness at any price whatsoever is scarcely an acceptable approach to decision-making. Therefore, if the decision-maker really wishes the illumination of the decision-making path, a reasonable amount of funds should be devoted to micro-costing studies and the establishment of adequate costing systems for governmental activities made.

5.7 The Accountant's Objective

The question is what is the accountant's objective now? It is stated in a recent article that:

> "The accountant's objective is to then account for dollars spent to determine whether or not the wishes of the decisionmaker were fulfilled. This is the accountability function and it is an important requirement. Once a budget has been established (the political decision made) the accountant's role is to account for the expenditure in a manner that will facilitate budgetary control and budgetary comparison".[1]

What are the wishes of the decision-maker, according to which the accountant's accountability would be determined, and what are the requirements for their achievement?

The wishes of the decision-maker are closely related to the subject of budgeting and within the budget period. When resources are allocated on a subjective basis, he would need to receive an assurance that the autho-

---

1 G L Davidge, Accounting for Non-Profit Organization, Canadian Chartered Accountant, November 1972.

rized funds are spent during the budget period on the approved items. The accountant's objective would be to give such assurances, through regular and annual reports. Conventional accounting would be helpful to the accountant in achieving his objective. When resources are allocated on activity basis, conventional accounting alone would not be sufficient to provide the required information to the accountant achieving the current objective. The accountant would need cost information on activities and their level of performance. Therefore, a costing system would be required to be in force to facilitate the accountant's giving the required assurance to the decision-maker.

The real wishes of the decision-maker are neither spending funds on specific items of expenditure, nor on activities; spending on both is the means for achieving his aims. His wishes are the selected programme objectives, and for their achievement funds are authorized to be spent by the activities which have been chosen according to their effectiveness and performance criteria. The decision-maker wants to know whether or not the funds were spent on these programme objectives, and the actual level of effective efficiency achieved in utilizing these resources, compared with what was estimated in the budget - in short: the planned and the achieved benefits and their cost. Therefore, the accountant, in order to give the required assurance to the decision-maker, would account for the funds spent in programme terms, showing the actual benefits achieved and the cost of activity outputs utilized in their achievement, in comparison with the budget. This would require classifying the budget in programme terms, as well as the subjective classification, classification by activity and other classification thought necessary. Now the accountant's objectives would be threefold: providing the legislators with information on whether or not the funds were spent on the authorized items in the budget period; providing

the internal managers with information on the level of activity efficiency achieved in their units; and providing the decision-makers with information on the actual level of effective efficiency in utilizing resources for the achievement of their programme objectives.

5.8 Conclusions

PPBS is a comprehensive system gathering analytical tools (previously known and used but each as an independent technique rather than as a component of a system) and putting them into an ongoing learning process. PPBS is not a rigid system; different areas could have different PPBS treatment. The nature of the area and its organization structure are of great importance. It would be preferable, in implementing PPBS, to apply the incremental approach, which would be consistent with the nature of the learning cycle. It would be a misconception to regard one of its analytical roles as more important than the others, or to regard the reorganization of governmental activity to match the programme structure as a PPBS requirement.

Performance budgeting is a prerequisite for PPBS. Information on performance of activities is a principal need for an effective feedback process and a major need both for planning and analysis. The effective achievement of programme objectives regardless of cost is an unacceptable approach.

6 PLANNING PROGRAMMING BUDGETING SYSTEM IN THE HEALTH SERVICE

6.1 Introduction

Since the NHS Act was passed in 1948, the provision of maternity services has been regarded as one of the major 'objectives' in the management of the NHS. In spite of this, the rate of perinatal mortality (i.e. stillbirth plus neonatal birth until 28 days of birth date) in the United Kingdom is still higher than in some other countries, e.g. Sweden. It is true that the rate is decreasing all the time (except the unchange rate between 1948 and 1958) nationally and regionally. Nevertheless, the percentage of difference between regions is almost unaltered. The reasons for regional differences are still far from being completely explained. The last survey in 1958 (Butler and Bonham)[1] tried to accomplish this mission, by relating the differences to the biological and social factors of pregnant women among regions. The outcome of the survey explained only part of the differences /see Appendix A for the total difference among regions, Appendix A.1 for regional differences explained by parity factor, Appendix A.2 for regional differences explained by social class factor, and Appendix A.3 for regional differences explained by place of booking and delivery/.

If the reduction of the perinatal mortality rate is regarded from the political viewpoint as a desirable operational objective, with a particular priority among other operational objectives, the decision-maker would want to know the potential reduction of the rate by allocating an incremental sum of money ranging between £X and £Y. Unless the decision-maker is provided with information on the potential benefits of alternative programmes and their costs, the decisions of resource allocation will not be established on a rational basis. The desire to achieve an operational objective

---

1 N R Butler and D G Bonham, Perinatal Mortality: the First Report of the 1958 British Perinatal Mortality Survey, Edinburgh, E & S Livingstone, 1963.

is not sufficient for the determination of the incremental sum which ought to be authorised for such purpose. If the incremental sum is determined as a product of political debate, the allocation of the authorised resources between the related programmes, to reach a reasonable level of effective efficiency, will not be feasible without the availability of information on costs and benefits for each alternative. The function of the analyst or the analyst's team is to provide such valuable information to illuminate the way of the decision-maker. Section 6.2 presents salient points about the problem of perinatal mortality rate. The striking problem and the alternatives for its solution are the concern of section 6.3. Identification of the problem in the medium and long term is presented in section 6.4. Section 6.5 presents the actual situation on working programmes and related activities. Section 6.6 presents cost-benefit analysis of the alternatives for the achievement of programme objectives. The analytical summary is presented in section 6.7.

6.2 Salient Points

1 What are the reasons for perinatal mortality? To start with, we have to distinguish between the how and why. A baby's death can be explained by the post-mortem finding. But it is not always possible to identify the specific abnormality during pregnancy or labour which is originally responsible for the train of events ending in death; in short, the answer to the question Why? The possibility of identification could be increased by the existence of: a) clinical records with complete details, b) qualified and experienced pathologists in sufficient numbers for the workload.

2 According to the relevant analysis made by Sir Douglad Baird[1] and others,[2]

---

1 Douglad Baird, Social Class & Foetal Mortality, The Lancet, 11 Oct. 1947; The Evolution of Modern Obstetrics, The Lancet, 10 Sept. 1960; Baird & Illsley, Environment and Childbearing, Proceedings of the Royal Society of Medicine, Vol. 46, 17 Oct. 1952; D Baird, Perinatal Mortality, The Lancet, 8 March 1969.

2 J N Morris, J A Heady, etc., in four articles under the heading of Social & Biological Factors in Infant Mortality, The Lancet, 12 Feb. 1926, 5 & 12 March 1955, provided a very useful survey and reference to the causes of the perinatal mortality rate.

it was found that about 44% of perinatal mortalities were due to obstetrical causes, because of deficiencies in maternity services. Hence such a percentage could be greatly eliminated or at least substantially reduced by raising the standard of obstetric care. The other 56% are related to environmental reasons (e.g. physique, health of the mother and the environment in which she is living). The improvement of the service could contribute slightly in decreasing the effects of these circumstances.

3 The environmental effects are measured in terms of age, parity, status and social class. In spite of the independent effect of each, there is a great interrelationship among them which would affect the total risk from environmental reasons. Each factor is divided into subgroups. Some of the subgroups have positive effects and others have negative effects. It would be necessary to calculate the combined effects of patient group characteristics, using statistical methods such as 'binary variable multiple regression' or 'stepwise procedure'. It is important to use a clear definition for each factor and its subgroups, then use the homogenous data according to these definitions, and weigh the influences of the related area to calculate the effect of each factor. For instance, social class factor: women from social class '4', living in an industrial area, are not similar, in respect of husband's income, to women from the same class living in the countryside. Personal behaviour such as smoking, and the attitude of women in using maternity services would have some correlation with the environmental factors.

4 The medical effects are generally measured in terms of the standard of general medical care received since birth and up to pregnancy age, and particularly in terms of the standard of obstetric care received during pregnancy (antenatal clinic), delivery, post-partum and postnatal care.

5 The last survey shows that physicians delivered 13.7% and were present for the birth of 27.1% of the population. Meanwhile, midwives carried out

52.6% and were the senior person present at 70.4%. Accordingly, the midwife seems to be the key person in the majority of cases, but this is not without reservations, an important one being the availability of qualified medical personnel and equipment to deal quickly with any complication.

6 The tendency of the birth rate in the future is to increase. It rose from 15 per thousand in 1955 to 18.5 per thousand in 1964, but since then it has decreased to 16.9 per thousand in 1968. According to the mid-1968 projection, the rate is expected to reach 18.3 per thousand in 1997. This percentage indicates that the estimated increase in the future could require a similar proportional increase in the supply side to keep the rate level with its actual position. From another angle, there is an expected improvement in the health of the target population because of the arrival at pregnancy age of women who were born after the Second World War; this in turn could cause a reduction of the environmental effects and would probably reduce the compensative obstetric services partly used in treating those adverse effects related to environment.

6.3 The Striking Problem

The fact is that complication during labour usually appears suddenly without any advance signs.

This sudden complication is related only to a minority group and the majority of pregant women always have normal confinements. The striking problem is that: the perinatal mortality rate of transferable cases (i.e. cases transferred from the initial place of delivery during labour because of complication to a more sophisticated place, that is, the hospital) from general practitioner units and homes of pregnant mothers to hospitals, is three times greater than the national rate. In the last survey, the perinatal mortality rate for GPU-hospital subgroup is between 2.7 (south Western) and 4.3 (eastern) times higher than the national rate. For home-hospital subgroup, the rate is between 2.6 (southern) and 4.6 (north midlands)

times higher than the national rate. It is worth mentioning that, among regions, the high perinatal mortality rates of both subgroups are located within regions which have low regional perinatal mortality rates.

In the immediate future, it seems that efforts should be directed towards these subgroups, for the purpose of reducing their perinatal mortality rates. This suggestion is built on the following grounds:

a the reduction of the risk-set of the transferable group would lead to a reduction of the rate at the regional and national level;

b the net marginal benefit of the utilized resources would be greater than any other opportunity benefit (i.e. the reduction in the rate of other pregnant subgroups);

c the resources required for the achievement of this target would not require a great increase in the maternity division budget. In addition, improving the activity efficiency level of the activities concerned will make a positive contribution.

Regarding the target (programme objective) as the elimination or reduction of the risk-set of the transferable group, the three following alternatives present different methods for its achievement.

1 100% hospital confinement without affecting the ordinary length of stay after delivery. An increase in the maternity division budget would be needed to cover the relevant costs of this alternative, which would consist of:

   a capital expenditure for the establishment of new maternity wards and related services,

   b current expenditure for financing the activity of the new maternity wards (e.g. medical payment) and the incremental services of the other activities (e.g. nursing, paramedical departments, catering and laundry).

2 100% hospital confinement with the shortening of the ordinary length of stay after delivery (i.e. the early discharge system). This alternative

would not require the establishment of new maternity wards. The increase in current expenditure would be to cover the cost of items such as payment for overtime and the incremental services provided by other hospital activities, e.g. laundry.

3 The quick provision of techniques and equipment to eliminate the transfer of the pregnant mother during labour. This alternative would require the establishment of an adequate number of obstetric flying squads to provide quick service in the case of sudden abnormality.

Alternatives 1 and 3 cannot be implemented immediately, even if the required capital expenditure is authorized, because of the time needed for construction and furnishing. The scarcity of physical resources could be a constraint in the short and medium terms for the first alternative. The time of physicians and nurses utilised in providing the emergency obstetric service could adversely affect the quantity and quality of the service within maternity wards.

There would be no major financial obstacle to the implementation of alternative 2. The financial burden would be transferred completely or partly (e.g. the local health authorities could be charged with the other part), to the husband's budget. The real obstacle to the implementation of this alternative is the potential danger to the mother's life or her baby's, or to the health of both, as a result of applying the early discharge system. From the available information, there is no sound evidence to support the incidence of such danger during the recent implementation of the early discharge system.

6.4 The Problem in the Medium and Long Terms

Reducing the risk-set of transferable cases would contribute to the reduction of the national rate, but this has a limit which is reached when transfering the pregnant from one place to another during labour is eliminated. The second problem is the actual dispersal of rate differences be-

tween regions. There is no doubt that by eliminating or decreasing the actual dispersal, the national perinatal mortality rate would be reduced. This would require the authorization and planning of incremental resources for the high-rate regions and proportionately lower resources for the low-rate regions (or fixing their budget according to resource constraints). When authorization of the required incremental resources would not be possible, completely or partly, because of resource constraints, the redeployment of the actual resources between regions in favour of the high-rate regions, according to the equality principle, would be the alternative method.

The reduction of the national perinatal mortality rate as an operational objective could be accomplished by alternative programmes associated with different effects on the actual dispersal between regions. For instance, authorising incremental resources to the eastern and southern regions could reduce the national rate, but would increase the level of dispersal. If a larger proportion of the incremental resources were authorised to Wales and North western region, both the national rate and dispersal would be reduced. The interesting point is that by implementing a policy which would increase the dispersal of rate differences across the country, there would be no way to compensate the population target within the badly affected regions. Moreover, from the intuitive point of view, the net marginal benefit (Y perinatal mortality rate averted per X utilized resources) would be greater for the high-rate regions than the low-rate. If the actual perinatal mortality rates of the low-rate regions were adjusted to eliminate the effect of the related transferable group, a reduction of these rates would result. Assuming the elimination of the risk-set associated with the transferable group across the country, the difference in rates between regions at least would not be decreased. Therefore, in

the future, the degree of rate differences between regions would greatly depend on the chosen programme for reducing the national perinatal mortality rate.

During the planning process, the outcome of programme analysis would be provided to the planners in terms of the most effective efficiency alternative or alternatives in achieving an operational objective. In order to produce such an outcome, the analyst team would analyse the working activities in relation to the operational objective, according to the effectiveness and activity efficiency criteria. New alternatives could be discovered and may be recommended in the analysts' summary, when they proved, according to both criterion types, to be better than those actually in force. In the next sections, such analysis would be presented, but unfortunately the facilities required for examining such theoretical analysis, in an experimental study to obtain the information required, were not available to the author.

6.5 The Present Programmes

It has been found that there are three working programmes, as follows:

- Prenatal care
- Labour, Delivery and Postpartum care
- Postnatal care and Family Planning.

The whole target population (females from 16 to 50 years old) is not uniform in character. Therefore the risk-set is not homogeneous to all individuals, nor are their needs. We decided to use the particular classification resulting from the last survey, which divides the target population into two groups:

a the high-risk group, including primiglavide, multiparity, old age, lower social class and past obstetric history;

b the low-risk group, who are not affected by any of the above-mentioned factors.

6.5.1 Prenatal Care Programme

This consists of two sub-programmes:

a Detection: aims: to provide all pregnant women with standard types of tests and examination to prove pregnancy, search for early abnormality problems, and to make initial decision about place of delivery.

Sub-programme elements:

- acknowledgement of past obstetric and general history of the pregnant;
- installing, co-operation clinical card;
- physical examination;
- standard tests and examination (i.e. blood pressure, weight and urine and, when necessary, X-ray examination of the chest);
- arrangement for further tests and examination in the future;
- socio-economic investigation.

b Prenatal care during the pregnancy period: aims: to provide the pregnant regularly with the care and supervision needed to maintain the normal condition, to take the measures needed to reduce the risk of abnormality identified early and/or discovered later, up to the time of confinement.

Sub-programme elements:

First, for normal pregnancy:

- regular examination,
- standard tests during each attendance,
- particular tests at particular attendances,
- normal welfare services.

Second, for abnormal pregnancy:

- as previously stated for normal pregnancy,
- special preventive measures: obstetric - medical (e.g. cardiological and diabetic),
- additional welfare services (when required).

Alternatives:

For Detection:

a GP in his own surgery

b GP in his own surgery with LHA midwife attached.

For regular prenatal care:

For normal pregnancy:

a GP in his own surgery

b GP in his own surgery with attachments

c LHA clinic managed by:

- LHS medical officer

or GP employed by local authority.

For abnormal pregnancy:

a outpatient clinic

b specific consultation visits at out-patient clinic, followed each time by GP supervision.

For periodical rest during pregnancy for some abnormal pregnancies:

a in-patient ward (antenatal)

b maternity home

c home with GP supervision and additional welfare services (if required).

NOTES:

a the LHA clinic should not be regarded as an alternative (for regular antenatal care) when its function exists in terms of providing welfare, assistance and advice services only.

b Education and welfare services are LHA clinic functions; therefore they are not included in the LHA clinic as an alternative (for normal pregnancy).

c The availability of sufficient maternity homes varies across the country, as do the working functions of LHA clinics.

d The important role of the GP in detection, normal cases and following-up abnormal cases is the result of the actual policy and of the tendency of his role in the maternity service to increase.

6.5.2 Labour, Delivery and Postpartum Programme

This consists of two sub-programmes:

a Assistant care: aims:to provide women in normal pregnancy with medical supervision and assistance during labour and postpartum (socio-economic if needed) in a place within easy and quick reach of qualified manpower and equipment at the first stage of complication, to ensure the safety of the expectant mother and her baby.

Sub-programme elements:

- medical supervision;
- nursing assistance)
- assisting medical equipment))- a short period before labour and during it;
- medical examination of the delivered)
- medical examination of the baby))- after delivery;
- nursing assistance to the mother and baby - for defined period;
- socio-economic assistance.

b Preventive and treatment measures: aims: to provide women with abnormal pregnancies with preventive and/or treatment care during and after labour (postpartum) in a qualified place with respect to manpower and equipment, to ensure the safety of mother and baby.

Sub-programme elements:

- as previously stated;
- more qualified medical supervision;
- treatment required and associated equipment (e.g. operating theatre) during delivery;
- special nursing (if required) after delivery - for defined period;
- additional socio-economic service (if needed).

Alternatives:

1a hospital-maternity ward with 10 days stay after delivery

1b hospital-maternity ward with 5 days stay after delivery

1c hospital-maternity ward with 72 hours stay after delivery, or less (48 hours)

2 GPs use obstetric beds in consultant units (i.e. length of stay would be subject to the choice as in (1) above)

3 GP unit

4 home confinement under the supervision of GP (and the quick arrival of the obstetric flying squad).

6.5.3 Postnatal care and Family planning Programme

This consists of three sub-programmes:

a Detection: aims: to discover any abnormality in women after delivery, by providing full medical examination (including the genital tract) 6 weeks after delivery and not later than 12 weeks.

Sub-programme elements:

- physical examination;
- standard tests and examinations.

b Early treatment: aims: to arrange and provide early treatment for cases resulting from the detection process.

Sub-programme elements:

- diagnosis;
- treatment.

c Family Planning: aims: to improve the reproductive habits of women after confinement, through providing them with medical and social advice.

Sub-programme elements:

- medical advice;
- social advice.

Alternatives:

1 GP surgery;

2 FPU clinic;

3 Hospital clinic.

6.6 Programme Analysis

In the previous sections we have examined the problem, the possible approaches to it, and the actual working programmes and who are providing their elements. The characteristics of the present working situation are as follows:

1 detection is a GP function;

2 a great part of antenatal care is a GP function; part is a hospital clinic function and another an LHA clinic function;

3 more than 85% of delivery is a hospital in-patient function and the actual policy is to reach 100% in 1975 and to reduce the length of stay after delivery;

4 there is a shortage of evidence on the role of postnatal care and family planning.

First of all we will regard the previous three programmes as four, by separating 'Detection' as a programme on its own. This is because it consists of elements which are or should be provided for all pregnants (Figure 1).

6.6.1 Detection Programme

Assume the target is to discover the existing abnormality of the attended pregnant women during the pregnancy period (i.e. abnormality would be related to obstetric factors as well as medical and environmental factors). The analysis would relate to the alternatives which could accomplish this target. In other words, it would evaluate the performance of each alternative to identify how much of the programme target is achieved or could be achieved (through new alternatives) and the associated financial and non-financial cost and benefit.

It seems worthwhile to distinguish between the controllable and uncontrollable elements of partial ineffectiveness with regard to the programme target, in judging the performance of alternatives. The controllable elements would be within the range of the activity manager's responsibility.

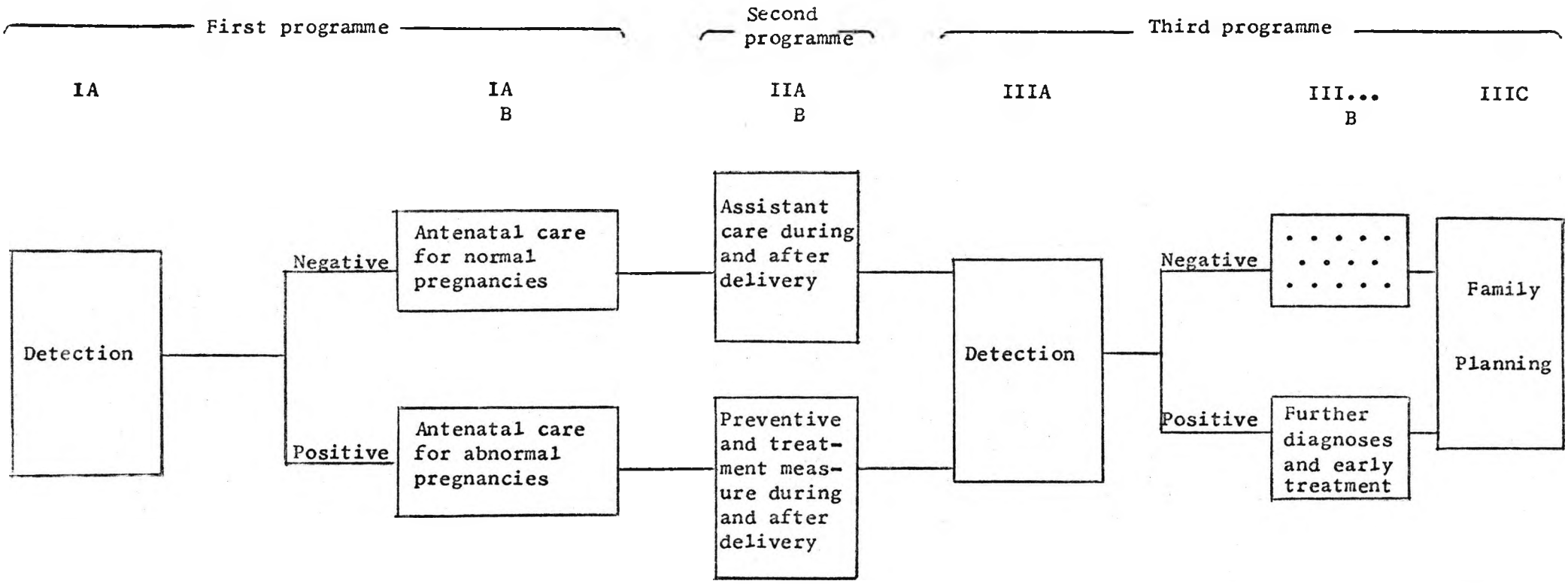

First programme
Second programme
Third programme
IA
IA B
IIA B
IIIA
III... B
IIIC
Detection
Negative
Positive
Antenatal care for normal pregnancies
Antenatal care for abnormal pregnancies
Assistant care during and after delivery
Preventive and treatment measure during and after delivery
Detection
Negative
Positive
Further diagnoses and early treatment
Family Planning

Figure 1

For example, the general practitioner who is not providing the pregnant woman with full detection elements. The unprovided elements represent a weakness in his performance, the level of which, and its consequences, would depend on the weight of these elements in relation to the total elements of the detection programme. The cost of output unit provided by such GPs would be increased by this partial ineffectiveness. The uncontrollable elements of partial ineffectiveness would not be within the activity manager's responsibility. For example, the qualification and/or experience of a general practitioner might not help him much in discovering some abnormality types (e.g. a pregnant woman with an earlier cardiological case). This would weaken his performance level which would reduce the effective efficiency of the utilized resources. For the controllable elements, the mission would lie in knowing the reason and taking corrective action in the future. The weight of the uncontrollable effect would be considered with regard to the percentage of the undiscovered abnormality and the associated risk factor. In fact, it is usually stated, generally and with particular reference to maternity, that when early abnormality is discovered, the risk-set would be reduced (through early treatment or taking preventive measures to avoid possible complication), and there would be a reduction in the socio-economic related cost.

For the improvement of the effectiveness of a detection programme, under its new target, in relation to the achievement of the operational objective, an alternative would appear, the procedures of which would be as follows:

i all pregnants would visit their GPs for the verification of pregnancy event, which is the first element of detection programme. Then the GPs would refer all pregnants to the hospital prenatal clinics, where full detection against any type of obstetric and/or medical abnormality would be searched for under a consultant's supervision, and the initial booking for delivery

would be decided (i.e. consultant's decision or under his supervision). According to the results of the detection, the consultant may decide that a) a proportion of the pregnants are normal and would be referred to their GPs until the 36th week, which would be the time of the second hospital detection or the discovery of any abnormality by the GPs, b) another proportion of the pregnants are abnormal and would be referred to their GPs to follow up their cases according to the consultant's instructions until the time of the next visit to the clinic or the next detection, or the appearance of further abnormality, c) some abnormal pregnants would attend the hospital clinic during the pregnancy period;

ii in the 36th week of pregnancy all pregnants would attend the hospital clinics for the second detection, during which the initial booking could be changed. According to the results of the detection, the consultant may decide that a) some pregnants would stay under GP supervision until a day before the estimated date of delivery, b) another proportion would continue attending or attend the hospital clinic until their hospitalization for confinement.

This alternative would not be in contrast with the actual policy of regarding the GP as the first point in providing any type of health services (except in the case of emergency). The benefit of this alternative would be mainly the reduction of the number of transferable cases during labour, due to sudden complication, to the hospital. The significance of this benefit is derived from the fact that the perinatal mortality rates of the transferable cases (from GP units and homes) are three and two and a half times the national average rate. Therefore, such a reduction could lead to a substantial reduction in the national rate.

The incremental resources of this alternative would be in terms of time and equipment: time with regard to consultants, medical staff and other clinical staff; equipment with regard to prenatal clinic and the

relevant paramedical services. These incremental resources could be supplied at the expense of the utility of their actual utilization by transferring resources within the budget of the maternity division. For instance, by applying the early discharge schemes (i.e. 24 hours, 72 hours and 5 days), instead of utilizing the saved hospital resources in the increase of hospital confinement to reach 100%, part of such saved resources only would be sufficient for putting this alternative pre-natal detection programme into force. The other part could be utilized and thereby produce incremental benefits in relation to other programmes.

The policy of 100% hospital confinement could be designed to overcome wrong booking decisions by the GPs which lead to an increase in the number of transferable cases. But the suggested alternative for a detection programme would greatly reduce the probability of wrong booking decisions at less cost. There is no doubt that the hospital is the safest place for delivery, but its cost is also high. It is worthwhile stating that the majority of pregnants are normal and have normal delivery. Moreover, a reasonable number of the abnormal group (consultant's decision), whose abnormality factors were detected early and effective prenatal care provided, had a straightforward delivery. What the pregnant needs, apart from the minority group who should have hospital confinement, is the quick availability of emergency obstetric service at call. The question is, does the alternative used in meeting the needs of the minority group need to be utilized in meeting the needs of all pregnant groups, regardless of the opportunity benefits of the resources involved? If the policy of 100% hospital confinement is stated as not to be subject to discussion, or compared with alternative policy at least partly, then the requisite incremental resources for the suggested alternative would need to be authorised but this would be at the expense of the opportunity benefits which could be produced by such incremental resources.

6.6.2 Prenatal Care Programme

Assume the target is to maintain the normality of the low-risk group and to reduce the probability of complication for the high-risk group, through preventive or care measures during the pregnancy period.

We would think that, if the alternative suggested above for achieving the target of the detection programme is accepted, then there would be one alternative to improve the effectiveness of this programme in relation to the operational objective. This alternative would be of giving the abnormal cases (according to the consultant's decision) the requisite preventive and care measures during the pregnancy period in the hospital clinics. The avoidance of the ineffective follow-up by GPs, ensuring continuity of care and the maintenance of the pregnant's feeling of being cared for by a specialist would be the favourable factors of this alternative. The incremental resources required for this alternative (i.e. consultant, medical and clinical time and equipment) are estimated not to be great because of the size of the relevant group and part of such group is actually receiving the service likewise. The net incremental cost of this alternative would be reached by deducting the GPs' fees (related to this group only) from the incremental hospital costs.

From the experience of another country (Holland)[1] another alternative emerges. This alternative would require the provision of detection and prenatal care services during the pregnancy period through hospital antenatal clinics and only the abnormal pregnants (consultant's decision) would be delivered in the hospital. An essential requirement for such an alternative would be the availability of sufficient and effective emergency obstetric services (obstetric flying squad) at call. In Appendix B, we provide

---

1 In Holland 70% of pregnants have home delivery, while the perinatal mortality rate is not greater than that in the UK.

an analysis of items of costs and benefits in relation to the different parties concerned. Certainly this alternative would require a radical change in the actual policy of 100% hospital confinement which, like other decisions, depends on the judgement of the decision-maker.

6.6.3 Labour, Delivery and Postpartum Programme

Assume the target is to ensure safety of delivery for the expectant mother and her foetus, and avoidance of complications in the short period after delivery.

If the policy of 100% hospital confinement could not be discussed and compared with other alternatives, then the alternatives concerned would be in relation to the length of stay after delivery. In this regard, we present in Appendix C items of cost and benefit of applying the scheme of discharging the delivered after 72 hours of hospital delivery. It is worth stating that the application of early discharge systems is not associated with a large number of readmitted cases to the hospital, only a few cases.

If the policy of 100% hospital confinement could be subject to discussion, then the place of delivery for normal pregnancy would be either a) in hospital or b) at home with the availability of obstetric flying squad.

There are considerations which should be taken into account in the choice between maternity methods. The choice of a method of maternity care has spillover effects on objectives other than the reduction of perinatal mortality. This means that where cost-effectiveness considerations in relation to this objective are fairly balanced, other considerations (customer preference and psychological factors within the family) might well become the deciding factors.

6.7 Summary of the Analysis

From the previous analysis, bearing in mind the shortage of actual data, the alternatives in relation to each programme can only be set out as

follows:

Programmes	Detection			Prenatal care		Delivery & postpartum					Probabili
Alternatives	A	B	C	D	E	F	G	H	I	J	
	GPs	GPs/ hospclinic	hospclinic	hospclinic/ GPs	hospclinic	hosp/ full stay	hosp/ 5 days	hosp/ 72 hours	hosp/ 24 hours	home/ EOS	
		3		X	2	X		5			= 30

Certainly, providing the services required for the three programmes would be most effective by hospital activities. But the cost would be the highest also. The initial recommendation about the cheapest effective alternatives would be as follows:

(i) A^1 + C + D + F (for abnormal group) + J (for normal group)

(ii) B + D + F (for abnormal group) + H and I (for normal group)

(iii) A^1 + C + E + F (for abnormal group) + G (for normal group).

In (i) the resources saved by home confinement for the majority group could be used (completely or partly) to supply the requisite incremental resources for the detection programme, increasing the number of EOS, and providing socio-economic benefits to the delivered at home. If partly used, then the other part would be utilized to provide incremental benefits in relation to other health programmes.

In (ii) the resources saved by applying early discharge systems would be used to supply part or all the requisite incremental resources for 100% hospital confinement.

In (iii) the resources saved by applying the 5-day system would not be enough to supply the requisite incremental resources for the detection

---

1 GP service for proving pregnancy event only.

and prenatal care programmes.

We would like to say that the previous order is only an initial one, which could be changed, when the cost information and any further information on the effectiveness of the activities concerned, in relation to targets, is provided.

APPENDICES

6.A Regional Differences

6.A.1 Regional Differences by Parity

6.A.2 Regional Differences by Social Class

6.A.3 Regional Differences by Place of Booking and Delivery

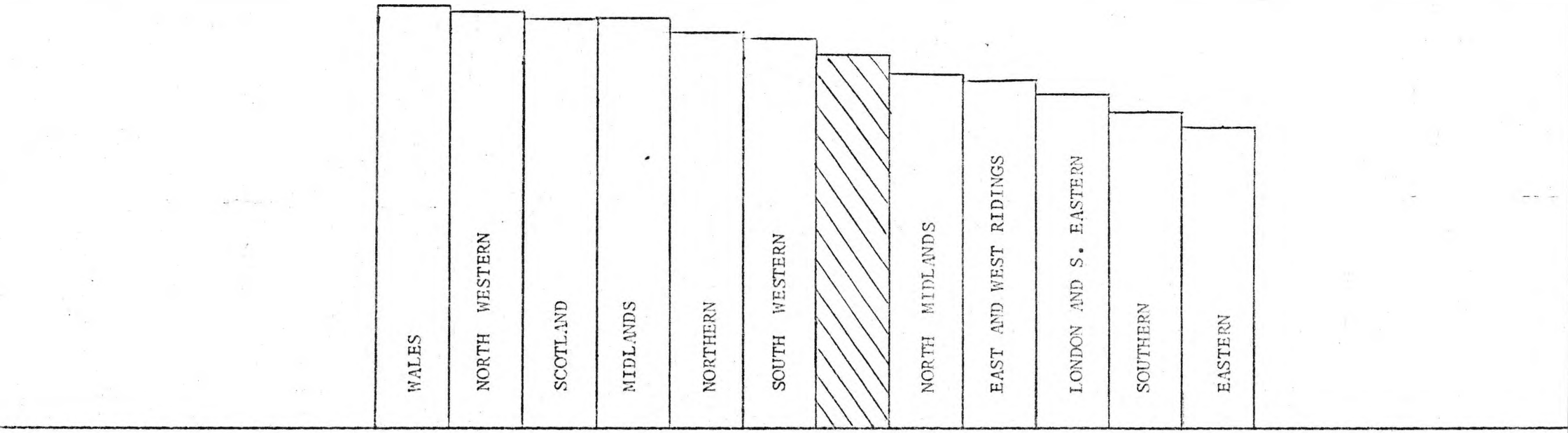
6.B Cost-Benefit Analysis of providing full detection and prenatal care programmes by hospital out-patient clinics and hospital confinement only for the decided abnormal group

6.C Cost-Benefit Analysis of hospital confinement followed by early discharge (72 hours) for qualifying group

Appendix 6.A REGIONAL DIFFERENCES

Regions	North Western	Northern	East & West Ridings	North Midlands	Eastern	London and S. Eastern	Southern	South Western	Wales	Midlands	Scotland	AVERAGE TOTAL
Perinatal Mortality Rate	39.14	36.96	32.65	33.08	28.30	31.35	29.85	36.78	39.38	38.31	38.42	34.89
Differences	(4.25)	(2.07)	2.24	1.81	6.59	3.54	5.04	(1.89)	(4.49)	(3.42)	(3.53)	
Differences in %	(12%)	(6%)	6%	5%	19%	10%	14%	(5%)	(13%)	(10%)	(10%)	

Source: Perinatal Mortality Survey, 1958



Regions	North Western	Northern	East & West Ridings	North Midlands	Eastern	London and S. Eastern	Southern	South Western	Wales	Midlands	Scotland	AVERAGE TOTAL
Perinatal Mortality Rate Parity (0)	(44.00)	(44.82)	29.68	35.92	32.43	32.24	31.75	35.87	(42.27)	(41.52)	(40.80)	37.03
Differences	(6.97)	(7.79)	7.35	1.17	4.60	4.79	5.28	1.16	(5.24)	(4.49)	(3.77)	
Perinatal Mortality Rate Parity (1)	(30.96)	24.76	24.69	20.53	20.03	25.43	21.38	24.58	(30.96)	(30.09)	(27.87)	25.87
Differences	(5.09)	1.11	1.18	5.34	5.84	0.44	4.49	1.29	(5.09)	(4.22)	(2.00)	
Perinatal Mortality Rate Parity (2)	34.11	30.55	(36.85)	(36.35)	27.15	33.60	32.18	(47.29)	(35.62)	(36.29)	(35.22)	34.70
Differences	0.59	4.15	(2.15)	(1.65)	7.55	1.10	2.52	(2.59)	(0.92)	(1.59)	(0.52)	
Perinatal Mortality Rate Parity (3)	(40.50)	36.11	(41.28)	33.33	32.56	37.16	38.81	32.89	35.25	(41.35)	(50.72)	39.08
Differences	(1.42)	2.97	(2.20)	5.75	6.52	1.92	0.27	6.19	3.83	(2.27)	(11.64)	
Perinatal Mortality Rate Parity (4)+	52.03	(60.26)	(57.08)	(65.83)	44.50	42.34	44.27	(68.37)	(62.24)	50.57	(56.83)	53.64
Differences	1.01	(6.62)	(3.44)	(12.19)	9.14	11.30	9.37	(4.73)	(8.60)	3.07	(3.19)	

Regions	North Western	Northern	East & West Ridings	North Midlands	Eastern	London and S. Eastern	Southern	South Western	Wales	Midlands	Scotland	AVERAG TOTAL
erinatal ortality Rate ocial Cl.1 & 2	(31.49)	(29.34)	(27.02)	25.53	24.01	23.94	21.17	(32.05)	21.09	(28.95)	(33.33)	26.91
ifferences	(4.58)	(2.43)	(1.11)	1.38	2.90	2.97	5.74	(5.14)	5.82	(2.04)	(6.42)	
erinatal ortality Rate ocial Class 3	(36.52)	(34.83)	30.53	33.20	27.12	28.11	28.44	(35.57)	(44.35)	(38.05)	(36.12)	33.32
ifferences	(3.20)	(1.51)	2.79	0.12	6.20	5.21	4.88	(2.25)	(11.03)	(4.73)	(2.80)	
erinatal ortality Rate ocial Class 4	(42.56)	36.96	35.92	37.47	37.03	(37.67)	35.71	30.95	37.17	(43.57)	34.98	37.61
ifferences	(4.95)	0.65	1.69	0.14	0.58	(0.06)	1.90	6.66	0.44	(5.96)	2.63	
erinatal ortality Rate ocial Class 5	(52.55)	(49.09)	39.47	35.94	25.98	(44.89)	44.19	(64.10)	37.87	34.55	(49.84)	44.73
ifferences	(7.82)	(4.36)	5.26	8.79	18.75	(0.16)	0.54	(19.37)	6.86	10.18	(5.11)	
erinatal ortality Rate o husband or nformation.	50.75	50.43	52.38	38.19	40.90	(57.63)	47.87	47.87	(64.81)	(62.03)	(62.94)	53.51
ifferences	2.76	3.08	1.13	15.32	12.61	(4.12)	5.64	5.64	(11.30)	(8.52)	(9.43)	

	North Western	Northern	East & West Ridings	North Midlands	Eastern	London and S. Eastern	Southern	South Western	Wales	Midlands	Scotland	AVERAGE TOTAL
[illegible] Rate	(41.62)	(41.35)	35.78	30.49	25.83	31.00	34.58	(40.15)	(40.81)	(43.63)	(36.82)	35.78
[illegible] s	(5.84)	(5.57)	0.00	5.29	10.15	4.78	1.20	(4.37)	(5.03)	(7.85)	(1.04)	
[illegible] Rate	(18.60)	16.53	15.40	(18.29)	16.13	15.12	15.04	(18.98)	(20.49)	(18.29)	(17.95)	17.17
[illegible] s	(1.43)	0.64	1.77	(1.12)	1.04	2.05	2.13	(1.81)	(3.32)	(1.12)	(0.78)	
[illegible] Rate	114.34	(120.72)	105.97	(157.40)	101.73	(125.31)	89.08	(136.66)	(120.00)	103.24	(127.65)	117.37
[illegible] s	3.03	(3.35)	11.40	(40.03)	15.64	(7.94)	28.29	(19.29)	(2.63)	14.13	(10.28)	
[illegible] Rate	(32.98)	30.86	28.24	(32.99)	26.43	29.61	25.59	(35.06)	(40.84)	30.62	(34.51)	30.87
[illegible] s	(2.11)	0.07	2.63	(2.12)	4.44	1.26	5.28	(4.19)	(9.97)	0.24	(3.64)	
[illegible] Rate	(25.00)	17.57	15.19	(20.37)	18.61	12.93	14.03	(21.14)	(23.80)	(24.17)	(19.88)	19.34
[illegible] s	(5.66)	1.77	4.15	(1.03)	0.73	6.41	5.31	(1.80)	(4.46)	(4.83)	(0.54)	

Perinatal Mortality Rate GPU-Hosp	(125.00)	(120.00)	109.00	99.00	(148.00)	(111.00)	105.07	93.57	107.84	(115.38)	108.79	110.4
Differences	(14.60)	(9.60)	1.40	11.40	(37.60)	(0.60)	5.33	6.83	2.56	(4.98)	1.61	
Perinatal Mortality Rate GPU-All	(38.46)	28.78	22.84	(31.99)	29.93	21.08	24.15	(33.19)	(35.51)	(35.00)	(33.61)	30.5
Differences	(7.91)	1.78	7.71	(1.44)	0.62	9.47	6.40		(4.96)	(4.45)	(3.06)	
Perinatal Mortality Rate In-bkd	160.71	(196.42)	(392.85)	147.43	134.61	131.20	(283.33)	154.76	(185.89)	(218.75)	169.35	172.6
Differences	11.97	(23.74)	(220.17)	25.25	38.07	41.48	(110.65)	17.92	(13.27)	(46.07)	3.33	
Perinatal Mortality Rate Sem.	37.35	(56.91)	(44.19)	29.96	(51.07)	34.94	37.03	32.16	36.11	(60.41)	(47.51)	40.5
Differences	3.23	(16.33)	(3.61)	0.62	(10.49)	5.64	3.55	8.42	4.47	(19.83)	(6.93)	

Appendix 6.B

Point of comparison: is the actual situation where detection is mainly provided by GPs; prenatal care for cases regarded as normal (untransferred) and following up care of abnormal - also by GPs; hospital clinic provides complete or partial prenatal care for abnormal (transferred); LHA clinics provide ununified prenatal care among regions and hospital delivery over 80%.

Alternative: Full detection and prenatal care programmes provided by hospital out-patient clinics and hospital confinement for the decided abnormal group.

Financial Costs Providing Authority (RHA)

I Capital expenditure:

- to build and equip new clinics and associated (if any) other capital construction in relation to:
  - para-medical departments
  - non-treatment department
  - car park

and/or
- capital expenditure (minor) to expand and improve existing clinics
- capital expenditure for establishing the required obstetric flying squad.

II Current expenditure:

- incremental current costs for the new capacity (i.e. actual resources, which would transfer to the new utility, should not be counted and would be deducted from the total requirement and the residual would be counted only) as follows:
  - consultant time
  - medical personnel time
  - nursing and associated staff time
  - clinical current facilities and equipment
  - incremental use of service of para-medical department
  - incremental use of service of non-treatment department

- current costs of obstetric Flying Squad.

DHSS:

1 - GPs' fees for the increase of home confinement

2 - GPs' fees for the increase of postpartum care.

LHA:

1 - increase of domicilary midwives service - for home confinement

2 - increase of health visitors service - for home confinement

3 - increase of home nursing service - for home confinement

4 - increase of domestic help - for home confinement.

Consumer:

1 - time and transportation cost to and from hospital clinic

2 - foregone free diet - for home confinement

3 - husband's work time lost to help wife with home confinement

4 - loss of husband's job because of absence to help wife with home confinement.

GPs : foregone income of providing detection and prenatal services.

Non-Financial Costs

Providing Authority (RHA)

1 - increase consultants' responsibility

2 - potential administrative problems in organising the incremental workload

3 - potential reduction of the teaching function of hospital pupil midwifery.

LHA

1 - objection, particularly in areas far from district hospitals.

Consumer

1 - women's attitude to regular attendance at hospital clinic because of distance, which could adversely affect the effectiveness of the programme

2 - the previous attitude but because of previous normal delivery

3 - care of the mother's children for a long time during each attendance, particularly if the hospital is distant (e.g. rural areas)

4 - the high risk to the expectant mother and her foetus, whose condition needs hospital facilities and therefore should be transferred.

GPs

1 - increase the gap between GPs and hospital staff

2 - potential adverse effect on GPs' experience resulting from not handling or contributing to the care of abnormal cases

3 - wasteing experience of GPs who have experience in that field

4 - expected objection from general practitioners committee

5 - pregnant/GP relationship during the provision of other parts of maternity service.

Financial Benefits

DHSS

1 - saved GPs' fees for detection service

2 - saved GPs' fees for complete, or partial, prenatal care service.

LHA

1 - saved GPs' fees for time employed to provide prenatal care in local clinics

2 - saved prenatal clinic season (including the following items)

- medical officer employed time
- domicilary midwives' related time
- health visitors' related time
- social workers' related time
- related equipment and facilities

and, /if the prenatal clinic service totally closed/

- factors relevant to relaxation and exercises.

Consumer

1 - saved day work lost resulting from complication as a cause of undiscovered abnormality and receiving sufficient care at early stage.

2 - saved time and transportation fees to and from hospital ward (by family) for home confinement.

RHA (providing authority)

I - saved capital expenditure: to build and equip new wards and associated other capital work (paramedical, non-treatment departments); and/or to expand and improve existing wards.

Note: its size, within the 100% hospital confinement policy, would depend on the prospective target population and the decided policy about length of stay after delivery (see Appendix D).

II - current expenditure: saved incremental current costs (what over the used size of actual resources): consultant, medical personnel, nursing and associated staff time, wards, delivery beds, baby coat unit and non-treatment departments.

- reducing the use of the ambulance service resulting from the generalization of early discharge system:

a - transferable and return journey (hospital/home and home/hospital)

b - collective journey related to the readmitted case (home/hospital) and the first journey (hospital/home)

c - transferable and return journey related to the readmitted (hospital/home and home/hospital).

- potential reduction in utilizing hospital resources resulting from reducing (or eliminating) the late transfer of abnormality during maternity period

- saving some of the utilized hospital resources as a causal relation to the increase of home confinement; related to:

a - maternity ward

b - consultant, medical staff, midwives' time and associated staff

c - delivery beds

d - baby coat unit

e - basic costs for hospitalization

f - decremental cost of some basic element (e.g. laundry).

Non-Financial Benefits

LHA

1 - increase the teaching function of domicilary pupil midwifery

2 - avoid the domicilary midwives' attitude caused by increasing institutional confinement and particularly when early discharge system is generalized (that factor would have less weight if they were involved in hospital confinement through GP attachment).

Consumer

1 - greatly reduce (or eliminate) the probability of not receiving the required elements of detection and prenatal programme

2 - greatly reduce (or eliminate) the probability of transferable cases with complication during pregnancy not in the early stage

3 - reduce infection probability from institutional environment

4 - happiness for the expectant mother and her relatives at having home confinement

5 - there is a great potential of large reduction in the risk-set associated with the actual transferable group through greater confidence of booking and being within close reach of qualified facilities at call (i.e. both would reduce the size of the transferable group and greatly reduce the associated risk-set for all home confinements).

Appendix 6.C

Point of comparison: is hospital confinement with full stay - 10 days - after delivery.

Alternative: Hospital confinement followed by early discharge (72 hours) for qualifying group.

Financial Costs

Providing authority (RHA)

1 - relevant costs to the readmitted cases including the onecost:
   - incremental use of paramedical departments' service
   - incremental use of treatment elements provided by treatment department(s).

2 - cost of transportation related to specialist attendance at the mother's home because of her and/or the baby's condition.

3 - incremental cost in using ambulance service as follows:
   a - transferable and return journey (hospital/home, home/hospital)
   b - collective journey of the readmitted and the first journey (hospital/hospital, hospital/home)
   c - retransferable and return journey (hospital/home, home/hospital).

4 - cost of providing women at home during the residual period with clean clothes (including the cost of first bringing, taking and cleaning).

5 - cost of disutility because of decreasing bed occupancy rate.

LHA

1 - incremental cost of domicilary midwives' time of attendance during the residual period

2 - cost of health visitors' time of attendance during the residual period

3 - cost of providing domestic help during the residual period

4 - cost of home nursing during the residual period

5 - cost of providing GP service employed by LHA during the residual period

6 - cost of social worker activity.

Note: sometimes, with regard to (1) and (2), only one of them happens, and at other times both.

DHSS

1 - GPs' fees for supervision during the residual period

2 - cost of GPs' prescriptions during the residual period (the mother and/or the baby).

Consumer

1 - foregone free diet during the residual period

2 - husband's work time lost while helping wife during the residual period

3 - loss of husband's job due to absence while helping wife during the residual period.

Non-Financial Costs

Providing authority (RHA)

1 - there is a potential risk in carrying out the system of early discharge by hospital medical personnel, regardless of the social environment of the patient, because of:

a - hospital doctor's attitude, affected by hospital policy

b - bad communication between the hospital and the community (GP) with regard to those whose social environment would encourage early discharge.

2 - there are expected shortages in some areas which would not help in carrying out the whole workload, which could lead to unfavourable effects on the mother and her baby. Therefore it could lead to an increase in the number of readmitted cases and would

represent inequality among similar groups.

LHA

1 - domicilary midwives' attitude to their job (the weight of that fact would be reduced if they were involved in hospital confinement through GP attachment.

2 - reducing the educational function of domicilary pupil midwives.

Consumer

1 - a potential risk in maintaining breast feeding.

2 - a possible unfavourable effect to be expected from returning the mother quickly to her domestic work.

3 - expected risk to the mother's and baby's life between the start of complication at home and receiving hospital treatment.

4 - the effect of distance between home and hospital, particularly in rural areas.

5 - family worry and particularly that of the mother at the start of complication, which could increase the risks

6 - foregone free comfort in hospital during a full-stay system.

Other consumer groups:

1 - unfavourable effect on other local health services - elderly, disordered and mental illness, in the case when the manpower time (health visitor, home nursing and domestic help) serving these groups as well as maternity are not sufficient under the new incremental demand related to the latter.

General consumer groups:

1 - the effect of time spent by GPs in carrying out the incremental workload on the general service, particularly in under-doctored areas and within the actual maldistribution of GPs.

Financial Benefits

Providing authority (RHA)

1 - saved capital expenditure to establish the incremental beds and their associated facilities under the full-stay policy;

2 - saved basic costs of used bed days related to the incremental bed number under the full-stay policy.

Consumer (target population)

1 - received domestic help during the residual period,

2 - received clean clothes " " " " ,

3 - home nursing service " " " " ,

4 - saved time and cost of transportation by the mother's family (visits) during the residual period.

GPs

1 - increased income from providing the incremental supervision during the residual period.

Non-Financial Benefits

Providing authority (RHA)

1 - foregone utility of specialist time in attending the mother's home.

Consumer (target population)

1 - happiness at home delivery,

2 - decreasing the infection probability.

In the previous cost-benefit analysis we have included only the incremental financial costs and benefits related to the providing authority which would result from that alternative. For more explanation, we are going to state the total financial costs required to face the incremental demand on hospital confinement, first by the full-stay policy and second by using the early discharge system.

FIRST

1 - capital expenditure

2 - current expenditure

a - basic costs of used bed days (actual bed number)

b - basic costs of used bed days (incremental number)

c - cost elements of the confined number (X)

SECOND

1 - nil

2 - current expenditure

a - basic costs of used bed days (actual bed number)

b - nil

c - cost elements of the confined number (X)

d - incremental costs because of readmitted cases:

- para-medical service
- treatment elements

plus 2, 3, 4 and 5 in the above analysis (i.e. financial costs of RHA).

7 HOSPITAL COSTING SYSTEM

7.1 Introduction

Cost information is a variable and a dependent need, closely related to management purposes. There are no unified cost data which could serve the requirements of the various management levels. Information in general and cost data as an integrated part is often categorised with regard to time factors into two categories - past-incurred costs and future-forecasted costs, and with regard to management purposes for control and planning. It is important to know the purpose for which the cost data are required before identifying the data type and details; otherwise the common mistake would very probably be made (i.e. cost data prepared for one purpose being used for all purposes).

Conventional accounting information always contains only the financial type, subjectively classified to accomplish the traditional purpose or function, that is, financial control. The roles of cost accounting have been extended from the traditional functions; costing of products for inventory evaluation, and income determination, to performance control and planning as a result of the increase of managerial demand at various levels on information types, besides the conventional type. The responsibility of the corporation controller has recently been extended to include routine reports on performance in quantitative and monetary terms, special reports related to specific decisions which cover particular operational areas, and reports focussed on the variances reflecting the application of management by exception. A cost (Management) accountant therefore has to work according to the wider concept of cost (management) accounting to provide the required information of the different managerial levels and external parties. It is essential for the management accountant to identify the purpose of costing and to choose the costing method with the best available efficiency level for analysis and presentation to accomplish

the stated purpose.[1] For instance:

a Cost control requires the comparison of actual cost with a predetermined standard (i.e. at the time of cost incurrence or through periodical performance reports) to identify the variance for locating responsibility and deciding the correct course of action. The chosen method of cost classification should permit the determination of responsibility on the cause of variance from standard or flexible standard budget;

b Planning (budgetary planning or policy planning) requires the inclusion of fully expected (forecast) costs related to the plan-capital and current expenditure, the final effect of which would be stated in terms of net expected benefit (i.e. the concern is a non-profit-making organization);

c In implementing the plan we are working in a learning cycle (i.e. one which could affect the plan itself) which would require the choice between alternative courses of action to accomplish the stated plan or replan, according to the new condition. For the current application of the plan as a purpose (or the special decisions related to the plan), the special cost data required are those expected in the future and relevant to each alternative. Not all future costs are relevant, only those that differ in alternatives are so, but it would be preferable to show the future unchangeable costs among alternatives in the report concerned, as a guide to the decision-maker about the total costs. Actual costs are irrelevant, but could be used as a guide in cost-estimation.

The significance of management accounting utility does not and should not stop at the profit-making organization. Classified cost data are also essential for performance control and planning in non-profitmaking organizations, such as hospitals. Non-profitmaking organizations are

---

1 The Use and Classification of Costs, (NA(C)A Editorial Department Note), in Studies in Cost Analysis, ed. David Solomons, second edition, Sweet & Maxwell 1970. (A very useful report on costing purposes and classification in profit-making organizations.)

rendering services which are not subject to price-mechanism for one reason or another; meanwhile they are almost entirely financed from taxes or local rate revenue. If we have an adequate functional costing system (we use the term adequate to refer to the requirement of having a predetermined standard), a real performance control could be applied; the effective efficiency of resource used in accomplishing planned targets would be improved, and at the aggregate level the different opportunities in benefit terms from utilizing £x million in the future, could be derived and presented to the decision-maker. It is worthwhile repeating here that in the choice of alternatives, not only financial costs/benefits have to be considered, but also non-financial costs/benefits with no less significance. In short, an adequate functional costing system seems to promise more effective efficiency in the use of limited (central and local) resources as a result of being the basis for satisfying the concept of management accounting.

A historical review about the different hospital costing systems applied in the UK is presented in section 7.2. Section 7.3 deals with the shortcomings of the 1966 costing system. An analysis of Dr Babson's approach is the subject of section 7.4. Section 7.5 analyses the costing methodology used in the study made by G Ferester and R J Pethybridge. Section 7.6 examines the costing methodology used in the study made under the supervision of Professor Magee, to extract the cost of hospitalization and related services. Section 7.7 analyses the new hospital costing system introduced with the reorganization of the NHS. In section 7.8 we present our proposed hospital costing system. Section 7.9 presents a summary.

7.2 Historical Review in Great Britain

Prior to 1948 there was no unified costing system of hospitals. The historical start towards that aim, which was restricted in practice, was

in 1869 at Birmingham under the 'Uniform system of Hospital Accounts' which was later revised, but never widely practised, by the King's Fund in 1906.[1] Under the NHS, hospital costing uniform system started in April 1950 according to the regulation of the NHS.[2] This system was built on the subjective classification, that is, by input types (e.g. salaries and provisions with no further breakdown). The annual reports showed the average cost per week of maintaining a patient through national adjustment only for out-patient expenditure (five out-patient attendances were regarded as the equivalent of one patient day). The ineffectiveness of the system with regard to performance control and planning was recognized from the start; probably the essential problem was the classification used, as was the general case in the governmental sector.

By April 1957 the 'Departmental Costing System' went into action as a result of the main recommendation of the Working Party, which was then accepted by the then Ministry of Health in March 1956. At the beginning, the implementation was not the same in all hospitals. "The main scheme", which involves the assignment of input categories to specific categorized departments, was implemented in the large and mainly acute types of hospital. These categorized departments were: a) patients' departments, e.g. wards, clinics and casualty; b) medical service departments, e.g. diagnostic X-ray, pathology and radiotherapy; and c) general services, e.g. laundry, catering and boiler-house. In addition, there were clearing accounts, dispensary, cleaning and general portering and transportation, and they were not reduced to unit cost but were re-allocated to appropriate departments within the re-allocation process. The re-allocation of clearing accounts

---

1 Charles Montacute, Costing and Efficiency in Hospitals, Oxford University Press 1962.

2 Report of the Working Party on Hospital Costing, Ministry of Health, HMSO 1955.

and general service total costs (i.e. the total could include reallocated costs from clearing and /or other general service accounts) to medical and patient departments caused great problems, which badly affected the validity of hospital costs for comparable purposes. The essential reason was probably the difference in methods used in reallocation across the country. The modified scheme, which was later eliminated through the general adoption of the main scheme, was applied to hospitals with gross annual expenditure of less than £150,000, and eventually applied also to those of £100,000. It did not ask for a reallocation process; the addition to the subjective system was in grouping the principal direct expenses of the main departments and services, and was reduced to a cost per unit of work performed similar (the cost units) to those under the main scheme.

The third costing system was implemented in 1966, the "modified costing system", and still remained in force until the new system started with the reorganization of the NHS in April 1974. The 1966 system decreased the reallocation process by increasing the number of cost centres, and greatly eliminated the reallocation costs of general services over medical and patient departments. Cost centres became charged only with the controllable costs-expenditure subject to the department's head of control. Thus the expectations were a) to enforce performance control, b) to improve planning function and c) to have a useful step towards a departmental budget.[1] The move towards increaing the application of departmental costing in itself is a step ahead, and the controllability principle as the charging basis represents a recognition of the nature of hospital activity with regard to its involvement of different professions, i.e. doctors, para-medical staff, nursing staff and administrators. Meanwhile

---

1 R W Wallis, Costing in the Hospital Service, (unpublished document, Department of Accounting, University of Manchester), quoted from John H Babson, Hospital Costing in Great Britain, The Hospital, April 1971.

we cannot say that the arbitrariness associated with reallocation was eliminated, nor that the controllability as the charged basis is applied within a defined management relationship with regard to authority and responsibility. Under the 1966 costing system, some kind of reallocation between non-treatment departments still existed (e.g. boiler-house steam production costs allocated to power-heat-light and laundry). No change was made to the treatment departments with regard to the averaging procedure, regardless of specialities.

7.3 The 1966 Costing System and Budget Functions

In spite of the essential need for financial control and the special treatment directed to it, the costing system fails to record costs of achieving measured results which could be helpful for a comparison process among hospitals using similar methods. That is because the 1966 costing system is within the framework of subjective accounting systems.

To implement the function of performance control, information on actual and predetermined performance should be produced and compared. The use of the national average as a standard is a false basis, as is the regional comparison as a method for measuring performance. To have a unit cost for all specialities, assuming that the differences of costs due to case-mix will disappear through the averaging procedure, is really a misleading figure based on a false assumption. Cost difference because of case-mix has been proved by a previous study,[1] but the question is: does that compensate for the related shortcoming of the 1966 costing system? To put it another way, by showing the effect of case-mix on hospital cost levels, would we be in a position to measure the level of hospital performance through comparison processes? There is great doubt here; we would not want to underestimate the importance of case-mix, but in the meantime it is not useful to exaggerate its outcome. Moreover, the shortcomings of performance control did not stop at treatment departments, but extended to

---

1 Martin S Feldstein, Economic Analysis for Health Service Efficiency, 1967.

easier areas, i.e. medical and non-treatment departments. To be fair, the modified system did improve the latter but not satisfactorily.

The reduction of department total costs to a unit cost would depend largely on the homogeneity of the relevant output and the weight of the joint cost problem. For a department, if a unit cost could be derived without 'significant' arbitrary procedure, at least the reduction would seem feasible, e.g. laundry and catering. That would facilitate the attachment of cost of services used, e.g. cost of laundry services, directly to the department receiving the services on the usage basis. But if this is not possible, as is the situation in the treatment departments, a better procedure would be required. Accordingly, the present situation tells us that investigation associated with micro-costing studies is required, at least in both medical and treatment departments. For the former, some of these efforts are working. For the latter, there is a lack of performance data; it needs greater attention. It is necessary for performance control to distinguish between the relative costs for each department (i.e. according to speciality) which would provide valuable information for feedback and planning.

As a result of the failure of the 1966 costing system to provide us with performance data, and the compensation derived through the clarification of case-mix effect on hospital cost levels (which probably are not enough), the attention of some researchers and the Department of Health and Social Security has turned to further research in the area of hospital costing. We propose to analyse the costing methodology related to the three researches in applying the "Disease Costing Method" by Dr J Babson, G Ferester and R J Pethybridge, and a research team under the supervision of Professor C C Magee. Our intention is to examine the effectiveness of each methodology. Thereafter we propose to analyse, on the same lines, the new costing system introduced by the DHSS with the reorganization of the NHS

of 1974. Finally, we will present our proposed hospital costing system.

7.4 First, John H Babson [1]

Dr Babson made a pilot study for the purpose of developing and testing the methodology of 'Disease Costing'. As a result of applying the chosen costing methodology, Dr Babson suggested that the calculated figures could be used in: a) comparing the cost of different methods of treatment for a selected course of treatment (e.g. hernia) within hospital buildings; b) comparing the cost of alternative methods of providing the required course of treatment and extending the range of comparison outside the hospital; c) to test the actual policy with regard to providing a particular course of treatment (e.g. maternity confinement) on cost grounds. He then gave his own suggestions for policy decisions and required cost data.

The question we wish to raise is: do the resulting data really achieve the suggested aims? And, if not, where are the biases and shortcomings within the methodology used? Could we do better by using an alternative approach to the question?

7.4.1 Babson's Approach: was as follows:

i The cost object was the determination of cost attributable to a particular course of treatment.

ii The study with regard to collection of information was related only to what was regarded as direct cost (or variable). These include all manpower, drugs, equipment, ancillary services and other costs which can be uniquely associated with an individual course of treatment.

iii Other hospital costs, e.g. 50% of nursing pay, domestic pay and other kinds of pay, uniforms, equipment, training, nurses in training, and all "hotel" costs were regarded as indirect costs (i.e. these include those

---

1 John H Babson, Disease Costing, Manchester University Press 1973.

costs which are not in the short run influenced by patient throughput and those related to the latter but regarded as independent of case-mix). In addition, some change in treating cost items was made according to the related course of treatment, e.g. 50% of general portering in 'hernia cases' was regarded only as indirect, and in maternity confinements 50% of medical pay was regarded as indirect costs.

iv The constant full utilization of hospital beds (capacity) was assumed. This would mean that if there were a reduction of department 'A' beds, an equal increase of department 'B' beds would occur. Therefore, and according to the assumption that items are included in the regarded 'indirect cost category' because of their independence of case-mix, this trade-off would not have any effect (increase or decrease) on the total sum of 'indirect costs'. In other words, some indirect cost items were regarded as fixed with throughput, and all indirect costs were regarded as fixed with case-mix.

v The normal absorption costing method was chosen as the appropriate method. The chosen cost unit was the 'case'. Bed day was chosen as the basis for allocating indirect costs item by item, and in total, regardless of speciality. The cost per case (cost unit) was calculated by charging the relevant case (e.g. hernia, confinement) with the direct and indirect costs. For calculating the cost of direct items, physical units were observed from a sample study; through averaging procedure the average physical units per typical case were arrived at. The fee charges used in translating physical units into cost units were provided by the hospital treasurer. Indirect costs were calculated by reference to the recorded patient's length of stay and the calculated fixed cost/patient/day (indirect costs/patient/day).

vi For domiciliary service, costing was done on a simple unit basis (i.e. fixed charge for each visit).

From the start we have no objection to the stated object of costing,

because its achievement probably would lead to the provision of very important information on performance control and planning, which has actually been lacking. We concentrate below upon an analysis of the previously stated costing methodology.

In addition, this basic methodology was used in more than one experimental study, but, associated with each, some addition or change on the basic methodology was introduced. Therefore, we are first going shortly to present the additions and changes, and then direct our analysis to the whole picture.

7.4.2 Additions

Day care unit study:

To separate the costs regarded as attributable to the day care from those of the entire out-patient department, and owing to the lack of a separate record in the actual hospital accounts (1966 costing system), it was decided to make the extraction by using the ratios between day care and out-patient department according to a chosen allocative basis (e.g. patients, staff, and floor space). For reasons Dr Babson thought appropriate, (i.e. inadequacy of using a single allocative base for all items), the total costs of the day care unit were extracted through an item-by-item allocative process. Thereafter, the total costs were, according to the basic costing methodology, classified as direct and indirect costs.

7.4.3 Changes

Maternity confinement study:

a A move from selecting a random sample of patients on admission, and following them up until discharge, in order to sample longitudinally by one day's stay.

b A change from a fixed charge basis for domicilary and other community services to the basis of actual time involved.

c 50% of medical pay was regarded as indirect cost and 100% of the cost of porters was regarded also as indirect.

7.4.4 Analysis

There is a general fact concerning the unit cost, that is as cost measurement carried out at a more aggregate level, the number of indirect items will be reduced; accordingly a reduction will be achieved in the size of the potential for errors resulting from the measurement procedure. That does not mean that we have to choose the highest aggregate level, which in our case would be the hospital. It is a critical question and there is no unified answer to it.

Where a firm produces one product, all the firm's expenditure would be the product's expenditure, and there would be no problem about the identification of cost unit. The other end of the extreme is the case of a firm with multiple products. The production process would vary from product to product, or from group to group, with or without a relative variation within each group. Meanwhile, there are functions other than that of production (e.g. sales, administration, research and development), part of which could specifically serve a particular group or product, and the other part could serve the firm to achieve its objectives through the provision of services and activities to other functions, according to the feasibility of the organization structure of the organization unit concerned. In industry, there is a favourable factor which assists in solving part of the costing problem (i.e. direct cost). The production mechanism for each product or group facilitates the establishment of physical standards in measureable terms of the attributable items for each product. The exception could be referred to the new job order which can be regarded as a minor case, and in time the mechanism will also be known, or could be estimated in advance, with only a small error. The one remaining problem is related to indirect

costs which are so regarded because they do not satisfy the required criteria for regarding them as direct costs:

a to be related to specific output,

b can be traced to the cost unit in measurable units,

c cost factor related to costing procedure should be less than the expected benefits. (This factor is sometimes mistakenly neglected.)

Non-profitmaking organizations such as universities and hospitals are located at the other end of the extreme (multiple products firm), but are missing out on the favourable factor which exists in industry, for reasons like professional autonomy, measuring quality factor, or professional rejection of the whole idea. Professionals claim that their work is always related to individual and group problems, and the need of the latter differs from one individual to another in the same category. Once again, there is the problem of standards. In any profession there should be standard in its practice. But the lack of standards would not mean reducing the significance of costing techniques; on the contrary, it should be regarded as an encouraging factor to present the cost of actual policy, methods and activities. The application of costing techniques, and the presenting of understandable figures would encourage the professionals to participate with their valuable contributions in an area where the cost is the only saving factor. What should be borne in mind when faced with such a situation is that great care should be taken in choosing the costing method.

7.4.5 The Cost Unit

As far as hospital costing is concerned, we do not agree with the "case" as the starting point in costing procedure; even if there is homogeneity of services required for cases under the studied category head, there seems little point in costing at case level rather than at the level of homogeneous aggregate. A word of caution; the homogeneity factor does

not depend only on the patient's condition, but also on the method of treatment. As a difference could be found in the services rendered in two cases with different conditions under the specific speciality, it could also be found in two similar cases treated with different methods. As a result of using the "case" as the starting point, the problems associated with costing procedures would be increased in terms of reducing the scale of direct costs, and from the other side, of increasing the scale of indirect costs. Accordingly, there would be a reduction of the level of correctness, and of confidence in the derived results, because of the arbitrary factor involved in the allocation process. This final result would be associated with less error if the cost items were attached to their direct aggregate level. Now we come immediately to another important question; that is, to what extent are we analysing the aggregated costs with regard to the level of cost unit? Generally speaking, this would depend on the level after which the arbitrary factor seems to be greatly involved in the analysis process.

Here is an example to illustrate the view explained above:
A maternity department has three functions which characterise the services provided. They are ante-natal care, labour and delivery, and post partum care. Medical pay would be used as an example of input, because its cost element is involved in the three functions. A further analysis of the stated functions is required because of different service types and intensity factors. Under antenatal care, the service is provided through ante-natal clinics and patient wards; also, for labour and delivery, there are types of delivery factor, and a similar situation exists in post partum care. If we are using Babson's starting point, then we have to take a sample for each patient group with regard to the service rendered. Medical pay, therefore, would be from the start a joint cost (i.e. cost related to more than one function).

Supposing we had arrived at the average time required for each representative case under each category. Two questions would arise: the first relates to the homogeneity factor and the second to unaccounted medical time; i.e. it is not attributable to any patient type through the sampling procedure. The weight of the homogeneity factor depends on the possibilities of classifying the related patients to homogeneous groups with regard to the required course of treatment. For that we have to know the cut-off point at which the patient has recovered, thereafter identifying the patient groups according to the required course of treatment. The cut-off point is possibly determined in some courses of treatment, e.g. hernia, taking into account the possibility of repeated operations, and maternity, by regarding each birth as a separate one. In some courses like cervical cytology, some difficulties would appear.[1] For the patient groups, that would depend on the variety of the combination of elements of treatment (for example, in confinement we could say we have two groups: normal and abnormal, but for cervical cytology, the variety is greater and extends over a long period of time). For that factor only, the individual approach (Babson) could be applied to the former course, but not to the latter, because of the difficulties of finding a representative case. In starting costing procedure according to the individual approach, medical pay from the start would be a joint cost, from which we would have to extract the attributable cost of the patient concerned, and that could be done by multiplying the average time of a typical case by the average price (for a grade) per hour. The problem of joint cost would appear again in another phase, and with a danger of omitting cost of element, which has an indirect relationship to the unit cost (case) but without which the quality

---

1 Report on costing cervical cytology, C C Magee, University College, Cardiff, pp. 2-5, 1974.

of work and/or the work itself could not be completed. The question here is about the difference between the real time and the costed time. This difference could be a result of medical administrative work, time spent in the hospital (i.e. on call) during deliveries which did not require the doctor's intervention, and time spent in moving from one ward to another. A probable solution under the individual approach is to estimate that residual and calculate an allowance time which has to be added to the average time of the "typical case". In other words, all medical pay should be regarded as direct cost unless a slack capacity is known to exist or time is spent in other activities, e.g. attending medical committees. Babson chose another solution; he regarded 50% of medical pay as indirect cost, explaining this by saying[1]

> "...consultant physicians, obstetricians, etc., had nothing to do with the cases then under study"

that is, normal delivery. Meanwhile, in specifying the cases costed, he said: "as many of the patients studied had either complicated obstetric histories or had had no previous babies".[2] But the percentage used as a dividing line between direct and indirect cost is an entirely arbitrary one. If the costing procedure is started at the department level, at least medical pay and the like would not be a joint cost from the beginning; rather, they would be direct costs to the relevant department. And the dangers of using arbitrary allocation would be avoided here.

7.4.6 Costing Method

The absorption costing method was used to arrive at the total cost per case, which would require the involvement of all cost elements. But what about the cost of capital expenditure (depreciation)? There is no

---

1 John H Babson, Disease Costing, 1973, p. 38.

2 Ibid., p. 52.

mention of that. It is true that it is a general shortcoming in the accounts of the public sector, and hospitals are an example. The chosen method, nevertheless, requires the inclusion of such a cost. For performance control, the method used would fail to achieve its aim; functional costing with the inclusion of controllable costs only under each function would probably be the most appropriate, because it would, besides other things, serve the aim in terms of the comparison of similar functions. For comparison of alternatives (in the short term), a point of comparison has to be identified, and a statement has to be prepared, presenting the relevant (and/or incremental) cost under each alternative with regard to the point of comparison. The most promising method in this regard is surely the incremental costing method.

7.4.7 The Behaviour of Some Cost Items

The indirect (fixed) costs under the Babson approach consist of two types: a) cost items which were regarded as independent of patient throughput[1] in the short term, b) cost items which were considered to be related to patient throughput but were largely regarded as independent of case-mix, e.g. laundry, catering etc. There is no argument about the first type; they are, according to their nature, general overheads created by the existence of the hospital itself as an organization unit, rather than any of its specific activities (we will return later to the question of allocating overhead costs).[2] For the second type, Babson claimed that these cost items are largely independent of case-mix. But by examining the figures and percentages in the table below, we find a large difference between the cost of laundry per in-patient week in maternity hospitals and three other hospital types. We regard maternity hospitals as the basis and derive the variation accordingly in three measures, to take into account the

---

1 Throughput = number of cases treated per bed per week.

2 See section 7.8.

Cost of Laundry per in-Patient Week in different hospital types[1]

	Maternity hospital	Acute hospital (over 100 beds)	Mainly acute hospital	Partly acute hospital	Acute hospital (51-100 beds)
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Total national average	1 15. 6.	1 2. 11.	1 2. 1.	19. 4.	1 2. 2.
Minimum region	1 9. 0.	19. 2.	15. 9.	14. 0.	13. 8.
Maximum region	2 6. 10.	1 6. 7.	1 9. 8.	1 5. 10.	1 8. 7.
% Total national average	100%	(34) 66%	(37) 63%	(44) 56%	(37) 63%
% minimum region	100%	(35) 65%	(47) 53%	(52) 48%	(53) 47%
% maximum region	100%	(43) 57%	(37) 63%	(45) 55%	(39) 61%

Source: Hospital Costing Returns 1968-69

activity efficiency of the laundry department. In spite of this and the possible effect of size factor, the case-mix seems to be responsible for the greater portion of the variation in the cost of laundry/in-patient week. The size factor, which is a variable dependent on hospital size, seems to have an adverse effect with doubtful variance. The size of the variance could not be related only to the department's activity efficiency, and the amount of the variance increases the probability that a great portion of it would be caused by case-mix. In examining the variance with regard to the total national average, its scale appears from 34% to 44% from the basic. In comparing the variance, from the basic, of acute hospital (over 100 beds) and acute hospital (51-100 beds), we find the

1 These data are for the same year as that of the Babson research.

variance differs by 3% in favour of the hospital with the smaller number of beds. We would expect the opposite to happen under Babson's assumption (i.e. laundry cost largely independent of case-mix), and because of the size factor which would favour the hospital with the greater number of beds. Meanwhile the similarity of the cost of laundry per in-patient week for both groups supports this view. That is, the expected economies from size factor favouring acute hospital (over 100 beds) could be outweighed by an increased proportion of maternity beds coupled with the other groups. In examining the minimum region figures to avoid as far as possible the effect of activity efficiency of the laundry department, more variance appears in favour of the hospital with fewer beds. The same result would also be derived by using the maximum region figures for both groups. In comparing the variance of the acute, mainly acute, and partly acute, we find the latter two greater than the first, and the third greater than the second. A part of the responsibility could be related to the percentage of beds allocated to the excluded departments;[1] 15%, up to 40%, up to 60% respectively, which could increase the work-load of maternity departments, and the like (e.g. surgical departments); (for the first more than the latter two, and for the second more than the third). Finally, other departments such as surgery could have a different effect on the laundry work-load, and therefore on the unit cost. On the other hand, medical departments could have a lesser effect than those of maternity and surgery. It should be mentioned that we used the figures and data of the maternity hospital to explain the effect of maternity departments in other hospitals because we have no closer information.

If the previous analysis is right, then we should not fix the cost of laundry per week or day for all specialities; otherwise the result

---

1 Excluded departments are those for psychiatry (mental illness), psychiatry (mental subnormality), disease of the chest, chronic sick, geriatric and convalescence (including rehabilitation but preconvalescence)

would be an underestimation of the cost of some courses and overestimation of the cost of other courses of treatment. Only by good luck, which does not exist as a principle in accounting procedure, could both types of difference be "washed out" to derive an acceptable average. In this case, also, the inaccuracy will exist, couple with the arbitrary factor which would lead to adverse results in using the resulting figures. The same idea could be applied to other costs regarded by Babson as independent of case-mix, e.g. catering, medical records, nurses in training. For such costs, their inclusion as a direct cost would depend only on the satisfaction of the second criterion stated above. In addition, if the actual distribution of hospital beds is changed in favour of more beds to surgical departments, on account of the size of medical departments, would that change not be associated with any change in the sum and items of indirect costs? There is great doubt. A possible change associated with increase is expected in equipment, uniform and laundry. A potential decrease is that related to catering. Moreover, such a decision could lead to the occurrence of some capital expenditure, e.g. purchasing of equipment, establishing new operating theatres, and in the future that would lead to a change in the sum of indirect costs.

7.4.8 Arbitrariness and Omission

The procedure used (under the additional methodology) in the day case unit study to extract the attributable costs would be worse than any accepted level of arbitratiness. The allocation of costs between in-patient and out-patient departments under the 1966 costing system is still surrounded by considerable doubt with regard to accuracy, and it is recognised as an actual system shortcoming. When the total or itemised cost of an out-patient department is derived under the doubtful allocative basis, the extracted part for the day care unit would be associated with much less accuracy. The use of functional costing methods would surely be

of great help here. We did not find any acceptable reason (e.g. accuracy) other than increasing cost of costing, in the move from simple unit basis to a basis of actual time for domicilary or other community services.

Within the whole study, the presented costs were the monetary type, and in the latter respect were not complete (e.g. there is no mention of the cost of GP services in the community). The economic bases were given as the grounds in arguing for or against an alternative (e.g. day care, or in-patient wards, hospital-home or hospital-ECF or hospital-district nurse with regard to hernia and appendix, and domicilary confinement, GP maternity homes, district general hospital maternity wards, or forty-eight hour discharge for the latter two in the case of maternity confinement). Meanwhile, some monetary costs were omitted. It was recognised in the research, in spite of the stated aim, that "this would constitute only part of a total case made for, or against, a more general deployment of such facilities".[1] The question is, can one make a judgement or suggest a preferable alternative on 'partial'economic grounds only? There is no argument about who will take the decision, but the analyst in the analysing process has to take into account monetary factors, quantitative factors which cannot be valued in money terms, and qualitative factors with regard to cost and benefit. According to the weight of non-monetary value and of monetary value, a suggestion about the apparently (from the analyst's point of view) best alternative could be presented with the others. Otherwise, the analyst's report would not satisfy the required conditions, and the 'partly' presented figures could be more misleading than helpful to the decision-maker. There is no account of the incremental burden on the patient (hernia and appendix patients) associated with the hospital-district nurse in comparison with other alternatives. In the day care study it was recognised that for hernia and varicose veins, one member of

---

1 Robson, ibid., p. 40

the family is frequently required to remain off work for two days after an operation. At least on economic grounds, without reducing the importance of non-monetary values, this should be counted. In addition, the recognised benefits in the study in terms of reducing the waiting list by introducing day care units, and the associated monetary and non-monetary effects, should be presented. And what about the cost and benefit of alternative places of delivery and different stay-periods? Refer, for more details of this point, to our analytical studies.[1]

7.4.9 An Answer to the Question

Now is the right time to give an answer to the question we started with, that is, does the costing methodology applied to achieve the planned aims so achieve them? The answer is NO. The normal absorption costing method is not the right method for performance control, nor for choosing among alternatives; for the former, functional costing, and for the latter, incremental costing methods are needed. But where the long term is concerned, both capital and current cost-elements would be involved, and there would be no need to distinguish between fixed and variable costs as is the case in the short term. Starting costing procedure from the bottom (i.e. the case) would increase the size of the joint cost problem, and arbitrary allocation would not solve the problem. On the contrary, it would reduce reliability and confidence in the resulting figure; therefore they would mislead the user. In designing a costing model for an organization unit, it is essential for the assumptions about the behaviour of cost elements to "approximate" the actual behaviour, a cornerstone condition which was not satisfied under the analysed costing methodology. Comparative analysis among alternatives should include all monetary and non-monetary cost and benefit, not only the former or part of it;

---

1 See Chapter 6.

otherwise the analysis would not be completed and, if used by the decision-maker, would mislead him. Finally, it was claimed by Dr Babson that the resulting performance data would facilitate the standardization of treatment techniques for comparison purposes. Surely it is better to leave such dangerous statements to the medical profession to judge!

7.5 Second, G Forester and R J Pethybridge[1]

This study was directed to cost a particular sector of the NHS, that is, maternity. The scale of the study was more comprehensive than the study previously dealt with, because the former included both types of patients, normal and abnormal, and presented the cost of providing a patient with institutional services (e.g. consultant and GP units), as well as the other types provided by GPs and local authority funds, in terms of supplementary service to the GPs or as a competitive alternative. A step forward has been made in distinguishing between intervention and non-intervention cases with regard to both delivery and non-delivery days. The objective was as in the previous study, to arrive at the cost of a representative case under each of the patient categories.

7.5.1 Analysis

1 As a starting point in the costing procedure of the approach concerned, it appears that a different method was used which is probably right, that is by choosing the departmental instead of the individual approach. But the causal reasons are not just those claimed by the authors, which are avoiding the disadvantage of sampling cases, and taking account of excess and slack capacity. As was explained in the previous section,[2] the matter is broader than that made observable by focussing on other influenced

---

1 G Forester & R J Pethybridge, The Cost of a Local Maternity Care, The Hospital and Health Services Review, July 1973, pp. 243-47.

2 See section 7.4.

factors, such as reducing arbitrariness through reducing the scale of indirect items.

2 The "case" was chosen as the output (cost-unit) of the department (but not as a starting point); the unit cost for both patient types was derived from knowing the average cost of delivery and non-delivery day. There are some doubts about the assumption that only the cost of delivery day (for both types) differs from the residual stay (length of stay - 1). The cost-curve would be expected to begin dropping to the right, particularly in intervention cases, at a point which will represent the start of further decrease, because of the time involved. But this does not mean that the cost should decrease daily by a certain proportion; some items would be expected to remain stable (e.g. nursing pay, catering, laundry); others would depend on the patient's condition (e.g. medical pay, drugs). Here the length of stay should also be taken into consideration. If the 48-hour discharge system is working, one will not expect the falling of the cost-curve to the same degree in that case, as in the case of full-length stay (10 days). The early discharge system could create more intensive care, so that greater costs would occur in the two days following delivery. So what we suggest is as follows:

a for normal delivery, we have, basically, to distinguish between the different systems of care. For each system there has to be a cost unit or units. For early discharge, we could probably have one cost unit, but for a normal or shorter length of stay (but over 48 hours) it would be better to have two cost units (i.e. one representing the average of, say, two days after delivery, and the second representing the average of the residual stay);

b for abnormal cases, we would have one system so that two daily costs through the whole length of stay would be required at least. It would be better to have a separate unit daily cost of the sub-categories of abnormality, if the variation of cost between them were significant.

c A good beginning would be to have the cost of patient/day as the "basic cost"[1] for all patients, and derive the incremental part because of type of delivery and stay (i.e. normal and abnormal).

3 In spite of using the term "relevant cost", which reflects the use of what was thought to be the adequate costing method, the presented application is surrounded by shortcomings:

a there is no separation between hospital-related cost (i.e. general overheads) and the cost of other functions involving the calculation of unit cost. Accordingly, there is no distinction between time dimensions and the relevant cost of each, which would certainly affect the type of information derived and its usefulness;

b in attaching the cost of items like fuel, electricity, drugs and dressings, pathology, etc. to the maternity department, there was no acceptable model or procedure, but the figures were derived as a result of discussion with the secretary or administrators.[2] Probably the shortcomings of the actual costing system are greatly responsible for the described shortcomings of the study.

4 A general shortcoming is the absence of any signs of the cost of capital expenditure and the affected running cost (e.g. maintenance).

5 There is no inclusion of cost attributable to the patient and his relations under any alternative which would be subject to the criticism made above.

7.6 Third, C C Magee

The subject of Professor Magee's study is the cytology screening project in the Cardiff area[3] with the two-fold purpose of: a) obtaining some financial information on the long-term medical costs resulting from

---

1 For a more detailed explanation of the concept of "basic cost", see section 7.8.

2 A letter sent to me by Mr C Bagwater, July 1973.

3 C C Magee, ed., Report on Costing Cervical Cytology, University College, Cardiff, Department of Economics (Accountancy), 1974.

the project; b) calculating the cost of treated females who presented themselves during the survey, having shown suspicious or abnormal smears. The survey period is five years. Our concern is related to the second aim, which is related to the hospital costing system. The team decides, after an initial attempt, to move away from the individual approach (i.e. individual costing for each individual in a sample) because of the range of treatment available. Therefore they decide to follow another costing procedure:

a getting figures for the cost of each constituent item in the full range of treatment;

b applying these standards or average actual unit costs to the different elements of treatment to which each individual in a random sample of cases had been subject. (The condition of the samples taken being representative of the whole group is satisfied.)

To obtain the financial figure of each constituent item, the team decides to use a mixture of methods, as follows:

1 operating theatre: the observed times of the concerned operations costed by the average cost (i.e. cost per operation per hour is obtained and then transferred to per minute use cost basis) obtained from the financial statement of the hospital concerned;

2 ward: the observed length of stay costed by the weekly average cost per patient calculated by the finance officer. The original figures of hospital costs as they appeared in the financial statement of the year ended 31 March 1971 are adjusted for the exclusion of the effect of the geriatric and isolation wards, which make the new figures more reasonable in the study concerned. The weekly ward cost/patient is reduced to a daily in-patient cost for ward usage;

3 specialized departments (the main concern being the pathology department): it is decided to accept the average pathology-operations relationship by

dividing the total pathology costs by the number of operations, to reach an average per operation used;

4 overhead and general costs: the extension of the use of the time factor employed in allocating the ward costs is used in this category as the relevant factor for apportioning cost procedure. Therefore, the weekly oncost rate from the financial statement (revised figured) is accepted and reduced also to a daily rate.

The above costing principles are applied, resulting in cost units (i.e. per minute, per day, per operation and per day on the previous order) being applied to the different types of treatment (e.g. cone biopsy, colposcopy and hysterectomy) to derive the cost of an average case of each element of treatment, together with the nursing and hospitalisation which necessarily follow.

7.6.1 Operating Theatre

To find the cost per unit for the operating theatre, either the number of operations, or the number of hours used, is normally employed as a basis. We agree with the team's view related to the rejection of the cost per operation as a unit cost because of the size of operation and the intensity factors, which would have an effect on costs. There is some disagreement with the second part of the costing procedure used by the team, i.e. charge fees of operating theatre. Operations on medical grounds could be classified into minor, moderate and major types. The cost of operations tends to increase respectively. The question is: does the time of an operation increase proportionately to cost increase? The point of this question depends on the operation-type carried out in an operating theatre. The time factor could be used when there were specialised operating theatres according to previous medical classification. Probably, for each operating theatre the difference between the proportion of time increase and of cost increase would not be large for operations of similar categories (e.g. minor operations).

Such differences could be washed out through the averaging procedure without greatly affecting the accuracy level. The case would not be similar where an operating theatre was in general use. To simplify the discussion, assume the exclusion of out-patient operations, on the grounds that there exists a special operating theatre for them. The cost of the operating theatre would consist of cost elements relevant to more than one operation-type. The total costs of the operating theatre would be divided on the time used in the operating theatre consisting of different operation times, each of which would be related to a particular type, to obtain the unit cost of using the operating theatre - per hour or minute. Thus, the accuracy of the derived unit cost used by the Magee team would be viewed with great doubt, because the assumption that the difference of cost according to operation-mix would be eliminated through the averaging procedure, could not be accepted. The analogy is the familiar rejection of averaging procedure as a way through which the difference of cost, because of case-mix, would be eliminated.[1]

Not all elements used in the operating theatre would be related to time; only some would really be so related (e.g. anaesthetic gas, oxygen, drugs and basic operating table prepared for all types). Others would be related to operation-type (e.g. fluids, blood transfusion, antibiotics, type of instrument used, and equipment used, like cautery and portable X-ray). For example, a recurrent inguinal hernia (regarded as a moderate operation) would require a time span of between 1½ and 2 hours and could be done by a surgeon single-handed. At the same time, a peptic ulcer or cholycystectomy (both regarded as major operations) would on average require less time and be accomplished at greater cost, e.g. medical payment for the surgeon and his assistants and cost of equipment. Using the time factor here as an

---

1 M S Feldstein, Economic Analysis for Health Service Efficiency, 1967.

allocative basis would lead to the overestimation of the cost of moderate operations and underestimation of the cost of major operations. Recurrent high aneal fistula, regarded as a minor operation, would require about one hour and an appendectomy, regarded as a moderate operation, would take about twenty minutes; these are further examples. The use of the time factor as an allocative basis would cause the derivation of misleading data. Now we will proceed to present the suggested models for costing the service of the operating theatre.

Costing Models for the Operating Theatre

First: when there are specialised operating theatres according to operation types (minor, moderate and major). We will assume that there is a specific operating theatre for the operations of the out-patient department. The classification of cost items against different operating theatres (at the same time, different types of operations) and the resulting cost formula would be as follows:

Cost items:	Operating theatre for out-patient department	Operating Theatre for minor op. in in-patient department	Operating theatre for moderate op. in in-patient department	Operating theatre for major op. in in-patient department
Cost of basic items (for all operations within a type)	x_o	x_1	x_2	x_3
Cost of relevant items (influenced by operation categories within a type	y_o	y_1	y_2	y_3
Hours used	t_o	t_1	t_2	t_3
Average cost - per unit time (hour or minute)	h_o	h_1	h_2	h_3

$$\frac{x_i + y_i}{t_i} = h_i$$

Cost formula: $C = mh_i$ (1)

Second: when an operating theatre is available for all types of operations (for the in-patient department), the classification of cost items against different types of operations will appear as follows, and the cost C may be calculated by using one of the following three formulae:

A

	General operating theatre		
	Types of operations		
	Minor	Moderate	major
Cost items:			
Cost of basic items (distinguished by type of operation)	x_1	x_2	x_3
Cost of relevant items	y_1	y_2	y_3
Hours used	t_1	t_2	t_3
Average cost per unit time (hour or minute)	h_1	h_2	h_3

$$\frac{x_i + y_i}{t_i} = h_i$$

AC

Cost formula: $C = m h_i$ (2)

B

	General operating theatre		
	Types of operations		
	Minor	Moderate	Major
Cost items:			
Cost of basic items (not distinguished according to operation type)		X	
Hours used (for all operation types)		T	
Cost of basic cost per unit time (hour or minute) $\frac{X}{T} = H$		H	
Cost of relevant items	y_1	y_2	y_3
Number of operations	n_1	n_2	n_3
Cost of relevant items per operation	p_1	p_2	p_3

$$\frac{y_i}{n_i} = p_i$$

Cost formula: $C = mH + p_i$ (3)

C

	General operating theatre		
	Types of operations		
	Minor	Moderate	Major
Cost items:			
Cost of basic items (distinguished by operation-type)	x_1	x_2	x_3
Cost of relevant items	y_1	y_2	y_3
Hours used	t_1	t_2	t_3
Number of operations	n_1	n_2	n_3
Cost of basic cost per operation $(x_i = h_i)$ $(\frac{}{t_i})$			
Cost of relevant cost per operation $(y_i = p_i)$ $(\frac{}{n_i})$	p_1	p_2	p_3

Cost formula: $C = m h_i + p_i$ (4)

In the above formulae, C is the cost of an operation calculated by using one of the stated formulae, m is the actual time of the operation, and i = o, 1, 2 or 3. For the three costing formulae related to the general operating theatre the most accurate is number (4); thereafter formula (3) and (2) respectively.

Note (1): Basic and relevant items would include only the controllable items and the cost of service provided by other departments which have a measured cost unit e.g. laundry.

Note (2): It is worth stating that we accept the procedure used in the cytology screening project for the calculation of operation time as the anaesthetist's time, to which five minutes will be added to allow for the necessary intervals between operations. Our acceptance is limited to the determination of the value of m.

7.6.2 Ward Costs

The adjusted weekly costs per in-patient are used for extracting the ward cost for the purpose of the study. The weekly rate is reduced to a

daily rate on the ground of neglecting the difference in treatment and care between the first day after operation and the day before the patient is discharged. The adjustment greatly reduces the effect of case-mix. However, there is nothing in the accounts to distinguish between the cost of in-patient stay and the cost of in-patient treatment in relation to ward function. The former would represent a fixed cost, in the short term, which would occur regardless of patient admission and discharge in general or for particular groups (within the hospital capacity). In other words, when the type of treatment concerned ceases to be provided by the hospital, meanwhile maintaining the original capacity, probably no change would show in the accounts (i.e. utility could be transferred to another speciality). The situation seems not to be similar with regard to treatment costs since, if treatment ceased, they would not be incurred. In-patients will probably get equal shares per staying-day of cost of stay related to ward (we will call it "basic ward cost"). This would not be true in the case of treatment, even when it is in similarly intensive conditions, because the different methods of treatment within the same hospital would cause variation in utilizing treatment elements. Accordingly, we would prefer the use of the ward (as on a similar line, out-patient clinic) as the cost unit instead of a more reduced level such as in-patient/day or week or the case. There are known levels of intensity for wards, and by distinguishing the basic cost of ward function from the incremental cost because of intensity level (e.g. basic nursing and incremental nursing), we would separate the relevant (the latter) from the irrelevant costs. For the single type ward, the relevant cost would be related to a specific speciality, and for the mixed ward the relevant costs would be distributed between the departments according to the cases of each (note: the mixed situation would not exist in an out-patient clinic).

7.6.3 Specialized Departments

These provide for diagnostic and/or treatment purposes required for

patients under the supervision of a specific department (i.e. in-patient or out-patient). The in-patient average figure could not be accepted even in the specialized hospital (e.g. maternity). The team decides to use the average per operation procedure in allocating the cost of the pathology department, but we would think that this procedure is not very accurate because of the difference between patients' use of the service (unless it is found that this is very minor; even then we cannot generalise on such a procedure).[1]

7.6.4 Overhead and general cost

The team regards the time factor as the adequate basis for allocating these two cost types regarded as one category. As a matter of fact we are raising a serious problem, recognised in industry and consequently in the health industry. It is worth mentioning here that the overhead and general costs are about 40% of patient cost/week. Our view is as follows: we disagree with treating the two types of expenditure as one category on a time basis. We would like to distinguish between general fixed expenses (e.g. general administration, general cleaning, maintaining the grass and gardens) and functional costs (e.g. laundry, and catering). The former is a "genuine joint cost" which would be incurred in the short term regardless of the output volume or its composition. It seems hard to accept the claim of the invariability of services provided by these functions or at least some of them, e.g. laundry usage expected to be ranked among great aggregate categories, such as surgical specialities, maternity and medicine departments. The research team regards the increase in the cost of drugs as a justifiable compensation for decreasing the cost of catering services during the early days after an operation. We cannot generalise on such an assumption, and why should we do that if the unit cost of each function could be derived, whereby the relevant cost for each speciality on usage basis could be attached.

---

1 For further investigation, see proposed costing system, section 7.8.

7.7 Fourth - New Hospital Costing System

A new hospital costing system is suggested as an integral part of the accounting system proposed for the NHS after the reorganization of the service structure which started in April 1974. The objective of the system is to have an integrated system of financial and cost information, to be used as a basis for functional budgets. However, the difficulty of having systems of budgetary control at a national level because of local patterns is recognised. The functional basis will be in use in constructing the statutory accounts (i.e. the primary analysis), which means that controllable expenditure only will be charged to each functional account according to the responsibility of each function's head and cross accounting between functional accounts will be eliminated. Accordingly, functional unit costs will be derived. Functional full costs will be obtained through memorandum accounts.

Apportionment of expenditure will be used when an expenditure type (e.g. salaries of supervisors and managerial staff, cost of materials and equipment) is related to more than one service or section within the same department, also when the allocation of expenditure according to the secondary and tertiary analysis is not possible at the initial coding point. The decisions on how to apportion will be left to the local management.

The secondary analysis will be between in-patient and out-patient departments. A further analysis of the costs of the out-patient department can be made to extract the costs of large accident and emergency departments, day patients (when attendances will exceed 5,000 per annum), and day cases (when attendances exceed 1,000 per annum).

The tertiary analysis will concern the allocation of in-patient costs between speciality groups. The new system distinguishes between the two types of hospital services, namely general services (the expenses of which, it is assumed, will not vary in accordance with the nature of the rendered out-put - i.e. patient treatment and care given - on the ground that these

services are deemed not to form part of medical treatment) and patient care services (the cost of which is assumed to vary and is essentially generated and controllable by medical and other professional staff). The latter type only will be subject to the secondary and tertiary analysis (part of it would be allocated in less detail - as group or groups particularly for small hospital) as part of the regular production of accounting information. The former type will be subject to secondary analysis annually to ensure the continuity of producing information about the cost of hospital output by the hospital type (i.e. cost per in-patient week and per case and cost per out-patient attendance), with the possibility of more frequent analysis, such decisions being within the discretion of the authorities.

Memorandum accounts, the information in which will not be submitted regularly, but should be available on demand, will also exist for activities, the elements of which are under the control of separate and different functional heads (e.g. operating theatres, intensive care units, staff residences, staff housing and CSSD), in addition to the annual requirement for other types (e.g. for farms and gardens).

7.7.1 Analysis

i The first point is related to the mixing of use of the terms 'direct' and 'variable' with regard to cost, implicitly claiming that costs which vary in accordance with output type are essentially direct costs;

ii there is little evidence to support the assumed ground used in distinguishing patient care service costs (direct and variable, assumed to be similar) and general services (indirect and fixed) with regard to the output type. In sections 7.7.2 and 7.7.3 we will demonstrate the analysis which seems to support our doubts about the assumption used in the new system, on the ground that the assumptions are not coincident with the behaviour of some cost factors of the hospital. Our analysis will be related to the behaviour

of the cost of laundry service, as an example of general services, and of 'nursing', as an example of patient care services. The result of the analysis shows that:

a the cost of laundry service dramatically varies according to the output type (patient care group) in spite of being regarded within the fixed block in the new system;

b the cost og nursing service, in spite of the apparent variation, is less dramatic than in the laundry service (i.e. in percentage rather than in total); the size factor seems to be the real cause of a reasonable part of the total variation. Therefore, the significance of output type (patient care group), as the variation response of nursing costs, would be expected to be reasonably reduced when the total variation is adjusted by the related effect of the size factor. Nursing costs are included in the variable block under the new system.

iii The new system treats the joint cost problem using several approaches. One is through apportionment, another is by using an arbitrary basis (e.g. administration, training and education, transport, grounds and gardens, are suggested to be allocated as a percentage of expenditure on patient care services). This would endanger the validity and the reliability factors. Other items would be subject to the choice of local decisions. All of that would mean the lack of uniformity of hospital costing system at the level below the primary analysis.

iv The allocation of the cost of patient care services (regarded as likely by the system) between in-patient and out-patient departments seems to be a system ineffectiveness. The derivation from such analysis regularly through the year, with the annual analysis of what is regarded as the cost of general service, would be the same as was produced by the 1966 costing system - cost per in-patient week and per case and per attendance. These recognized hospital outputs would not be so useful in their general

concept, either for comparison purposes, or for performance control, or planning. At that level of analysis we would find the fruitfulness of the functional basis used would not be increased by the secondary analysis. We would think, instead of the general analysis between the two grand blocks, that greater usefulness would be generated by moving from the primary analysis to the medical departments (i.e. narrower in detail than the tertiary analysis which is a group aggregate). Thereafter, for each medical department we would come down through a further analysis to ward and clinic as cost units (we will provide more detail about this under the proposed costing system).

7.7.2 Cost of laundry service

From the available cost data, total average national cost of laundry service per in-patient week for long-stay, acute-over 100 bed and maternity hospitals in 1968-69 was £0.73, £1.13 and £1.79 respectively.[1] In examining the figures representing the minimum region with regard to cost of laundry service per in-patient per week for the stated types, we find that maternity is over three times greater than long-stay and acute almost twice the latter. The variation would include the effect of service performance level and wages level. But from the information derived from table (2) it is difficult to accept these as responsible for variation. When the minimum regional cost of per in-patient per week for maternity hospitals is compared with the highest regional cost of laundry/in-patient week of other hospital types, the difference is still significant.

In examining the relevant figures for the South-East Metropolitan Region, the variation pattern and percentages are found to be almost identical to those for 1969.[2] The analysis shows a dramatic variation because of maternity speciality and a smaller one because of other case-mix /the lowest percentage of maternity beds and the expected higher usage of laundry service by other departments occupied the major part of acute

---

1 See Appendix 7.a, Table (1).

2 See diagrams 1 and 2, Appendix 7.A.

hospital beds e.g. surgical, add balance to the result7. Probably the fixed cost of laundry/in-patient/week equals the cost for a long-stay bed (i.e. 80p in 1971 and 92p in 1972),[1] and the residual of unit cost for each hospital type is a variable depending on bed distribution.

For the purpose of calculating the cost of a maternity department, the use of the cost of laundry per in-patient per week in maternity hospitals (treated as direct cost because the required conditions for that are satisfied) would be preferable to the procedure of gathering the cost of laundry services with the cost of other items under overhead costs which would be allocated on an arbitrary basis. The latter has been done under the Babson approach, and is suggested by the new hospital costing system.

It is true that the cost of laundry itself represents a small percentage of the total cost (in-patient/week). But we would think the result has another significance; it shows that the published data can be of more value if it is carefully examined and used.

7.7.3 Cost of nursing service

From the available cost data, total national average cost of nursing service per in-patient/week for long-stay, acute-over 100 beds and maternity hospital in 1968-69 was £8.92, £12.25, and £19.88 respectively.[2] Unit cost of acute hospitals is about 40% greater than that of long-stay hospitals, and maternity is greater by about 2.3 times than long-stay. Examining the situation by using minimum region's unit cost, we find no change - £7.44, £10.32 and £17.05 respectively. The situation is almost identical in the years 1970 and 1971.

Maternity hospitals always have a small number of beds (i.e. around 50 or less) in comparison with other hospital types (e.g. acute-over 100 beds, mainly acute, partly acute, mainly long-stay and long-stay). It seems that the size factor has a significant effect on nursing cost. The linear regression of nursing pay per in-patient/week against regional

---

1 See Appendix 7.A.

2 See Appendix 7.B, Table (1).

average staffed beds in maternity hospitals (see Appendix 7.B) appears to be as follows:

$$Y = 26.070 - 0.141 X$$

X = average staffed beds in maternity hospitals

Y = nursing pay per in-patient/week in maternity hospitals.

The coefficient of correlation is -,756 which represents a good relation ship. The value of r^2 is 58% and the remaining value 42% can be attributed to other variables not explicitly incorporated in the model and to random variation. Testing the accuracy of the regression line, we find that the value of 'B' (i.e. slope of the true regression line) in terms of its standard error equal to '4'. This would support the existence of a good relationship (because it is more than the limit of significance, which is '2').

In a previous study, it was found that the nursing cost per in-patient week in obstetric and paediatric wards is greater than that in medical.[1] In examining the relevant figures for the South-East Metropolitan Region, the nursing cost appears to be greatly affected by maternity speciality rather than other specialities. Diagram 1 in Appendix 7.B shows that the relevant nursing cost because of maternity beds presented in the area ABC is much greater than that mostly related to other speciality beds presented in the area ACD. Because maternity hospitals always have a small number of beds, the size factor would be responsible for a portion of the relevant nursing cost of maternity beds. How much such a portion would be and would it be enough to permit the neglect of any slight variation due to speciality are open questions, the answer to which requires a further investigation into the requirement of nursing service in different wards. At this stage, we would think that there is a basic nursing required for the most minimal

---

1 M S Feldstein, Economic Analysis for Health Efficiency, 1967

type of hospitalized patient care, the amount of which does not vary by speciality. The nursing service thought to be required in a convalescent or long stay ward would be a good example in satisfying this condition. Therefore, the concept of "Basic Cost"[1] includes what is regarded as the basic nursing service.

7.8 Proposed Costing System

The objectives to be achieved are as follows:

I Vote accounting

II Measuring and improving the performance level of hospital activities

III Evaluating the performance level of hospital management

IV Furnishing basic data for planning decisions or choice between alternative policies.

i The ideal solution for the achievement of these objectives is the establishment of standards. The standards to be used are those which represent "attainable good performance", because establishing unattainable high standards will be ignored by those who are expected to work to them and therefore be ineffective. In fact, there are two major conditions which should be maintained, for the establishment of standards. First, the different professionals involved in hospital activities should be persuaded to generate and recognise standards; otherwise the imposed system will be practically ineffective whatever its theoretical perfection. Second, the expected benefits of establishing standards seem likely to outweigh the costs involved. Really, these two conditions are not separate, but are closely related, because the expected benefits of establishing standards greatly depend on the acceptance of the professionals concerned.

ii The alternatives in establishing standards: the first alternative is the establishment of standard according to the scientific method, which requires a) determining the segments of work for each department or activity;

---

1 See section 7.8.

b) identifying the most economic way of doing this work and c) determining the time and equipment required at normal pace to do each segment. Certainly, the effectiveness level of this alternative is the highest of the alternatives. But the obstacles facing this alternative, in terms of the two essential conditions stated above, should be first overcome. The second alternative, which represents the second best, requires a) choosing the minimal unit cost for each segment of work which has actually occurred and regarding it as the practical standard; b) judging on the performance level of each segment of work against the practical bench mark chosen, taking into account the effects of the related factors (e.g. size factor).

There is no doubt about the preferability of the first alternative, when the stated conditions are met, but without such the second will be the best available alternative.

For both alternatives, information on the factors expected to affect the costs of the related departmental activity and the estimated significance of each, derived from the application of the method of regression analysis, will provide a useful guide.

iii Costing Methodology

It is worthwhile to mention once again that the hospital is an organization unit producing multiple outputs according to a job order system with the existence of basic process. Classifying the job orders into two categories - in-patients and out-patients - we will find that all in-patients are getting the same service for each unit of time; for instance day; from the basic process which is the basic word service. Also we will find that all out-patients are receiving the same service for each attendance from the basic clinic service. In addition, each in-patient and out-patient, according to his condition, will get the required services, which are the outputs of different departments other than that of the genuine service departments. From one side, each of the out-patient and in-patient groups under a particular speciality is getting the physician service, but

the quantity and quality of this service differs according to the intensity of the case. At the other extreme, the services of para-medical departments are provided for the patient according to the physician's orders.

Therefore, for the purpose of performance control, we should stop at the department level regarding the basic process for each category as a department. The general requirements for each department are a) to identify the attributable items of expenditure in a unified manner at the national level; b) to choose, in a unified way also, the appropriate output unit for which to calculate unit cost; and c) to report regularly to the responsible manager, from the regular accounting system the variance between the actual unit cost and the chosen yardstick (i.e. obviously the standard costs when the major conditions are satisfied) with explanation on the reason of such variation. The requirements for vote accounting will be satisfied, by maintaining on the correspondence between the items of expenditure shown in the departmental accounts and the estimates, through the summarization of subjective head information. Let us now identify the items of expenditure for the "basic process".

The Concept of "Basic Cost": This is the cost of services which are incurred and provided for any ward and clinic, regardless of speciality, because of hospitalization or attendance service. These services are the basic nursing, domestic, dressing and medical records. These services are different from those unrelated to the output of patient departments, and independent of speciality and throughput; categorised as genuine service departments. Also, these are different from services the usage of which does vary by speciality. As stated before, each in-patient and out-patient will receive the same basic service per unit of time or attendance, then the cost unit will be the in-patient per week for the ward and the unit of attendance for the clinic.

Departmental costs: Departmental costs will be purely prime cost and do not include any costs which first are charged to any other department in

the hospital. The departments costed will be under the following categories (bearing in mind that the ward and clinic departments are treated before):

1 Supporting service departments (e.g. laundry and catering): the use of laundry service differs by speciality and there is a ground for applying the same view to catering services (e.g. surgical bed would use less diet than the other bed types). Therefore, for the purpose of speciality costing, it will be inaccurate procedure if the in-patient week is used as the cost unit in charging the different specialities. More accurate procedure will be by charging each speciality according to the actual usage (e.g. number of lbs. washed, in the case of the laundry), and then for each speciality the cost of usage could be reduced to the cost per patient day or week. By adding the cost of laundry and catering per day to the basic in-patient cost per day, the cost of hospitalization per day will be reached.

2 Medical and para-medical service departments (e.g. diagnostic X-ray, radiotherapy, and occupational therapy): for the purpose of speciality costing, the actual usage of each speciality for in-patient or out-patient will be costed using the unit cost of each department. Information on the usage by the different specialities will be derived from ward and clinic records directly, or from statistical information based on these records, or the records of the departments providing the service.

3 Speciality departments (e.g. surgery, medical, maternity and mentally handicapped): for speciality costing the following cost items will be gathered under each department:

a prime cost - medical and nursing pay (other than basic nursing), medical, surgical equipment and drugs;

b cost of services provided by medical and para-medical service departments;

c cost of services provided by supporting service department, or just the incremental cost relevant to each speciality would be preferable if it could be specified at acceptable cost of costing.

Thereafter the speciality costs will be divided between in-patient ward and out-patient clinic according to the quantity and cost of treatment elements used. For further breakdown within each speciality, by type of disease, a classification will be required to identify the treatment elements and their costs for the representative case of sub-categories of each type of disease.

4 Genuine service departments (e.g. administration, estate management, miscellaneous services and expenses, portering, training and education): these services are not related to the output of patient department nor affected by throughput or speciality; rather they are related to the hospital as an organization unit. For costing purposes, such as deriving the total cost per patient for pricing purposes, the required allocation of these costs to extract the cost per in-patient week, per case and cost per out-patient attendance by types of hospitals, will be done outside the regular accounting system.

The prescribed system above will maintain the provision of the required information for vote accounting, provide information on the actual performance in each department and furnish useful cost data for the aid of planning or in the choice between alternative policies such as "hospital or home confinement". In addition, it will permit answering a question which is still without an answer, that is, how can the performance level of hospital management be evaluated? The answer will be obtained as a result of knowing the performance level of the basic process, the supporting service departments and the genuine service departments. In fact, the establishment of standards is the really effective method for control purposes and provides a useful aid for planning purposes.

7.9 Summary

The problem is: on what basis the regular accounting system would be constructed, and what type of information should be regularly provided?

In examining the problem, generally, and with particular reference to the hospitals, the following conclusions are reached:

1 Functional basis is an effective ground for constructing the statutory accounts;

2 Regular information will be of two types -

a summarized subjective head information for vote accounting,

b departmental unit cost for performance control;

3 The establishment of standard costing system is the effective method for control purposes and providing useful aids in planning and special cost studies.

4 If the identification of programme objective is an essential requirement as a benchmark in identifying the effectiveness of alternatives, the standard costs are the only effective benchmark in practising a real control on the activity used, in improving the level of performance and in aiding planning purposes.

5 Performance budgeting is a prerequisite of PPBS, and to secure effectiveness the former should be on the established standards.

APPENDIX 7.A

Analysis of laundry cost per in-patient week

Appendix

Cost of Laundry per patient per week

	Long stay			Mainly long stay			Partly acute			Mainly acute			Acute over 100 beds			Maternity		
	1969 £	1970 £	1971 £	1969 £	1970 £	1971 £	1969 £	1970 £	1971 £	1969 £	1970 £	1971 £	1969 £	1970 £	1971 £	1969 £	1970 £	1971 £
E. N. Average	0.73	0.78	0.80	0.80	0.86	0.91	0.96	1.00	1.14	1.10	1.11	1.20	1.13	1.20	1.28	1.79	1.86	2.03
Minimum Region	0.49	0.52	0.52	0.49	0.63	0.74	0.65	0.59	0.82	0.81	0.83	0.84	0.91	1.01	1.01	1.43	1.54	1.64
Maximum Region	1.05	1.26	1.33	1.17	1.58	1.69	1.11	1.22	1.43	1.28	1.57	1.62	1.28	1.55	1.57	2.45	2.58	2.57

Table (1)

Sources: DHSS, Hospital Costing Return 1969, 1970 and 1971

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
REGIONAL HOSPITAL BOARDS	Occupied beds for maternity in non-maternity hospital	Cost of laundry per patient/wk. (NHB) for maternity hosp.	Cost of laundry per patient/wk. Highest hos/type for each region	Cost of laundry per patient/wk. Highest NA for hosp/type	Cost of laundry per patient/wk. Highest minimum region for hosp/type	Cost difference of cost of ldry. per patient/wk. 3 - 4	Cost difference of cost of ldry. per patient/wk. 3 - 5	Cost difference of cost of ldry. per patient/wk. 3 - 6	Cost of laundry per patient/wk. Minimum region NA for maternity hospitals	Cost difference of cost of ldry. per patient/wk. 10 - 4	Cost difference of cost of ldry. per patient/wk. 10 - 5	Cost difference of cost of ldry. per patient/wk. 10 - 6
	£	£	£	£	£	£	£	£	£	£	£	£
Newcastle	449	1.48	1.07	1.13	0.91	0.41	0.35	0.57	1.43	0.36	0.30	0.42
Leeds	533	1.64	1.11	1.13	0.91	0.53	0.51	0.73	1.43	0.32	0.30	0.42
Sheffield	821	1.47	1.20	1.13	0.91	0.27	0.34	0.56	1.43	0.23	0.30	0.42
East Anglia	260	1.44	1.25	1.13	0.91	0.19	0.31	0.53	1.43	0.18	0.30	0.42
N W Metropolitan	656	2.17	1.22	1.13	0.91	0.95	1.04	1.26	1.43	0.21	0.30	0.42
N E Metropolitan	807	2.30	1.20	1.13	0.91	1.10	1.17	1.39	1.43	0.23	0.30	0.42
S E Metropolitan	727	2.22	1.29	1.13	0.91	0.93	1.09	1.31	1.43	0.14	0.30	0.42
S W Metropolitan	661	1.85	1.28	1.13	0.91	0.57	0.72	0.94	1.43	0.15	0.30	0.42
Oxford	370	2.05	1.27	1.13	0.91	0.78	0.92	1.14	1.43	0.16	0.30	0.42
South Western	578	1.69	1.21	1.13	0.91	0.48	0.56	0.78	1.43	0.22	0.30	0.42
Welsh	779	2.45	1.18	1.13	0.91	1.27	1.32	1.54	1.43	0.25	0.30	0.42
Birmingham	752	1.62	1.31	1.13	0.91	0.31	0.49	0.71	1.43	0.12	0.30	0.42
Manchester	992	1.73	1.18	1.13	0.91	0.55	0.60	0.82	1.43	0.25	0.30	0.42
Liverpool	396	1.75	0.97	1.13	0.91	0.78	0.62	0.84	1.43	0.44	0.30	0.42
Wessex	477	1.43	1.13	1.13	0.91	0.30	0.30	0.52	1.43	0.30	0.30	0.42

Table (2)

An Equation for Laundry Cost

The figures used are those for 1970-71 (Table (1))

/Cost/patient/week = 80p + X per acute % beds + Y per maternity % beds/ (1)

/Long stay - Maternity = Difference because of Maternity/ (2)

80p - 203p = 123p

∴ Y = 1.23p

The point now is to derive the incremental part because of acute bed from long stay. As we expect from the start that there is a small difference among acute beds because of speciality type (case-mix), and the latter is not similar among partly-mainly and acute-over 100 beds. Moreover, these three types, include a small part for maternity. For these two reasons, it is not possible to derive the value of X by deducting any of the three types from long stay or making the deduction after taking into account the influence of the proportion of beds staffed for maternity. Accordingly, we decided to derive the value of X for each of the three and take the average, as follows:

acute over 100 beds: 128 = 80 + 84.13 X + 11.32 . 1.23 = 0.404

mainly acute: 120 = 80 + 67.5 X + 10 . 1.23 = 0.410

partly acute: 114 = 80 + 47 X + 6.2 . 123 = 0.56

∴ X = 0.44.

Then we can write the proposed equation for the cost of laundry per in-patient/week as follows:

80p + 0.44p per acute % beds + 1.23p per maternity % beds (3).

Test the proposed equation:

			Variation
mainly long stay	= 80 + 0.44 . 20 = 89p	0.91	- 2
partly acute	= 80 + 0.44 . 47 + 1.23 . 6.2 = 108p	1.14	- 6
mainly acute	= 80 + 0.44 . 67.5 + 1.23 . 10 = 122p	1.20	+ 2
acute over 100 beds	= 80 + 0.44 . 84.73 + 1.23 . 11.39 = 131p	1.28	+ 3

B: maternity hospital D: mainly long-stay hospital F: partly acute hospital

South-East Metropolitan Region

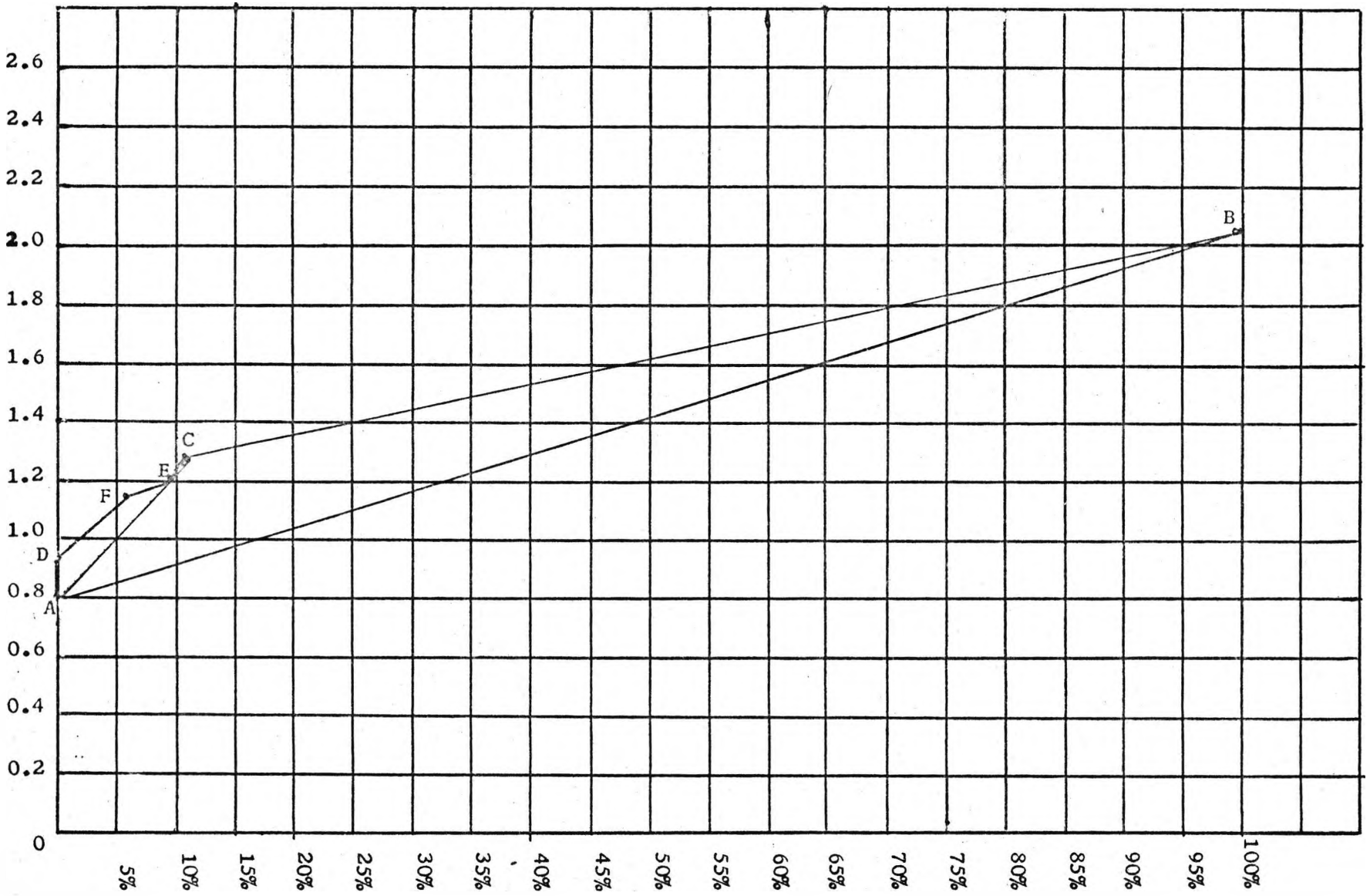


Diagram (1)

Laundry cost
of in-patient
week
1969)

A: long-stay hospital

B: maternity hospital

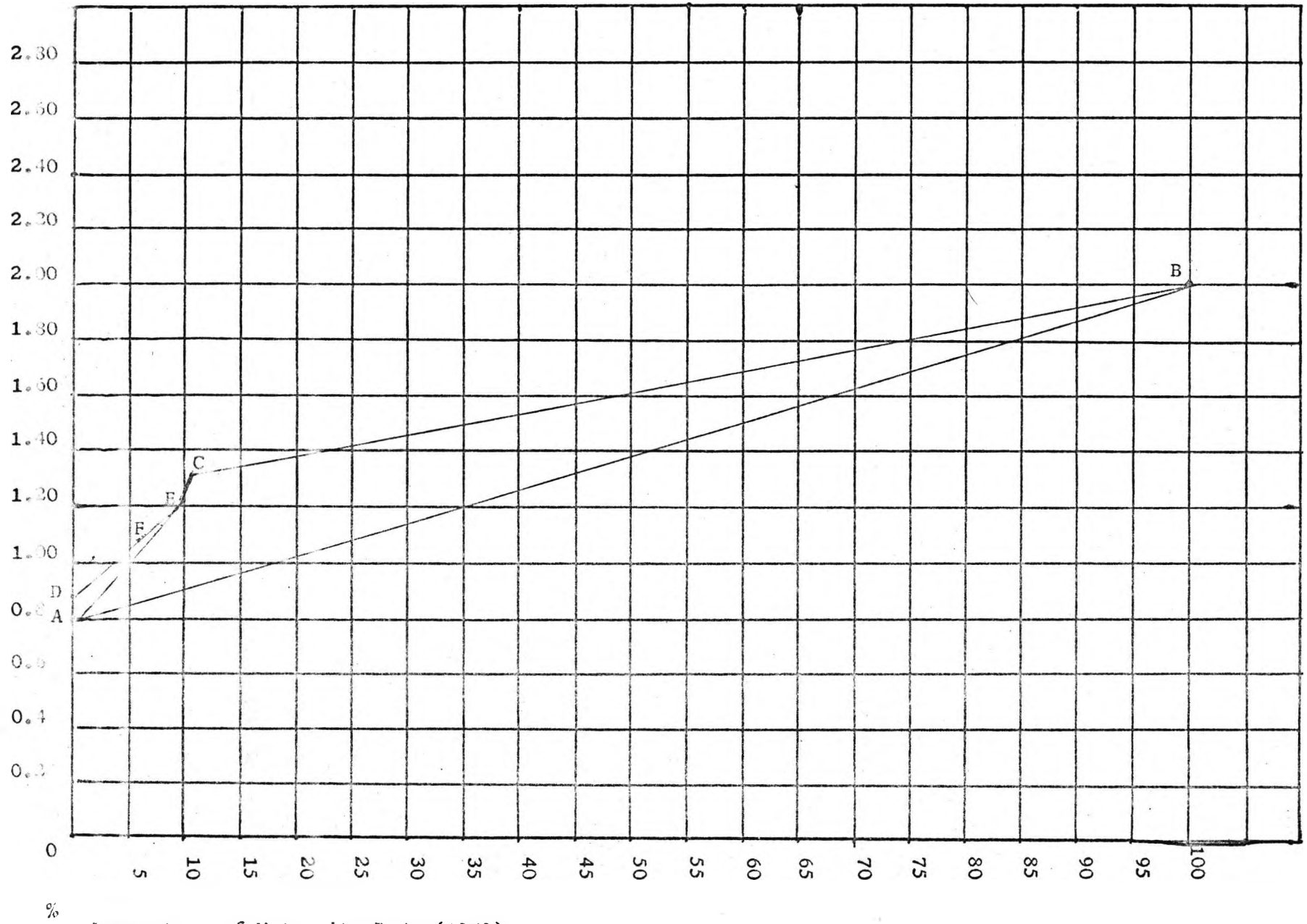
C: acute hospital (over 100 beds)

D: mainly long-stay hospital

E: mainly acute hospital

F: partly acute hospital

South-East Metropolitan Region



Percentage of Maternity Beds (1970)

Diagram (2)

APPENDIX 7.B

Analysis of nursing cost per in-patient week

Appendix

Nursing Pay per in-patient/week

Hospital type	Long stay			Mainly long stay			Partly acute			Mainly acute			Acute over 100 beds			Maternity		
Cost unit	1969	1970	1971	1969	1970	1971	1969	1970	1971	1969	1970	1971	1969	1970	1971	1969	1970	1971
T. N. Average £	8.92	9.73	11.62	10.84	11.58	14.00	11.11	12.33	15.81	11.70	12.77	16.21	12.25	13.67	17.54	19.88	21.98	26.51
Minimum Region £	7.44	7.98	9.64	8.37	9.54	11.27	9.80	10.74	12.93	10.36	11.33	14.82	10.32	12.12	15.58	17.05	19.30	23.94
Maximum Region £	11.60	13.17	15.05	14.15	13.65	19.88	14.82	14.85	18.82	13.55	15.59	19.67	13.55	14.95	16.61	24.30	25.82	33.83

Table (1)

Sources: DHSS, Hospital Costing Return 1969, 1970 and 1971

B: maternity hospital D: mainly long-stay hospital F: partly acute hospital

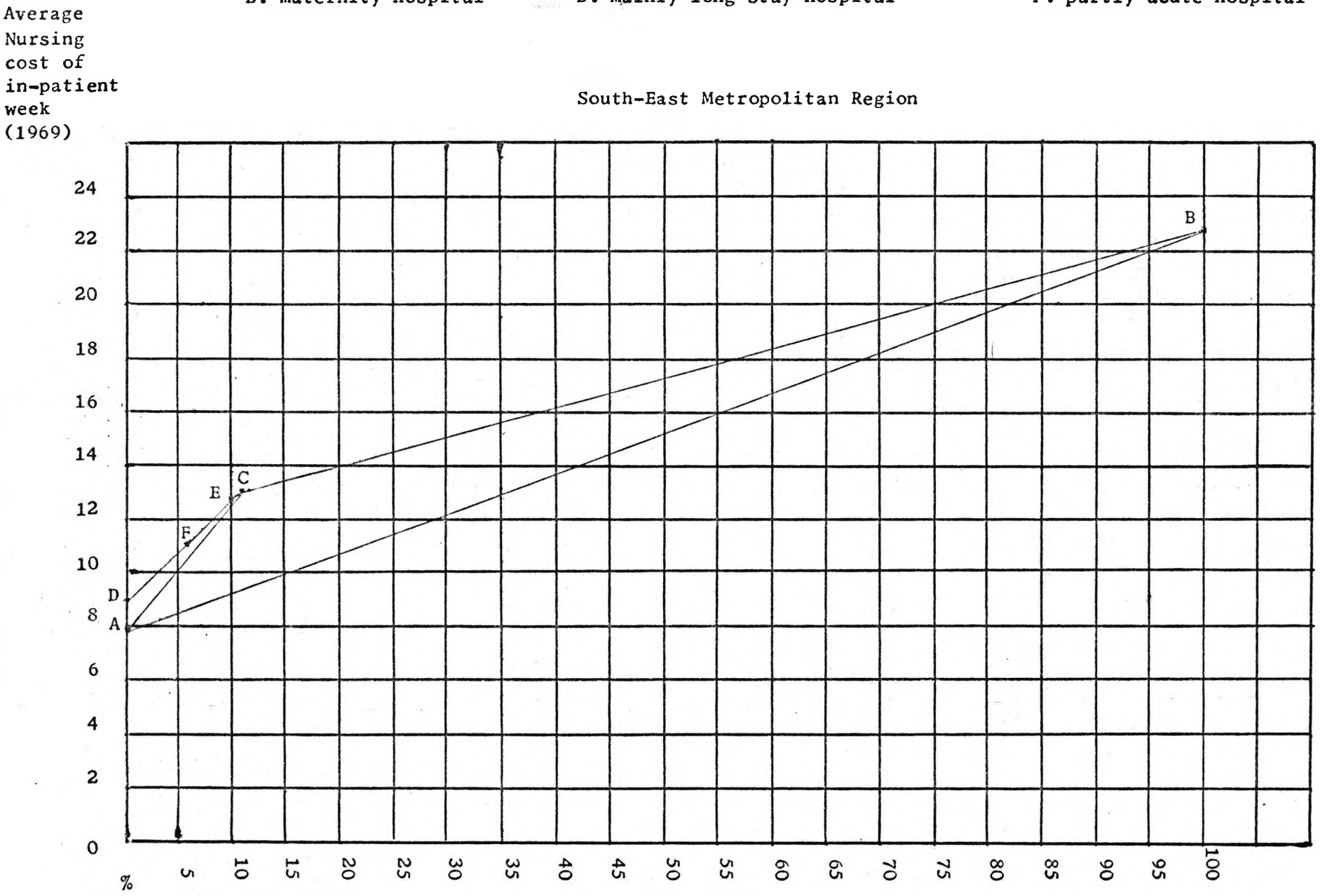


Diagram (1)

Regional average maternity staffed beds and nursing pay per in-patient per week

	Regional Hospital Boards	1969		1970		1971	
		A. Maternity hosp. staff beds	Nursing pay per in-patient per week	A. Maternity hosp. staff beds	Nursing pay per in-patient per week	A. Maternity hosp. staff beds	Nursing pay per in-patien per week
			£		£		£
1	Newcastle	40.60	18.84	45.00	20.98	45.00	25.70
2	Leeds	42.20	18.62	36.40	19.30	45.80	24.87
3	Sheffield	28.20	20.32	29.70	23.07	31.00	26.54
4	East Anglian	21.10	21.00	21.00	23.04	19.00	30.51
5	N W Metropolitan	56.00	19.92	48.00	23.14	48.20	28.98
6	N E Metropolitan	60.00	17.05	55.50	19.97	54.80	24.55
7	S E Metropolitan	34.60	22.92	34.50	25.82	36.20	30.23
8	S W Metropolitan	44.20	20.39	44.40	22.65	49.20	27.27
9	Oxford	24.00	21.95	22.40	24.86	22.00	29.62
10	South Western	27.30	21.63	27.70	23.70	28.00	28.50
11	Welsh	16.10	28.64				
12	Birmingham	62.65	18.22	65.60	20.24	71.50	23.94
13	Manchester	24.80	20.78	24.00	23.12	24.40	28.16
14	Liverpool	45.00	19.56	42.20	22.06	43.60	26.85
15	Wessex	18.70	24.30	18.60	26.95	20.00	33.83

Table (2)

Sources: DHSS Hospital Costing Return 1969, 1970 and 1971

Regional Hospital Boards 1968-9

Nursing pay per patient/week against average staffed beds in maternity hospitals

R H B s	X^2	Y^2	XY
Newcastle	1648.36	354.946	764.904
Leeds	1780.84	346.704	785.764
Sheffield	795.24	412.902	573.024
East Anglia	445.21	441.000	443.100
N W Metropolitan	3136.00	396.806	1115.520
N E Metropolitan	3600.00	290.702	1023.000
S E Metropolitan	1197.16	525.326	793.032
S W Metropolitan	1953.64	415.752	901.238
Oxford	576.00	481.802	526.800
South Western	745.29	467.857	590.499
Welsh	259.21	820.250	461.104
Birmingham	3925.02	331.968	1141.483
Manchester	615.04	431.808	515.344
Liverpool	2025.00	382.594	880.200
Wessex	349.69	590.490	454.410
	23051.70	6690.907	10969.422

Table (3)

$\Sigma Y = Na + b\Sigma X$ (1) $\quad 314.14 = 15a + 545.45b$ (1)

$\Sigma XY = a\Sigma X + b\Sigma X^2$ (2) $\quad 10969.422 = 545a.45a + 23051.70b$ (2)

$\therefore b = -0.141$

Deriving the value of (a) from equation (1) or (2)

$\therefore a = 26.070$

The linear regression of nursing pay per patient/week against regional average staffed hospital (maternity) would be:

$Y = 26.070 - 0.141\ X$

Correlation and Coefficient of Determination:

- mean: $\bar{x} = \frac{\Sigma x}{N} = 36.363, \quad \bar{Y} = \frac{\Sigma Y}{N} = 20.943$

standard deviation of Y $(s_y) = \sqrt{\frac{\Sigma(Y-\bar{Y})^2}{N}} = \sqrt{\frac{111.93}{15}} = \sqrt{7.453}$

Total variation $= \Sigma(Y-\bar{Y})^2 = 111.93$

Unexplained variation $= \Sigma(Y-Y_c)^2 = 47.78$

Explained variation $= \Sigma(Y_c-\bar{Y})^2 = 64.15$

Therefore :

coefficient of determination $(r^2) = 1-\frac{\Sigma(Y-Y_c)^2}{\Sigma(Y-\bar{Y})^2} = 1-\frac{\text{unexplained variance}}{\text{total variance}}$

$= 1- 42 = 58$

coefficient of correlation $= \pm \sqrt{\text{coefficient of determination}}$

$r^2 = \sqrt{58}$

$r = 756$

Then 42% of the variation in the nursing pay per patient/week can be attributed to random variation (chance) and the effect of other variables not explicitly incorporated in the model. The remaining 58% of the variation in the nursing pay is accounted for by differences in the number of staffed beds.

NOTE: the sign attached to r is (-) because it is the sign of b in the predicting equation.

From above, the least-squares line did not provide a very good fit, so the indication that the nursing pay per patient/week affected by staffed beds number appeared, but not in a strong relationship, particularly if

we consider the value of r^2 rather than r, because the latter indicates a higher degree of explanation than is warranted.

Testing the accuracy of the regression line:

(s_e) standard error of estimate for the population $= \sqrt{\frac{(Y-Y_c)}{n-2_{(1)}}} = \sqrt{\frac{47.78}{13}} = 2$

standard error of b regression coefficient = $s_b = \frac{s_e}{\sqrt{\Sigma x^2 - \bar{x}\Sigma x}}$

$= \frac{2}{\sqrt{(23048.67) - (36.363)(545.4}}$

(1) we used (n-2) lo represent the degree of freedom around the regression line.

$$s_b = \frac{2}{\sqrt{23048.67 - 19838.20}} = \frac{2}{\sqrt{3210.47}} = \frac{2}{56.6} = 0.035$$

We now have two hypotheses: B (slope of the true regression line) = 0

$$B \neq 0$$

The first would indicate that there is no relationship between nursing pay and the number of staffed beds, according b (0.141) is 0.141 units from B.

The second would indicate that there is a relationship.

In the former is true, then there should be no more than a dediation of two standard errors. Putting the value of (b) in terms of its standard error, this is $0.141 \div -.035 = 4$. Accordingly b is 4 standard errors from B. It is more than the limit of significance (2), but not high enough to support the strong relationship.

---

1 We used (n-2) to represent the degree of freedom around the regression line.

BIBLIOGRAPHY

This bibliography is primarily a list of works cited in the text. A few additional items dealing with either the NHS of PPBS are also included.

ABEL-SMITH, B. The hospitals: 1800-1948, London: Heineman 1964

ABEL-SMITH, B. and TITMUS, R M. The Cost of the National Health Service in England and Wales, Cambridge: Cambridge University Press 1956

ABRAMS, F. "Budgetary Control and Business Finance: the Coincident Profit Hypothesis", in The Theory of Business Finance, etd. by Archer, S M and Ambrosio, C A D, The Macmillan Company 1967

ACHESON, E D and FELDSTEIN, M S. "Duration of Stay in Hospital for Normal Maternity Care", British Medical Journal, 1964

AKLIN, A V C. "The Provision of a comprehensive integrated Health Service", The Hospital, September 1971

AMEISS, A P et al., "Program Management in Missouris Division of Mental Health", Management Accounting, August 1973

ANTHONY, R. "Closing the Loop between Planning and Performance", Public Administration Review, May/June 1971

ARROW, K J. "The Welfare Economics of Medical Care", in Health Economics, etd. by Cooper, M H and Culter, A J, Penguin Books 1973

ARTHURTON, et al., "Paediatric Aspects of Early Discharge of Mothers", British Medical Journal, 3, 520, 1967

BABSON, J H. "Hospital Costing in Great Britain", The Hospital, April 1971

BABSON, J H. "Disease Costing", Manchester University Press 1973

BAILEY, D T. "Enterprise Accounting in the USSR", Accounting and Business Research, Winter 1973

BAIRD, D. "Perinatal Mortality", The Lancet, 8 March 1969

BAIRD, D. "The Evolution of Modern Obstetrics", The Lancet, 10 September 1960

BAIRD, D. "Social Class and Foetal Mortality", The Lancet, 11 October 1947

BAIRD, D. and ILLSLEY, "Environment and Childhearing", Proceedings of the Royal Society of Medicine, Vol. 46, 17 October 1952

BAUMOL, W J. "Economic Theory and Operations Analysis", Prentice Hall, Englewood Cliffs, New Jersey (Third edition) 1972

BIRD, P A. "Accountability: standard in Financial Reporting", Modern Finance Series, 1973

BISPHAM, K et al., "Planning for Health", The Hospital, March 1971

BITHELL, J and DEVLIN, H B. "Prediction of Discharge of Hospital In-Patients", Health Services Research, 1968.

BUCHANAN, J M. "The Inconsistencies of the National Health Service", Institute of Economic Affairs, London 1965

BUTLER, N R and BONHAM, D G. Perinatal Mortality: the first Report of the 1958 British Perinatal Mortality Survey, Edinburgh: E and S Livingstone 1963

BUTTLER, J R and PEARSON, M. Who Goes Home?, occasional paper on Social Administration, No. 34, George Bell & Sons 1970

CAVENAGH, A J M. "Role of GP Maternity Unit - 1000 Deliveries Analysed", British Medical Journal, 7, 533, 1966

COCHRANE, A L. "Effectiveness and Efficiency", The Nuffield Provincial Hospital Trust 1972

CHUBB, B. The Control of Public Expenditure, Oxford University Press 1952

CRAIG, G A and MUIRHEAD, J M P. "Obstetic Aspects of Early Discharge of Mothers", British Medical Journal, 3, 520, 1967

CULYER, A J and LAVERS, R J and WILLIAMS Alan. Social Indicators: Control of Public Expenditure (Plowden Report), Cmd 1432, HMSO 1961

DHSS, Management for the Reorganized National Health Service, HMSO 1972

DHSS, Hospital Costing Returns 1968-69, HMSO

DHSS, Hospital Costing Returns 1969-70, HMSO

DHSS, Hospital Costing Returns 1970-71, HMSO

DHSS, Hospital Costing Returns 1971-72, HMSO

DHSS Health and Personal Social Service Statistics for England 1973

DHSS, National Health Service: The Future Structure of the NHS, HMSO 1970

DHSS, Consultative Document, 1971

DHSS, Report of the Working Party on Medical Administration, HMSO 1972

DORFMAN, R. "Measuring Benefits of Government Investments", The Booking Institute 1965

DHSS, Annual Report for the Year 1968.

DHSS, NHS Reorganization: Manual for Accounting System, December 1972

ECKSTEIN, H. "The English Health Service, Harvard University Press 1958

EDWARDS, R S and HINES, J S. "Budgeting in Public Authorities", George Allen and Unwin Ltd., London 1956

ELZE, P. "Public Expenditure, Parliament and PPB", Broadsheet 1971

EVANS, R G. "Behavioural Cost of Functions for Hospitals", Canadian Journal of Economics, May 1971

EXCHEQUER AND AUDIT DEPARTMENT ACT 1866

EXCHEQUER AND AUDIT DEPARTMENT ACT 1921

FELDSTEIN, M S. "Economic Analysis for Health Service Efficiency", North Holland Publication Company, Amsterdam 1967

FELDSTEIN, M S. "An Economic Model of the Medical System", The Quarterly Journal of Economics, Vol. LXXXV, No. 1, February 1971

FERESTER, G and PETHYBRIDGE R J. "The Cost of a Local Maternity Care", The Hospital and Health Services Review, July 1973

FIELDEN, J and LOCKWOOD, G. Planning Management in Universities, Sussex University Press 1973

FORSYTH, G and LOGAN, R F L. "The Demand for Medical Care", Nuffield Provincial Hospital Trust, Oxford University Press 1968.

FOX, I H and HERFINDAH, O C. "Attainment of Efficiency in Satisfying Demand for Water Resources", American Review, Vol. 54, No. 3, 1964

GARETT, J. The Management of Government, Pelican Books, London 1972

GRIFFITHS, D A T. "Inequalities and Management in the National Health Service", The Hospital 1971

HEASMAN, M A and CARSTAIRS, U. "In patient management: variation in some aspects of practice in Scotland", British Medical Journal, 27 February 1971

HENDERSON, P D. "Investment criteria for Public Enterprises", in Public Enterprise, etd. by R Turvey, Penguin Modern Economics Readings 1971

HINRICHS, H M. "Government Decisions and the Theory of Cost-Benefit Analysis", in Program Budgeting and Benefit-Cost Analysis, etd. by Hinrichs, H M and Taylor, Goodyear Publishing Company 1969

HITCH, C. "An Appreciation of Systems Analysis", in System Analysis, etd. by Optner, S L, Penguin Modern Management Reading 1973

HOBBS, M S T. "Survey of GP Maternity Units in England and Wales", British Medical Journal, 4, 287, 1967

HOFSTEDE, "The Game of Budget Control", Tavistock Publications, London 1972

House of Commons Standing Order No. 90

IMTA, "Programme Budgeting - some practical problems of implementation", London 1971

JACKMAN, M W . "Financing Public Hospitals in Ontario: A Case Study in Rationing of Capital Budgets", Management Science, Vol. 20, No. 4, December 1973

JENKINS, W. "Non-Profit Hospital Accounting System", Management Accounting, June 1973

JEWKES, J and JEWKES, S. "Value for Money in Medicine", Oxford: Basil Blackwell 1963

JEWKES, J and JEWKES, S. "Genesis of the British National Health Service", Oxford: Basil Blackwell 1961

KAMMERER, G M. Program Budgeting: An Aid to Understanding, (Gainesvill) 1959

KENDALL, M G. "Cost-Benefit Analysis", The English University Press 1971

KLARMAN, H E. "The Economics of Health", New York: Columbia University Press 1965

LAW, R G. "Standards of Obstetric Care", E and S Livingstone 1967

LEES, D S. "The Logic of British National Health Service", The Journal of Law and Economics, Vol. 5

LEES, D S. "The Economics of Health Services", Lloyds Bank Review, April 1960

LEES, D S. "Health through Choice", in Freedom for all? Hobart Paper, Vol. 3, 1961

LINDBLOM, C E. "The Science of Muddling Through", Public Administration Review, Vol. 19, Spring 1959

LYDEN, F J and MILLER, E G. "Planning Programming Budgeting a System Approach to Management, Markham Publishing Company/Chicago, (Second edition) 1972

MAGEE, C C et al., Report on Costing Cervical Cytology, University College Cardiff 1974

McGILVERY, Francis E. "Program and Responsibility Cost Accounting", Public Administration Review, March/April 1968

MAUNDERS, K T. "Financial Management in the Soviet Industrial Enterprise", Accounting and Business Research, No. 8, Autumn 1972

McEWAN, E D. "Effect of Early Discharge after Hospital Confinement", Lancet 2, 744, 1964

McKEAN, R M. "Efficiency in Government through System Analysis", RAND 1958

MEREWITZ, L and SOSNICK, S H. "The Budget's New Clothes", Markham Series in Public Policy Analysis 1971

MINISTRY OF HEALTH, Report of the Maternity Services Committee (Willinck Report), London: HMSO 1959

MINISTRY OF HEALTH, Report of the Working Party on Hospital Costing, London: HMSO 1955

MINISTRY OF HEALTH, The Administrative Structure of the Medical Service and Related Services, HMSO 1968

MISHAN, E J. "Cost-Benefit Analysis", Unwin University Books 1971

MONTACUTE, C. Costing and Efficiency in Hospitals, Oxford University Press 1962

MORRIS, J N et al., "Social and Biological Factors in Infant Mortality", The Lancet, 12 February 1926

MORRIS, J N et al., "Social and Biological Factors in Infant Mortality", The Lancet, 5 March 1955

MORRIS, J N et al., "Social and Biological Factors in Infant Mortality", The Lancet, 12 March 1955

MOSHER, F C. "Program Budgeting", Public Administration Review, 1954

MOSHER, F C. "Limitations and Problems of PPBS in the States", Public Administration Review, March/April 1969

MUSGRAVE, R A. "The Theory of Public Finance", McGraw-Hill Book Company, London 1959

MUSHKIN, S J and COLLINGS, F. "Economic Costs of Disease and Injury", Public Health Reports, Vol., 74, No. 9, September 1959

MUSHKIN, S J. "Health as an Investment", Journal of Political Economy, October 1962

PAULY, M V. "Medical Care at Public Expense", New York, Praeger 1971

PEACOCK, A T and WISEMAN, J. "The Growth of Public Expenditure in the United Kingdom", Oxford University Press 1961

PETERS, G H. "Cost-Benefit Analysis and Public Expenditure", Eaton Paper, No. 8, The Institute of Economic Affairs, London 1973

PETERS, G H. "Cost-Benefit Analysis and the Third London Airport", in Lessons of Maplin, Occasional Paper, The Institute of Economic Affairs, 1974

PREST, A R and TURVEY, R. "Cost-Benefit Analysis: A Survey", in Surveys of Economic Theory, Vol. 111, 1972

PUBLIC EXPENDITURE: A New Presentation, HMSO 1969

REINHARD, K et al. "Time Loss and Indirect Economic Costs caused by Disease among Indians and Alaska Nations", Public Health Report, Vol. 85, No. 5, May 1970

REPORT of the Committee on the Civil Service, Cmd. 3638, HMSO 1968

REPORT of the Committee of Inquiry into the Cost of the National Health Service (The Guillebaud Report), HMSO 1956

ROBERTS, F. "The Cost of Health", Turnstile Press, London 1952

REPORT on Confidential Enquiries into Maternal Deaths in England and Wales 1967-69, HMSO

ROSE, K E. "Program Budgeting", IMTA 1969

RICHARDS, I D G and LOW, C R. "Changes in Stillbirth Rate in England and Wales", The Lancet, 1, 1169, 1966

RUSSELL, J K et al. "Maternity in Newcastle upon Tyne", The Lancet, 1, 711, 1963

SCHULTZE, C L. "The Politics and Economics of Public Spending", The Booking Institute 1968

SELECT Committee on Procedure, 1968-69

SHADOAN, A T. "Preparation, Review and Execution of the State Operating Budget", Lexington 1963

SHICK, A. "The Road to PPB", Public Administration Review, December 1966

SHORTELL, S M and GIBSON, G. "The British National Health Service: Issues of Reorganization", Health Services Research, Vol. 6, No. 4, Winter 1971

SHUMAN, L J et al. "The Role of Operations Research in Regional Health Planning", Operations Research, March/April 1974

SIMON, H A. "Administrative Behaviour", The Macmillan Company 1960

SMITH, M D. "The Management of Your Government", New York 1965

SOLOMON, E. "The Theory of Financial Management", Columbia University Press 1963

SOLOMONS, D. "Studies in Cost Analysis", Sweet and Maxwell 1970

SPENCER, B G. "Budgetary Control in Ontario Hospitals", The Hospital, May 1971

SOMERS, H M and SOMERS, A R. "Doctors, Patients and Health Insurance", Bookings 1961

SOMERS, H M and SOMERS, A R. "Medicare and the Hospitals, Washington, Booking Institute, 1967

STALEY, J D. "The Cost-Minded Manager", American Management Association, New York 1961

STANDING Maternity and Midwifery Advisory Committee of the Central Health Service Council, Report of the Sub-Committee. Domicilary Midwifery and Maternity Bed Needs (The Peel Report), London, HMSO 1970

STEINER, P O. "The Public Interest", in Public Expenditure and Policy Analysis, etd. by R Haveman, Markham Publishing Company 1971

TACCHI, D. "Integrated Antenatal Care", Lancet, 1, 1059, 1965

THIRD report from the Estimates Committee 1970-71, HC 549, HMSO 1971

THOME, P G and WILLARD, G P. "The System Approach", in System Analysis, etd. Offner, S L, Penguin Education 1973

TOUSSAINT, J R. "The Problem with Hospital Accounting', Management Accounting, November 1970

VERTINSKY, I and UYENO, D. "Demand for Health Services and the Theory of Time Allocation", Applied Economics 1973

WALLIS, R W. Costing in the hospital service (unpublished document), Department of Accounting, University of Manchester

WILLIAMS, A. "The Economic of Public Expenditure", Memorandum to the Select Committee on Procedure 1968-69

WALSH, M G and WILLIAMS, A. "Current Issues in Cost-Benefit Analysis", CAS, Occasional Paper, No. 11, HMSO 1969

WEISBROD, B A. "Economic of Public Health", University of Pennsylvania, 1968

WEST, P A. Allocation and Equality in the Public Sector: the Hospital Revenue Allocation Formula, Applied Economics 1973

WEISBROD, B A. "Collective Action and the Distribution of Income: A Conceptual Approach, in Public Expenditure & Policy Analysis etd. by H Haveman 1971

W H O, Technical Report Series No.428, "Organization and Administration of Maternal and Child Health Services".

WILLIAMS, A. Output Budgeting and the Contribution of Micro-Economics to Efficiency in Government, CAS, Occasional Paper No. 11, HMSO 1967

WOODS, J O. "Place of the GP in the Obstetric Service", British Medical Journal, 4, 803, 1971