The Costs of Medical Care

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Cover:
A page from the Account Book of Thomas Roots, Apothecary, of Kingston-on-Thames, showing the Account of David Garrick, the actor.

The Costs of Medical Care

THE cost of the National Health Service in the United Kingdom now exceeds £1,000m. per year. Ten years ago, when expenditure was less than half this amount, the cost of the Health Service was the source of continued public concern. Cost was "the one aspect of the National Health Service which, since its inception in 1948, has given rise to more critical discussion and controversy than any other single issue".[1] The controversy has now largely died away, and expenditure on the Service is no longer viewed with such alarm or disquiet. Currently there tends to be greater criticism of under rather than of over spending on certain sectors of the Service.

This paper considers the cost of the National Health Service in England and Wales in terms of the specific tasks performed —the treatment of disease. It attempts, for example, to estimate the relative order of expenditure on the treatment of bronchitis, mental disorders, tuberculosis and other diagnoses by the domiciliary and by the hospital services. It has been suggested that "on many fronts, medicine is buying life at an ever increasing marginal cost".[2] But what are these costs and how have they arisen? The National Health Service exists for the prevention and the treatment of illness. The "medical procedures" adopted in this task, which are shaped by existing resources and organisation and by prevailing scientific knowledge and ability, are the dominant influence on the pattern and on changes in the level of expenditure on health.

This exercise, like all attempts at cost analysis, is built up on a large number of assumptions, and so the result gives no more than an indication of the general order and pattern of expenditure for different diseases and conditions. Its value lies primarily in revealing the nature and in indicating those factors which shape expenditure on health, rather than in providing precise estimates of cost of specific diseases.

The Cost Controversy

Quite apart from the broad political controversy in which the creation of the National Health Service became involved, the early fears about cost came from a misunderstanding of factors determining expenditure on health and a failure to estimate correctly or to present these estimates in a comprehensible fashion. The first official estimate of Health Service expenditure was given in the Beveridge Report. It calculated as "a very rough estimate" that in 1945 the service would cost £170m.: it also suggested that 20 years later, in 1965, costs would not have risen. A dominant idea underlying the creation of the Health Service was the prevention of ill health and incapacity. Although this ideal is as old as the practice of medicine, its feasibility is largely a product of the twentieth century. Scientific advance enlarged the scope for preventive action and raised the level of public expectation. With this in mind, Beveridge "assumed that there will be actually some development of the Service, and as a consequence of this development a reduction in the number of cases requiring it".[3] Events turned out to be not quite so simple.

With a hope of savings from preventive action and with a lack of experience on which to base estimates, it is understandable that in its early years official estimates of cost of the Service fell below actual expenditure. The stream of supplementary estimates for the National Health Service added to the impression that costs were rising without limit or control. The situation was aggravated by the fact that "the Government's appropriation accounts failed to indicate the cost of the National Health Service in any economically useful sense".[1] The theory of health costs which gained widest credit was that costs must inevitably rise because of the growing proportion of elderly people in the population.[4] However, the analysis of a social institution in terms of the effects of ageing alone grossly over-simplifies.

Fears that the cost of the National Health Service were uncontrolled were allayed by the report of the Guillebaud Committee in 1956. The Committee concluded that "the rising cost of the Health Service in real terms during the years 1948-1954 was kept within narrow bounds".[5] Subsequent investigations of the costs of individual services found no evidence of extravagance. The Hinchliffe Committee's investigation of the Pharmaceutical Services concluded that

expenditure on prescriptions had not risen any faster than total Health Service expenditure and that this rise was the result of "the introduction of a free and comprehensive health service for all and the discovery and large-scale production of valuable but expensive drugs".[6] The Royal Commission on the remuneration of doctors and dentists which looked at professional earnings generally, made recommendations which led to a rise in remuneration.[7] These reports changed the climate of opinion about the cost of the Health Service and have led to a better understanding of the determinants of expenditure on health.

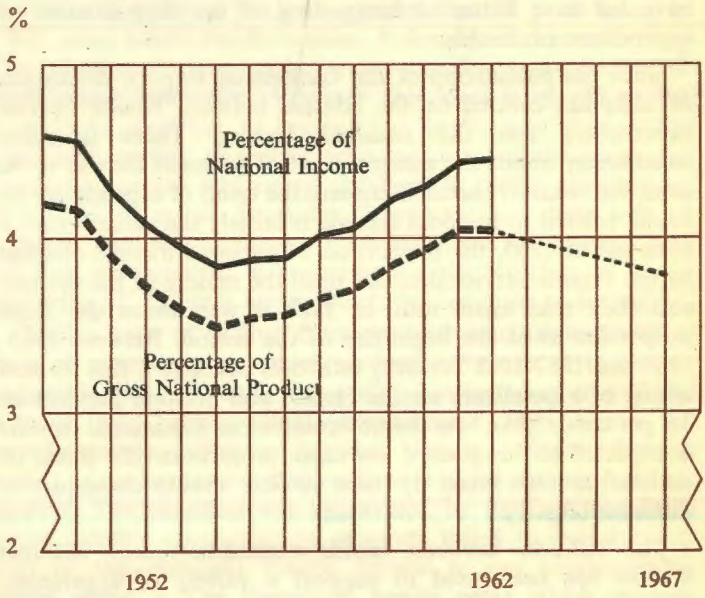
Since the publication of the Guillebaud Report, discussion of costs has centred on the relation between Health Service expenditure and the national income. There is some controversy about the measurement of national income to be used, but whatever series is chosen, the trend of expenditure on health related to national income is largely the same. From a peak about 1950, the proportion of national income claimed by the Health Service declined until the middle of the decade, and then rose again until in 1961 it was about the same proportion as at the beginning of the period. Between 1963-1964 and 1967-1968 Treasury estimates envisage a rise (in real terms) of expenditure on the Health and Welfare Services of 3·3 per cent a year.[8] As the prospective rise in national income is expected to be greater, on these projections the share of national income taken by these services should consequently diminish (*Fig.* 1).

The relation between health expenditure and national income has been used to support a variety of arguments. Expenditure on health has been seen as a function of national income, with the growth of national income leading to a faster growth of expenditure on health. Affluence leads to proportionately higher demands for the means to preserve and to promote health.[9] Disparity between the proportions of national incomes spent on health in nations with different schemes of medical care have been used to argue that the public control of the Health Service artificially limits expenditure[10], or alternatively, that a private system of medical care is less efficient and makes heavier demands on national resources.[11] However, expenditure cannot be fully appraised unless it is related to the tasks performed—to the actions which give rise to costs.

Fig. 1

National Health Service expenditure as a proportion of national income and gross national product. United Kingdom. 1949-1962 (with 1967 Treasury projection).

Sources: Central Statistical Office. National Income and Expenditure 1963. Tables 1 and 44. Annual Abstract of Statistics. Table 52. Public Expenditure in 1963-64 and 1967-68. Cmnd 2235.



Note: National Health Service Expenditure includes payments by patients.

The Estimate of Costs

THE major part of the current costs of the Health Service, analysed to show amounts spent on different conditions and diseases, is set out in *Table* A, which allocates expenditure to broad diagnostic groups. *Table* B shows costs of the major diseases within these broad diagnostic groupings. The build-up and sources of these estimates are described in the appendix.

The estimates are based on statistical data not originally collected for cost analysis. The costing method has, therefore, been decided by the available data rather than by the selection of ideal units for costing. The costs of the hospital and the specialist services have been estimated generally from the time spent for different conditions in acute, chronic, teaching or other types of hospitals. Costs of the general medical services were allocated proportionately to the number of consultations for different conditions. The pattern of expenditure, therefore, indicates the relative prevalence of different diagnoses in general practice (except those connected with pregnancy). Costs of the prescriptions and other items supplied under the Executive Councils were analysed according to the estimated value of items prescribed for different conditions.

The analysis covers the major part of expenditure by the hospital and specialist services, the whole of the services administered by the Executive Councils, together with the cost of the midwifery service provided by local health authorities. The major items excluded are costs of central and area administration, certain central government services, the mass radiography and blood transfusion services, all local authority health services (except the midwifery service) together with all local authority welfare and welfare food services. Expenditure on these services cannot be related systematically to specific diagnoses. They may, however, be influenced more by certain conditions, such as mental illness, than by others. The analysis

Table A

Analysis of National Health Service Expenditure by Diagnostic Groups. England and Wales. 1961-1962

Diagnostic Group	*Domiciliary*			*Hospital*	
	Medical Services	*Medical Goods*	*Sub-Total*	*Specialist Services*	*Total*
	£m.	£m.	£m.	£m.	£m.
00 Tuberculosis	0·2	0·9	1·1	16·0	17·1
01 Other infectious diseases	2·3	1·1	3·4	6·3	9·7
02 Malignant neoplasms	0·7	0·4	1·1	22·3	23·4
03 Benign and unspecified neoplasms	0·2	0·0	0·2	6·0	6·2
04 Allergic, endocrine, metabolic & nutritional disorders	3·7	6·4	10·1	8·3	18·4
05 Disease of blood and blood-forming organs	1·7	1·0	2·7	2·6	5·3
06 Mental, psychoneurotic and personality disorders	2·9	4·6	7·5	92·9	100·4
07 Vascular lesions of central nervous system	0·4	0·3	0·7	11·8	12·5
08 Inflammatory and other diseases of nervous system	1·7	1·7	3·4	9·7	13·1
09 Diseases of eyes	5·8(a)	11·9(a)	17·7(a)	5·2	22·9(a)
10 Diseases of ears and mastoid process	1·7	2·5	4·2	1·7	5·9
11 Diseases of circulatory system	6·3	8·2	14·5	37·4	51·9
12 Diseases of respiratory system	12·8	20·2	33·0	22·1	55·1
130 Diseases of the teeth and supporting structures	43·7(b)	12·8(b)	56·5(b)	0·5	57·0(b)
13 Diseases of the digestive system (remainder)	5·1	5·4	10·5	28·0	38·5
14 Diseases of urinary system	1·0	0·5	1·5	4·5	6·0
15 Diseases of male genital organs	0·2	0·0	0·2	3·7	3·9
16 Diseases of breast and female genital organs	1·5	1·7	3·2	7·4	10·6
17 & 18 Deliveries and disorders of pregnancy	12·6(c)	1·2	13·8(c)	30·8	44·6(c)
19 Diseases of skin and cellular tissues	4·3	5·7	10·0	4·9	14·9
20 Diseases of bones and movement organs	4·4	5·0	9·4	14·6	24·0
21 Congenital malformations	0·1	0·0	0·1	3·7	3·8
22 Certain diseases of early infancy	0·1	0·0	0·1	2·5	2·6
23 Symptoms, senility and ill-defined conditions	7·9	8·8	16·7	8·4	25·1
24/26 Injuries, accidents, poisoning, etc.	3·6	1·4	5·0	22·0	27·0
27 Special admissions and convalescence	6·0	1·3	7·3	6·4	13·7
Unallocated	—	3·5(d)	3·5	48·3(e)	51·8
Total Items Analysed	130·9	106·5	237·4	428·0	665·4
ITEMS EXCLUDED FROM ANALYSIS:					
i. Hospital Services Capital expenditure and other services					73·1
ii. Central government and Executive Councils' administration					9·9
iii. Other central government services					12·1
iv. Other local health authority services					72·4
v. Local authority welfare services					38·3
vi. Welfare foods services					26·5
vii. Residual error					3·1
Total gross cost health and welfare services (1961/62)					900·8

Table B

Expenditure on Specific Diseases and Conditions. England and Wales. 1961. £m.

00 Tuberculosis

Items	*Respiratory Tuberculosis*
Hospitals*	13·9
Gen. Med. Services	0·2
Pharmaceutical Services	0·9
Total	15·0

02 Malignant neoplasms

Items	*Stomach*	*Rectum*	*Lung*	*Breast*
Hospitals*	1·4	3·3	3·8	2·8
Gen. Med. Services	0·0	n.a.	n.a.	0·1
Pharmaceutical Services	0·0	n.a.	n.a.	0·0
Total	1·4	3·3	3·8	3·0

Items	*Cervix*	*Leukaemia*
Hospitals*	1·0	0·6
Gen. Med. Services	n.a.	n.a.
Pharmaceutical Services	n.a.	n.a.
Total	1·0	0·6

04 Allergic, endocrine, metabolic and nutritional diseases

Items	*Hay Fever*	*Asthma*	*Diabetes*	*Obesity*
Hospitals*	n.a.	1·3	3·7	n.a.
Gen. Med. Services	0·3	1·0	0·5	0·9
Pharmaceutical Services	0·3	2·0	1·5	1·7
Total	0·6	4·3	5·7	2·6

05 Diseases of the blood and blood-forming organs

Items	*Anæmia*
Hospitals*	2·6 (includes certain other blood diseases).
Gen. Med. Services	1·6
Pharmaceutical Services	1·0
Total	5·2

* Excludes out-patient costs
n.a. = not available or not applicable. £0·0 = less than £0·05m.

Notes for Table A (opposite)
Sources and methods are described in the Appendix, pp. 28-31.
(*a*) Includes Ophthalmic fees, £4·7m., and costs of lens, etc., and ophthalmic dispensing, £10·6m.
(*b*) Includes Dentists fees, £43·3m. and estimated cost of dentures, etc. £12·6m
(*c*) Includes £6·9m. for local authority midwifery services.
(*d*) Dressing's, trusses, hosiery, etc., supplied on N.H.S. prescriptions.
(*e*) Estimated Out-patient costs.

08 Diseases of the nervous system

Items	Cerebral Paralysis	Epilepsy	Migraine	Sciatica
Hospitals*	3·4	1·1	n.a.	n.a.
Gen. Med. Services	0·3	0·4	0·2	0·2
Pharmaceutical Services	0·3	0·7	0·3	0·1
Total	4·0	2·2	0·5	0·3

09 Diseases of eyes

Items	Infectious diseases	Glaucoma	Items	Refractory Errors
Hospitals*	0·5	0·8	Ophthal. Serv.*	4·6
Gen. Med. Services	0·7	0·1	Gen. Med. Serv.	0·2
Pharmaceutical Services	1·1	0·0	Lens, etc.	10·6
Total	2·3	0·9	Total	15·4

10 Diseases of ears and mastoid process

Items	Otitis Externa	Otitis Media	
Hospitals*	n.a.	1·1	(with mastoiditis)
Gen. Med. Services	0·3	0·7	(without mastoiditis)
Pharmaceutical Services	0·4	1·8	(„ „)
Total	0·7	3·6	

11 Diseases of the circulatory system

Items	Arteriosclerotic Heart disease	Hypertensive Heart disease	Varicose Veins of lower extremities
Hospitals*	7·8	1·9	1·7
Gen. Med. Services	1·0	1·8	0·6
Pharmaceutical Services	1·2	4·3	0·3
Total	10·0	8·0	2·6

Items	Hæmorrhoids
Hospitals*	1·4
Gen. Med. Services	0·3
Pharmaceutical Services	0·6
Total	2·3

12 Diseases of the respiratory system

Items	Acute upper Respiratory Infections	Influenza	Pneumonia
Hospitals*	1·0	0·1	4·2
Gen. Med. Services	5·5	1·5	0·4
Pharmaceutical Services	7·7	1·2	0·9
Total	14·2	2·8	5·5

Items	Bronchitis	Hypertrophy of tonsils
Hospitals*	7·2	6·2
Gen. Med. Services	4·5	n.a.
Pharmaceutical Services	8·7	n.a.
Total	20·4	6·2

* Excludes out-patient costs
n.a. = not available or not applicable. £0·0 = less than £0·05m.

13 Diseases of the digestive system

Items	*Diseases of teeth, etc.*	*Peptic ulcers*	*Appendicitis*
Hospitals*	0·6	5·9	5·6
Gen. Den. Services	43·3	—	—
Gen. Med. Services	0·4	0·9	0·1
Pharmaceutical Services	0·2	1·0	0·0
Dentures, etc.	12·6	—	—
Total	57·1	7·8	5·7

Items	*Hernia, abdominal cavity*	*Gastritis, etc.*	*Constipation*
Hospitals*	5·3	n.a.	n.a.
Gen. Med. Services	0·2	0·9	0·6
Pharmaceutical Services	0·1	1·0	0·8
Total	5·6	1·9	1·4

16 Diseases of breast and female genital organs

Items	*Disorders of Menstruation*	*Menopausal symptoms*
Hospitals*	n.a.	n.a.
Gen. Med. Services	0·6	0·4
Pharmaceutical Services	0·6	0·4
Total	1·2	0·8

19 Diseases of the skin

Items	*Boils, carbuncles*	*Impetigo*	*Eczema*
Hospitals*	n.a.	n.a.	n.a.
Gen. Med. Services	0·6	0·2	0·7
Pharmaceutical Services	0·7	0·5	0·9
Total	1·3	0·7	1·6

Items	*Acne*
Hospitals*	n.a.
Gen. Med. Services	0·4
Pharmaceutical Services	0·2
Total	0·6

20 Diseases of bones and movement organs

Items	*Rheumatoid arthritis*	*Osteo arthritis*
Hospitals*	3·7	2·7
Gen. Med. Services	0·6	0·7
Pharmaceutical Services	0·9	0·7
Total	5·2	4·1

Items	*Unspecified arthritis, rheumatism, etc.*	*Displacement of vertebral disc*
Hospitals*	n.a.	1·2
Gen. Med. Services	2·4	0·3
Pharmaceutical Services	2·3	0·2
Total	4·7	1·7

* Excludes out-patient costs
n.a. = not available or not applicable. £0·0 = less than £0·05m.

23 Symptoms, senility and ill-defined conditions

Items	*Vertigo*	*Disturbance of sleep*	*Cough*	*Abdominal Pain*
Hospitals*	n.a.	n.a.	n.a.	1·4
Gen. Med. Services	0·2	1·2	0·7	0·2
Pharmaceutical Services	0·5	0·9	0·4	0·2
Total	0·7	2·1	1·1	1·8

Items	*Other pains in chest, back or limbs*	*Nausea, Vomiting*	*Diarrhoea*	*Rash*
Hospitals*	n.a.	n.a.	n.a.	n.a.
Gen. Med. Services	0·5	0·1	0·3	0·2
Pharmaceutical Services	0·4	0·2	0·2	0·1
Total	0·9	0·3	0·5	0·3

Items	*Debility and undue fatigue*	*Depression*	*Headache*	*Senility without psychosis*
Hospitals*	n.a.	n.a.	n.a.	2·9
Gen. Med. Services	0·7	0·9	0·4	0·5
Pharmaceutical Services	0·6	3·0	0·3	0·3
Total	1·3	3·9	0·7	3·7

24, 25, 26 Injuries, poisons and adverse reactions

Items	*Fractures*	*Sprains*	*Lacerations and contusions*	*Adverse reactions to medical procedure*
Hospitals*	16·3	n.a.	n.a.	1·1
Gen. Med. Services	0·4	0·8	0·5	n.a.
Pharmaceutical Services	0·0	0·3	0·9	n.a.
Total	16·7	1·1	1·4	1·1

* Excludes out-patient costs
n.a. = not available or not applicable. £0·0 = less than £0·05m.

concentrates on the costs of therapy and covers approximately three-quarters of the total National Health and Welfare Services expenditure in England and Wales during 1961.

It is useful to distinguish between the costs of the domiciliary and the costs of the hospital and specialist services. The domiciliary services are defined as medical care provided outside hospitals which covers in the analysis those services administered by the Executive Councils. It is also valuable to make a further sub-division in domiciliary medical care between "medical services", particularly remuneration of general practitioners, dentists, ophthalmists and the midwifery services, and "medical goods", which comprise mainly the cost of drugs, the costs of dentures and the cost of items supplied under the supplementary Ophthalmic Services. Costs are gross before deduction of charges to patients.

The Pattern of Costs

Over the broad range of its activities the National Health Service is largely passive: it functions only when certain situations are brought to its attention. When a person first becomes conscious of a symptom he may do one of three things; he may ignore the symptom in the hope that it will disappear; he may treat himself, or finally he may consult his general medical practitioner or one of the other services open to him. It is to meet this third course of action that the National Health Service exists. Once the health services are called into operation, a number of different courses may be followed. The two major alternatives are, that the general practitioner may perform the whole treatment necessary, or, he may refer the patient to the specialist and hospital services. The patient may then become either an out- or an in-patient under the care of the hospital authorities. These events do not exhaust all possibilities, but cover the majority of cases.

It would be misleading to consider expenditure on domiciliary and hospital medicine independently or in isolation from other personal expenditure on health. Expenditure in each of the spheres of medical care has risen in recent years (*Fig.* 2). Current expenditure by hospital authorities rose less rapidly between 1957 and 1962 than expenditure on self-medication or on the prescribed medicines. The trends in each of these spheres are not independent. The

Fig. 2

Expenditure on Hospital Services, Pharmaceutical Services and household medicines. England and Wales. 1957-1962. £m.

Sources: Ministry of Health. Annual Reports (various years). Ministry of Labour. Family Expenditure Survey—1962.

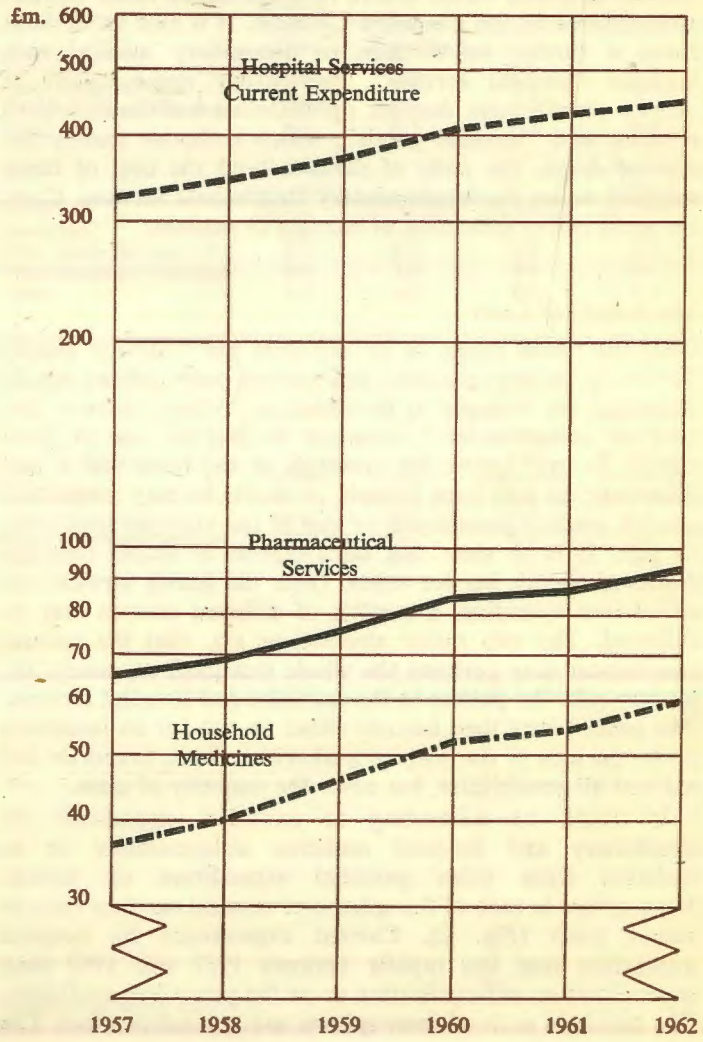


Fig. 3

National Health Service expenditure allocated to diagnostic groups. England and Wales. 1961. Percentage analysed expenditure.

Source: Table One.

cost of prescriptions may be reduced if patients decide to medicate themselves or if their doctors leave them to buy their own drugs for items costing less than 2*s.* 0*d.* It will be increased if patients who might otherwise have been treated in hospital remain under the care of their general practitioner. The discharge of patients from psychiatric hospitals into domiciliary care, for example, is reflected in expenditure on the pharmaceutical services.

In some respects, the pattern which emerges is surprising. Mental disorders account for the largest expenditure, £100m. (*Fig.* 3) Next in importance comes diseases of the teeth and supporting structures, £57m. mainly on the Dental Services. At just below this level come two important groups of diseases, those of the respiratory system, £55m., and those of the circulatory system, £52m. Although the order of costs for these two groups is approximately the same, the distribution of expenditure between domiciliary and hospital services is substantially different: with diseases of the circulatory system, costs are concentrated on the hospital service. Deliveries and disorders of pregnancy, £45m., follow in importance together with diseases of the digestive system, £38m. Around £25m. come five broad diagnostic groups: malignant neoplasms, diseases of the eyes (which includes expenditure on the Ophthalmic Services), diseases of the bones and movement organs, injuries and accidents, and the group comprising symptoms, senility and ill-defined conditions.

The Determinants of Expenditure

WHAT factors lie behind this pattern of costs? They may usefully be classified in three broad groups; "patient demand", "medical procedures" and "the economic environment". Patient demand covers all the factors which influence the patient in his decision to use the service. The term "medical procedures" covers the organisation of the health services and their ability to cope with the conditions presented to them. The "economic environment" describes the resources available to the Health Service and the factors determining their scope and prices. Of these three sets of factors, medical procedures has been and remains the most dynamic and the one most likely to affect costs in the short-term. Patient demand and the impact of the economic environment are unlikely to alter rapidly as a result of factors unconnected with medical care.

The discovery of new medicines and improvements in medical and surgical techniques have more radically affected the cost of the Health Service than independent and long-term changes in the nature of the demand for the services or the purely economic factors influencing resources.

Patient Demand and Medical Procedures

Patient demand is shaped by the epidemiology of the community and its demographic and social structure. The pattern of morbidity in a community is a reflection of its highly complex ecology. Basic social and economic changes will affect the natural history of diseases. But these changes are generally slow to operate and do not rapidly affect patient demand. Much of the reduction in mortality from whooping cough came with and took as long as the rise in living standards during the first half of this century. In contrast, a change in medical procedures affects epidemiology more swiftly. The

vaccination campaigns virtually abolished diphtheria in one decade, and poliomyelitis within five years. Infectious diseases now account for only a small proportion of Health Service expenditure. Tuberculosis, measured by mortality, declined slowly with improved social conditions during the first half of this century; the speed of change was increased four-fold following the introduction of streptomycin, PAS and INH.[12] The successful treatment of respiratory tuberculosis and public acceptance of BGC vaccine rapidly reduced the number of cases from the early 1950s. Expenditure on the disease is still substantial, but the number of hospital cases has been falling by approximately ten per cent a year. Since 1955, this represents a saving which has halved the amount which might otherwise be spent on this disease.

The social factors influencing the patient are also complex. Standards of living affect the concept of ill-health, and so the demand for medical care. Within the same community, there are widely different reactions to symptoms. The symptom itself, or its underlying condition, will be one important factor determining the subsequent course of events. It is certain that in the course of time, the health services will see the great majority of cancers, but it is equally certain that they see only a minute fraction of the common colds. Between these two conditions, there is a wide territory where factors other than the nature of the symptom or underlying condition will determine the use of the health services. A decision to use the health service may depend on a person's knowledge, on his initiative to seek help and on his opportunity to interrupt other activities. When the health service is called into operation, factors other than disease may determine the subsequent course of events. Admission to hospital will be affected by age, sex, family relationships, class and income.[1] But even so, the social and demographic make-up of a community is slow to change, and will only gradually alter expenditure. Abel-Smith and Titmuss have estimated that between 1951 and 1971, the "ageing" of the population would increase expenditure by no more than 3½ per cent.[1]

The patient demand, however, may be changed more swiftly by changes or improvements in medical procedures. The organisation of medical care under the National Health Service which makes it available at little or no cost to the patient influences the decision to make use of the service. The

discovery of new medicines and the development of new techniques may also change a patient's expectations. It is probable that the rapid growth of medical science during the past 25 years has led to an even more rapid rise in expectations. People now are far more ready to seek and to expect effective treatment for symptoms of which they become aware.

Medical Procedures

Medical procedures are a product of the structure and the organisation of medical care, and the ability of the health services to cope with diseases and other conditions confronting them. The dynamic factor is the progress of medical science.

It is useful, in understanding the pattern of expenditure, to make a broad classification of the manner in which medical science may affect the extent to which the health services can cope with the epidemiology of a community. It is not simply a question of prevention or cure; there are many other responses.

A disease may be prevented, like diphtheria or poliomyelitis. It may be cured like pneumonia or tuberculosis, either rapidly or more slowly depending on the efficacy of treatment. The cure may result from surgery, or from the use of a medicine. The disease may be reduced in danger and thus in duration through the control of complications, like influenza or measles. The progress of the disease may be arrested although the underlying disability is not affected, as in pernicious anæmia or diabetes. Finally, the disease may generally be beyond specific therapy, and treatment will comprise either symptomatic relief or merely custodial care of the patient. This may involve long-term care, as with mental sub-normality, or short-term, as with generalised cancer, depending on the mortality risk the disease carries and the extent to which the disease makes the patient dependent on others. As medical science progresses, diseases move from the later to the earlier categories. The progress against tuberculosis has covered the full range of these events. Treatment originally involved symptomatic relief and isolation. Complete rest in sanatoria could arrest the disease, while its course was controlled by surgical collapse of part of the lung, although the disease remained latent. The introduction of streptomycin, PAS and INH made it possible to cure the disease. Public acceptance of BCG vaccine and the successful treatment of infectious cases is

increasingly preventing the condition from developing. Thus at any one time, the spectrum of diseases in the community will call forth a corresponding range of responses from the health services, a range which depends on the prevailing state of medical science.

The pattern of expenditure on specific diseases reflects the current state of medical science's response to the prevailing epidemiology. Expenditure on infectious diseases is now relatively low compared to what it might have been, given the epidemiology of 30 years ago. The costs of their prevention fall on the local authorities and public health services which are, however, generally excluded from this analysis.

The high expenditure on respiratory infections reflects principally the use of antibiotics, many of which were not available in general practice before the mid-1950s. One tenth of the cost of prescriptions is accounted for by treatment of acute upper respiratory infections. A similar pattern of expenditure, largely for the same reason, is found with otitis externa and otitis media and the infectious diseases of the eye.

This pattern differs substantially from diseases and conditions requiring surgical intervention; hypertrophy of the tonsils, appendicitis, hernia of the abdominal cavity, displaced vertebral disc and fractures, where expenditure is concentrated in the hospitals. Expenditure on dental conditions can be classed with conditions requiring surgical intervention, but here in addition there is often the need to replace those items extracted.

The costs of diseases and conditions such as diabetes, which are merely controlled, tend to mount up. The need for treatment of existing cases persists; and as the mortality is reduced and new cases diagnosed, the numbers receiving routine treatment accumulate. Bronchitis may now be classified with these conditions following the prophylactic use of antibiotics. More than one-tenth of the expenditure on prescriptions is accounted for by this disease.

Diseases which are generally beyond specific therapy involve either very little or very great costs depending on the mortality risk and the extent of the patient's dependence on others. Expenditure on lung cancer is slight compared with its significance as a medical problem. The amount spent reflects the limited therapy possible and the speed with which the condition kills. The discovery of a cure for cancer would

certainly affect expenditure.* In contrast, mental disorders account for the largest expenditure on any one diagnostic group. The bulk of this expenditure is incurred in the hospitals. The inability to cure the graver forms of mental illness results in high expenditure on custodial care. The situation, however, has improved over recent years, and the release of patients into domiciliary care is already being reflected in expenditure under the pharmaceutical services. Six per cent of the cost of the prescriptions is accounted for by domiciliary treatment of the mentally ill—but this is no more than five per cent of the total N.H.S. expenditure on mental disorders. As more mental patients can be treated at home, expenditure on domiciliary care may rise, while expenditure on psychiatric hospital services should more than commensurately fall.

Progress in medical science may alter the calls made on the existing economic resources of the Health Service or create demands for new resources. The method which has been evolved for controlling expenditure is, therefore, important. Control is not imposed uniformly over the component parts of the Health Service. It is more direct and specific over the hospital authorities than over the local authority services; it is comparatively slight over the services administered by the Executive Councils, where the number of practitioners or treatments or prescriptions are not susceptible to direct short-term financial control.[2] The different sectors of medical care are subject to greater or lesser financial restraint. This mechanism might, therefore, affect the way medical care develops.

It is probable that other things being equal there will be more rapid implementation of innovations in sectors where there is less direct financial control. Pharmaceutical manufacturers have had the incentive to develop and introduce new medicines into medical procedures, while hospital authorities have often faced difficulties in financing modernisation.

The areas susceptible to direct control are most closely influenced by the broad range of economic factors bearing on Government financial policy, such as balance of payments difficulties or the pressures of inflation. From year to year, changes in these factors will affect expenditure upwards or

* If a rapid, safe and effective drug were found which was suitable for use in general practice, costs would probably fall. If, however, as seems more probable, a treatment was developed which involved prolonged therapy under close medical supervision, costs would rise.

downwards in those areas susceptible to direct financial control. In general, however, direct control acts as a restraint to growth. In developing a new service, for example, the hospital authorities must specifically justify and claim priority for new resources, to overcome reluctance to spend any more than the amount spent in the past.

The Economic Environment and Medical Procedures

The existing resources available to the Health Service comprise primarily the real capital assets of hospitals, ancillary buildings and equipment and the less tangible capital items such as the total number and distribution of trained and skilled professional personnel. The scope and nature of the existing assets or resources embody the past history of the Health Service and earlier systems of the organisation of medical services. The impact of the past is most clear with real capital assets.

It is a paradox in the history of the National Health Service that throughout most of its existence far less has been spent on developing new real capital assets than was spent on similar items before the war. Expenditure on hospital building in real terms during the early 1950s was only one-third the level prevailing before the war.[1] This occurred despite the removal of any economic barrier between the patient and hospital care and the rapid growth in national income and expenditure on health.

Instead of asking why capital expenditure under the Health Service has been low, it may be more relevant to ask why it was higher before the war. The prevailing organisation of medical care provides part of the answer. Methods of insurance before the war, particularly with the growth during the 1930s of hospital contributory schemes, tended to cover patients for costs of hospital care but—apart from working men—gave far less cover for domiciliary illness. Whenever a member of the family fell sick, the family turned to the hospital demanding the attention and care which was considered to be their right as a subscriber. Out-patient departments were still open to direct access by patients and general practitioners were no doubt influenced in referral by the fact that hospital care was economically less of a financial burden to the patient than domiciliary care. Hospital building

in the public sector was the responsibility of local authorities who react more rapidly and more sensitively to local pressures and demands than a central authority. In 1938-1939 two-thirds of capital expenditure on hospitals was undertaken by municipal bodies and the remainder by voluntary hospitals.[1] Membership of hospital contributory schemes grew rapidly in the 1930s and by the outbreak of the war covered more than 10m. wage earners and their families.[3] The system of medical care was perhaps a factor stimulating the higher rate of hospital building in the 1930s.

The advent of the National Health Service changed the situation from the patient's point of view. Progress in medical science from the late 1930s further and more substantially reduced the pressure. The use of firstly the sulphonamides, then penicillin and from the 1950s the broad spectrum antibiotics made it possible to treat diseases like pneumonia in the home rather than in hospital. The success of preventative measures and the general improvement in levels of health through public health services further curtailed the pressure. The development of effective medicines and new surgical techniques also improved the speed of therapy within hospitals: more could be done with existing resources. The average duration of stay in hospitals was reduced by over two weeks between 1949 and 1961. Hospitals raised the volume and speed of their turnover despite the neglect of capital resources. Immediate admissions among males for lung cancer rose from 43 per cent in 1955 to 53 per cent by 1961 despite a rise by nearly one-half in the total number of cases. The hospital service was able to expand its field of work without substantially extending capital resources.

The Hospital Plan of 1962 was devised to meet physical depreciation of the existing capital resources and the obsolescence of existing buildings. Obsolescence is a product of progress: the basic concept of hospital work has radically altered since the majority of existing hospitals were built. In the plan, the impact of progress in medical procedures on demands for capital measures is apparent. The success of new methods of treatment for mental illness combined with a new social attitude has made possible a planned reduction in beds for the mentally ill. But different considerations apply to mental subnormality which again reflect the state of medical procedures. On the one hand, a greater readiness to seek

hospital admission and the increased expectation of life increase the demand, but this may be offset by the growth of domiciliary services and the possibility of preventing certain forms of mental subnormality.[13]

Apart from the past history of medical procedures which have shaped the extent of resources available, the economic environment affects expenditure in the long-term through determining the prices at which current resources are obtained. These resources can be divided between services and goods, and further sub-divided between medical and non-medical items. The prices of non-medical goods and services, such as provisions and domestic labour in hospitals, are simply and directly determined by demand and supply in the economy as a whole. The prices of medical services are also affected in the long-term by the price mechanism, as remuneration prospects influence the size and the quality of entry to the medical and auxiliary professions. The prices of drugs, medical and surgical appliances, X-ray equipment and so on, are more directly involved in the general run of scientific progress. The price pattern of these goods is the same as those of other science-based industries. Initially, with limited production, prices carry the heavy burden of research, development and marketing overheads. As production expands and becomes more efficient, the overhead burden is reduced and prices tend to fall. As the product grows older it faces competition from new discoveries and developments in its field, resulting in further pressures on prices. In real terms, the price of aspirin is substantially lower than it was 50 years ago. The price of penicillin is now less than one-tenth the level ruling during 1947. Thus generally expenditure on medical goods is a product of the range of existing medical goods, the length of time they have been available and the speed at which new items are being introduced.

The organisation of medical care under the National Health Service can in the short-term substantially alter the whole pattern of prices. The Health Service is virtually the sole buyer of medical services and goods—a monopsony.[10] Prices for the whole range of medical services and goods are to a greater or lesser extent negotiated prices, and thus determined by central decisions. This may produce rapid fluctuations; remuneration of dentists fell by over one-third in three years from 1949, and rose again in real terms to 1949 levels by 1958.

Government financial measures or their policies affecting incomes make themselves directly felt in areas where the control over negotiations is greatest, such as over the remuneration of hospital nursing staff. The monopsonic position of the Health Service enables substantial pressures to be brought on the price structure of industries supplying medical goods. Because of its broad application, monopsonic control over remuneration and prices of medical services and goods represents the most important of the mechanisms through which central control over expenditure on health is exercised.

Expenditure and Motives

THERE are two important general considerations affecting medical procedures which broadly influence their economic impact. The first is one shared with most other social institutions. Expenditure is inelastic downwards; it is more liable to grow than to contract. Where a change in medical procedure has led to a direct saving on a specific disease, it is very unlikely that this saving will be reflected in total costs. Once resources are dedicated for a medical purpose, it is unlikely that they will be reallocated to a non-medical use. The control of infectious diseases has led to a substantial reduction in the number of isolation beds required and so their costs. However, many isolation hospitals were converted to other medical or welfare uses. Other sectors of the Health Service find it simpler to expand by converting existing resources to their own needs, rather than by making a claim for fresh resources. Savings from economically more efficient medical procedures tend to be swallowed: they represent the release of resources for expansion elsewhere within the service rather than a saving which is reflected in total expenditure.

The second feature stems directly from the nature and momentum of medical progress. The energies of those who direct and provide health and medical services are "devoted to the same process as their predecessors have been through the ages—to devising and discovering ways of doing things better, more effectively, more humanely, with less effort, therefore, ways of doing things that previously lay beyond their powers. Impulse and the driving force to do them does not arise from calculation of output or production, even in non-economic terms".[2] As the motive is not economic, it is scarcely to be expected that the economic effect will be uniform. The effect on expenditure of a change in medical procedures is largely an incidental by-product, unrelated to the decision to proceed.

The growth of expenditure on the health services tends to be endogenous—it is more affected by changes from within than by the operation of external factors. There is little systematic or conscious economic direction of expenditure. Where control of expenditure is exercised either through the administrative measures or through monopsonic power over the prices of medical goods and services, it operates as a centralised restraint or influences only the marginal developments. This is partly understandable; specific criteria which should be adopted in judging or in redeploying expenditure have not yet evolved. Yet, it is highly unlikely that endogenous growth combined with central restraint of expenditure on health produces the most effective allocation of resources. Expenditure needs to be related to the benefits it yields.

The community bears the cost of ill-health whether or not it finances expenditure on medical progress or on the Health Service. The total costs of ill-health comprise not only the direct cost of therapy, but also the indirect economic and social losses falling on individual patients. They or their kin or the community as a whole suffer deprivation from ill-health through losses arising from incapacity, chronic disability or premature death. The impact of medical progress on Health Service expenditure cannot be fully appraised until it is balanced against the indirect but real benefits the community derives from more effective therapeutic procedures.

Appendix

Sources and Method

THE exercise has been built-up from statistical data not originally collected for cost analysis. The costing method has, therefore, been decided by the form and basis of the available data rather than on the selection of ideal units for costing.

Expenditure on the National Health Service was allocated to the diagnostic groups contained in the short In-patient Diagnostic List (I.P. List) which correspond to either the whole or part of a main "chapter" of the Seventh Revision of the *International Statistical Classification of Diseases, Injuries and Causes of Death*, 1955 (I.C.D.). Certain diagnostic groups are further sub-divided to identify expenditure on specific causes which correspond to groups in the I.C.D. classification (e.g., I.P. List No. 12, *Diseases of the Respiratory System*—122 *Pneumonia*, I.C.D. Nos. 490-493). The only departure from the short I.P. Diagnostic List is the separation of the diagnostic sub-division 130 Diseases of Teeth and Supporting Structures (I.C.D. Nos. 530-535) from broad diagnostic group 13 Diseases of the Digestive System.

The expenditure allocated to these diagnostic groups comprises the greater part of expenditure in England and Wales by hospital authorities and on the services administered by the Executive Councils. Local authority health and welfare expenditure (except that on the midwifery service) and costs of central and area administration have been excluded.* The information used in the analysis refers to the years 1960 to 1962, but all costs have been adjusted to levels ruling during 1961 or the financial year 1961/62.

The costs of the Hospital and Specialist Services have been estimated generally from the time spent by in-patients for different conditions in acute, chronic, teaching or other types of hospital. Costs of the General Medical Services were allocated proportionately to the number of diagnoses made for different conditions, and the costs of the Pharmaceutical Services were analysed according to the value of prescriptions given for different conditions.

Information on the duration of stay in hospitals was derived from the Registrar General's In-Patient Enquiry (Min. of Health Report on Hospital In-patient Enquiry, 1960, Part II, Table 13, pp. 152-159). The average cost per spell was calculated by pricing these durations at average net in-patient cost per day for different types of hospitals (Min. of Health Hospital Costing Returns 1961/62, Part 1, Appendix 4).† The total cost to the hospital services arising from these diagnoses was then obtained

* Some items of expenditure by local health authorities could be related in part to diagnoses. It is, for example, possible to calculate the arithmetic average cost per visit of a health visitor, and to estimate costs of health visitors' visits to tuberculous households. However, it would be impossible to decide where the remaining sum should be allocated. Costs of immunisation might generally be allocated to infectious diseases, but it would be impossible to allocate these costs to specific diseases as triple antigens might be used. Also some unidentified part of the costs of protection is included by many local authorities under "care of mothers and young children". Similar considerations apply to most other items excluded from the analysis.

† Standardising costs per case in terms of duration of stay may underestimate expenditure on those diagnoses involving extensive surgical intervention. However, with conditions such as cancer and heart diseases although there may be a proportion of cases receiving extensive treatment, there will also be some where the condition is too far

from the estimated number of discharges and deaths for these conditions in England and Wales in 1961 (Min. of Health Report on Hospital In-patient Enquiry, 1961, Part I, Table 1, pp. 5-7). Adjustments were made to the average cost per spell where information was available about changes in the duration of stay between 1960 and 1961 (*ibid*, Table 3, p. 12).

The In-patient Enquiry excludes psychiatric and convalescent hospitals. Expenditure on psychiatric hospitals, allocated entirely to the diagnostic group I.P. 06—Mental, psychoneurotic and personality disorders, was obtained by multiplying the average daily bed occupation during 1961 in mental illness departments (Min. of Health Report, 1961 Part I, Cmnd. 1754. Appendix II, Table F 3, p. 153) by the average cost per day's stay in Psychiatric (Mental illness or mental subnormality) hospitals (Min. of Health Hospital Costing Returns, 1961/62, Part I, Appendix 4). The cost of psychiatric patients in general hospitals was allowed for, as they are covered by the in-patient enquiry. Costs of convalescence were also calculated on average daily bed occupation, and were allocated to diagnostic group I.P. 27—special admissions (Y List).

There is no comparable information classified by diagnosis available on out-patient attendances. The total cost of out-patient attendances was calculated, but not allocated to diagnostic groups, on a weighted average cost per out-patient attendance in different categories of hospital (Min. of Health Hospital Costing Returns, 1961/62, Part I, Section C) multiplied by the total number of out-patient attendances in 1961 (Min. of Health Report 1961, Part I, Appendix II, Table F, Part 4, p. 154).

The total cost falling on hospital authorities built-up in this fashion amounts to £428·0m. This comes close to the net revenue expenditure by hospital authorities in 1961/62 £429·4m, after deduction of the costs of central administration, blood transfusion and mass radiography services—all of which are excluded from the analysis (Min. of Health Report 1962, Cmnd. 2062, Health and Welfare Services, Appendix I, Table N, p. 144).

The source, for allocating the expenditure on general practitioner and the pharmaceutical services to diagnostic groups were the British Medical Index and the British Pharmaceutical Index. These publications are part of a market research service provided by Intercontinental Medical Statistics Ltd., a subsidiary of Intercontinental Marketing Services Ltd. (7 Portland Place, London, W.1.).

The information provided by this service is obtained from a random selection of general practitioners throughout the United Kingdom. A quota system is then applied to the random selection to ensure a balance of doctors by age and geographical distribution.

The sample of doctors reports on all patients seen for two consecutive working days. Reporting days are rotated to minimise any scheduling bias. Every three months, material from 400 doctors is collated providing detailed information on diagnosis and drug usage.

The information is published on a subscription basis. The British Medical Index contains data on diagnosis and drug usage, while the British Pharmaceutical Index contains information about the costs of prescription drugs.

advanced for surgery, and treatment (and thus expenditure) will involve only observation, symptomatic relief and terminal care.

More generally expenditure by hospitals on specific therapy accounts for only a small proportion of the total. Medical salaries in acute non-teaching hospitals (excluding nursing) account for 10 per cent and medical goods (drugs, appliances, dressings, etc.) for 8 per cent of total expenditure. Over half the costs are accounted for by non-medical goods (provisions, heating, light, domestic labour, etc.). (N.H.S. Summarised Accounts 1961/62 p. 6). The bulk of expenditure is related to duration of stay rather than to specific treatment.

The cost of the General Medical Service for the year 1961, was allocated to diagnostic groups according to the percentage distribution of diagnoses for the year 1961 given in the British Medical Index. The pattern was generally confirmed by comparison with the survey of morbidity carried out in the mid-1950s by the College of General Practitioners (Logan, W. P. D. and Cushion, A. A. Morbidity Statistics from General Practice Vol. I—General, Table 9, pp. 61-89). The major difference, apart from those expected from epidemiological change since the mid-1950s, such as a decline in tuberculosis, was a higher incidence of diseases of the male genital organs in the survey by the College of General Practitioners offset by a lower incidence of ill-defined conditions, particularly "disturbance of sleep".

Payments to general practitioners for ante and post-natal care were allocated to diagnostic groups 17 and 18—Deliveries and disorders of pregnancy. Patients' visits for these diagnoses were, therefore, excluded from the proportionate distribution of costs to diagnosis.

Expenditure on drugs under each diagnostic group was calculated from the British Pharmaceutical Index and the section on drug usage in the British Medical Index.

The information on expenditure on drugs by a detailed list of therapeutic classes in the British Pharmaceutical Index relates to net ingredients costs. A uniform addition of 18 per cent (Drug Tariff Scale of Fees) was made to each class to cover average on-cost allowances, and a variable percentage addition in each class to cover dispensing fees. The dispensing fee a chemist receives for say, a laxative, represents a higher proportion of expenditure in that class than say, for an antibiotic where ingredients costs are greater. The variable proportions for dispensing fees were calculated from the pattern shown by the analysis of prescription cost for a narrower list of therapeutic class by the Ministry of Health (Min. of Health Rep. 1961, Part I, Appendix V, Table B, Part 3, pp. 202-203).

The total cost of the drug element in the Pharmaceutical Services built up in this fashion and adjusted to relate to England and Wales in 1961 comes to £78·5m. compared with expenditure on drugs and dressings of £79·6m. The British Pharmaceutical Index does not include information on dressings, trusses, or hosiery dispensed on N.H.S. prescriptions. This accounted for an estimated £3·5m. in 1961 (*ibid*) which has not been allocated to diagnostic groups.

Total expenditure on drugs in each of the detailed therapeutic classes was allocated to diagnostic groups according to drug usage. This involves an assumption that costs of prescriptions in each therapeutic classification tend to be uniform. Errors arise where dosage, quantity prescribed, presentation or prices of drugs vary widely within a class. However, these factors may vary with matters quite unrelated to diagnosis.

The estimated value of drugs not allocated to specific diagnostic groups in the B.P.I. and the residual error between estimated and actual costs of the drug element in the pharmaceutical services was spread proportionately over diagnoses.

The cost of the general practitioner services are given under the heading "medical services" and the cost of drugs are listed under the heading "medical goods". In addition to these items expenditure on the following services have been included under appropriate diagnostic groups:

(i) The cost of the General Dental Services is given under diseases of the teeth and supporting structures (I.P. List No. 130). Expenditure was broken down between "medical services" £43·3m., and "medical goods" £12·6m. to cover the cost of dentures, etc., supplied to patients (Min. of Health Report 1961, Part I, Appendix VI, Table G, p. 212).

(ii) The cost of the Supplementary Ophthalmic Services was allocated to diseases of the eye (I.P. List No. 09, I.S.C. No. 380, Refractory Errors). Expenditure was divided between "medical services", £4·7m. and "medical goods" £10·6m., to cover the cost and dispensing fee for lens, frames, etc. Expenditure on privately purchased frames is excluded. (Min. of Health Report 1962, Part I, Appendix VI, Table D, p. 183).

(iii) The cost of local authority midwifery services, £6·9m. is included wholly under "medical services" for deliveries and disorders of pregnancy —I.P. List Nos. 17 and 18. (Min. of Health Report 1962, Part I, Appendix X, Table Q, p. 202.)

Because of the material on which the exercise is based, there are many places where the estimates lack precision. The division between domiciliary and hospital costs take no account, for example, of domiciliary visits by specialists or the special problem of deciding whether "day-patients" should be treated as receiving hospital or domiciliary care. However, these items do not substantially alter the pattern of expenditure. The study attempts to present the broad picture.

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Office of Health Economics

THE Office of Health Economics was founded in 1962 by the Association of the British Pharmaceutical Industry with the following terms of reference:

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1755 Mr. Garrick

May 3	Mrs. a Box of Pills	"	5.	0
	the Cook, dressing her face	"	1.	6
	a Box of Cerate	"	1.	0
5	the Coachman Flower of Brimstone	0	8	
18	Mrs. a Box of Pills	"	5.	0
June 25	— Syringing of the Ear twice		5.	0
26	— Ditto	"	5.	0
	the Coach Man a Saline Mixture	"	2	6
27	Ditto	"	2	6
	Mrs. Syringing twice	"	5	0
	the Coachman a Mixture	"	2	6
	£		[illegible]	
	[illegible]		[illegible]	
	[illegible]		[illegible]	
July 4	Lac [illegible] ℥i		[illegible]	
7	the Little Boy a Specific & Cath.	"	1.	[illegible]
9	Mrs. Syringing	"	2	6
11	— Do	"	2	6
	Salt of Wormwood 2oz	"	0	[illegible]
14	the little Boy 3 Specific Powders	"	3	6
16	Mrs. a Cathartic	"	1.	0
	the Little Boy Do	"	1	0
	the Maid Betty Do	"	1	0
17	Mrs. a Plaister for the Ear	"	1	0
	the Maid Betty Sp. C.C.	"	1	0
23	Mrs. Plaister	"	1	0
26	the Cook Sp. C.C.	"	0	6
	the M[illegible] Betty a Cath.			