

## COSTING AN ANAESTHETIC SERVICE

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By the term 'costing' is implied the determination of the cost of a unit of a commodity or service. Thus, in accounting for total hospital services, it is customary to refer to the monetary cost per patient per day. This figure gives an approximate measure of the financial efficiency with which the hospital is run, especially as an internal standard for regular comparison with similar estimates for preceding years. There is an optimum figure for this cost because the cheapest service is not necessarily the best service, while the best possible service may be far too expensive when all relevant factors are taken into consideration.

In providing a hospital service, however, other units besides monetary can, and should, be used to determine the cost. For example, surgeons and anaesthetists are craftsmen, leaning heavily upon personal judgment in working with imperfect materials, and their efforts may, of themselves, prove a source of death or of disability to the patient they are trying to aid. This mortality and morbidity, which is quite apart from the effects of the patient's disease, is thus also part of the price which may have to be paid by the patient for the service that he received and it may also be used to judge the efficiency of that service.

*Mortality Costs*

In whatever way they may be set down, figures of mortality and morbidity costs, in addition to providing a very useful index of the efficiency of a medical service, may also provide valuable information of a different nature. In Table I are

TABLE I. OPERATIVE MORTALITY (PER CENT) \*

Cause of Death	Group A	Group B	Group C
Original disease and complications of surgery .. ..	0.68	1.13	2.03
Anaesthetic direct and major contributing factor .. ..	0.05	0.07	0.13
Total .. ..	0.75	1.33	2.17
<i>Based upon</i>			
No. of operations .. ..	388,203	599,548	67,158
No. of hospitals .. ..	17	10	1
Period .. ..	1946-50	1948-52	1952-55
Load: operations per hospital per year .. ..	4,567	11,991	16,540
* $\frac{\text{No. of surgical deaths}}{\text{No. of operations}} \times 100$			

tabulated figures from recent statistical surveys which show the mortality costs for surgical and anaesthetic services in 3 hospital populations. These 3 statistical populations are not comparable in size, composition, geographical location or time, and all these factors may influence the efficiency of the work done within a given population. Therefore the fact that group A<sup>1</sup> appears vastly superior is not necessarily a condemnation of the work done by group B<sup>2</sup> or by group C.<sup>3-5</sup> Nor should it be concluded that the figures for group A, for example, represent the most efficient service, for they may exceed or fall short of the optimal figures for that group. It is possible that the

monetary cost of achieving a low mortality cost is altogether too great for the population at risk.

A natural question is the reason for the much greater mortality costs of group C. Groote Schuur Hospital was opened in 1938 and caters for European and non-European patients in approximately equal numbers. The bulk of the non-European patients are in very low income brackets. A survey by the Department of Social Science of the University of Cape Town in 1951<sup>6</sup> showed that at that time 37% of the non-European group lived at or below the poverty datum line, while only 2% of the European group were below that datum line. It is thus easy to suggest that social elements (e.g. poor nutrition, lack of clothing, bad housing etc.) play an important part in rendering the non-European group of the hospital population less able to withstand the stress of surgery and more likely to develop complications, and that a higher mortality rate in this group loads the rate for the whole population. But if the mortality costing is extended to each of the two groups (European and non-European) then we see (Table II) that there is

TABLE II. SURGICAL MORTALITY (PER CENT) \*

Year	White	Non-White
1952.. ..	2.6	2.6
1953.. ..	2.9	2.8
1954.. ..	2.6	2.6
1955.. ..	2.2	1.8
Total No. of patients .. ..	29,181	29,438

\*  $\frac{\text{No. of Deaths in Surgical Wards}}{\text{No. of Admissions to Surgical Wards}} \times 100$  Obstetrical patients excluded.

no significant difference in mortality rates for these numerically equal groups. Since they are served in the same hospital, at the same time, by the same staff, and for the same diseases these ethnically and economically differing groups, by showing the same mortality rates, suggest that some other factor may more directly affect the efficiency of the services they receive.

Table I suggests that perhaps the total hospital load (operations per annum) may be this factor. Group A, with the lowest mortality rate, has the lowest load, of 4,567 operations per hospital per year. The load carried by Groote Schuur Hospital (group C) is 16,540 operations per hospital year.

*Monetary Costs*

Monetary costs can easily be established by the application of conventional methods of cost accounting to the running of the hospital. This measure of the efficiency of a medical service has not, so far, received the attention which it deserves.

The Guillebaud Committee of Enquiry into the cost of the British National Health Service<sup>7</sup> pointed out that costing systems should be regarded, not as a means of imposing restrictions, but as a means of ensuring that the best value is obtained for money spent. The Committee was of the opinion that departmental costing should be started experi-

mentally and they continued: 'We trust that all concerned with hospital administration—not the least the doctors—will cooperate to the utmost in order to make a success of this vital aspect of hospital management.'

#### HOSPITAL ANAESTHETIC SERVICE COSTS

A system of cost-accounting was introduced into Groote Schuur Hospital during 1953 and advantage has been taken of this system to survey the cost of the anaesthetic service during 1955.

Because it is quite impossible to estimate what proportion, if any, of the original capital charges for erection and equipping of the hospital should be charged to the anaesthetic costs during 1955, this item has been excluded. The cost detailed in Table III are based upon the cost of existing anaesthetic equipment, anaesthetic drugs, anaesthetic gases,

hospital care. It is thus of theoretical and practical interest to attempt to determine the costs of an anaesthetic service where the patient bears the whole cost directly.

Costs in private are greater because consulting rooms, secretary and transport, for example, are legitimate added charges on the conduct of the practice. *Pro deo* work and unpaid accounts also are a debit to the practice.

A questionnaire was sent to 54 specialist anaesthetists engaged in the private practice of anaesthesia. As far as possible they were sent to an equal number in each Province. Those who had only recently entered practice were not approached. The questionnaire asked for the results of two simple calculations. The first was the division of the gross sum received from the practice (as declared in income-tax returns for the year ended 30 June 1956) by the number of anaesthetics administered in earning that sum. The

TABLE III. ANAESTHETIC SERVICE COSTING

Month	Anaesthetics No.	Itemized Costs (£S.A.)				Total Cost (£S.A.)	Unit Cost (£ S.A.)
		Salaries	Drugs	Gases	Equipment *		
January .. ..	1,209	1,631	119	591	107	2,448	2.02
February .. ..	1,312	1,460	158	571	107	2,296	1.75
March .. .. .	1,520	1,525	212	744	107	2,588	1.70
April .. .. .	1,288	1,529	160	903	107	2,699	2.10
May .. .. .	1,393	1,367	173	674	107	2,321	1.67
June .. .. .	1,458	1,342	216	722	107	2,387	1.64
July .. .. .	1,313	1,282	158	980	107	2,527	1.92
August .. .. .	1,392	2,896†	189	542	107	3,734	2.68
September .. ..	1,328	1,619	150	834	107	2,710	2.04
October .. .. .	1,373	1,562	147	518	107	2,334	1.70
November .. ..	1,428	1,482	181	596	107	2,366	1.67
December .. ..	1,137	1,475	175	669	107	2,426	2.14
Totals .. .. .	16,151	19,170	2,038	8,344	1,284	30,836	1.91

\* See text.

† Adjustment of retro-active salary increase.

and the salaries of the anaesthetists who made up the Department of Anaesthesia during that year, viz. 15 full-time with 5 part-time who worked one session of 4 hours per week. No explanation for individual items seems called for except 'Equipment'. This was arrived at by first dividing the estimated life of each article into the original capital cost of the article, and distributing the sum of the resulting annual cost of each article equally over the 12 months of the year. The table shows the following points of interest:

(a) The average cost of an anaesthetic was £1.91 (£1 18s. 2d.).

(b) Equipment accounts for 4.2% of the whole expenditure.

(c) Anaesthetic drugs account for 6.6% of the whole expenditure.

(d) Anaesthetic gases (nitrous oxide, oxygen, cyclopropane and carbon dioxide) account for 27% of the whole expenditure.

(e) The salaries of the anaesthetists make up the remaining 62% of the expenditure.

#### PRIVATE ANAESTHETIC SERVICE COSTS

At Groote Schuur Hospital, during the period of the study, the patient made no direct contribution to the cost of his

second was the division of the gross tax reductions allowed as legitimate expenses of the practice by the number of anaesthetics. The replies therefore gave the average remuneration received for each anaesthetic and the average cost of each anaesthetic. In order to ensure anonymity, stamped addressed envelopes were provided for the return of this information.

By 13 November 1956, 2 months after all tax returns had fallen due, 11 replies had been received, representing 20% of those approached. Judging by the franking of the envelopes, these replies came from all four Provinces. An analysis of the replies show that:

(a) The average cost of an anaesthetic to the private patient is £4.63 (hospital costs £1.91).

(b) The cost of administering the anaesthetic, which is deductible for tax purposes, was £1.90 (hospital cost £0.73). This figure is 43% of the cost to the patient, which is not very different from the figure (38%) for the hospital services.

(c) The average nett earnings of the anaesthetist, which are equivalent to the salaries in hospital practice, were £2.72 (hospital cost £1.18).

In view of the diversity of anaesthetists and of the conditions under which they practise, there was the expected wide range in values for each expense category. While the mean and the median figures for the nett income were almost

the same, the cost to the patient showed a mode which was 35% in excess of the mean and the cost of administering the anaesthetic showed a mode which was 40% below the mean.

The figures for Groote Schuur Hospital are quoted by permission of Dr. N. H. G. Cloete, Medical Superintendent.

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