OBSTETRIC CARE

The economics of specialist and general practitioner maternity units

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SUMMARY. The roles of general practitioner and specialist maternity units are increasingly being debated with reference to resources and the need for savings in the NHS. Unfortunately, many of the economic issues involved are frequently misunderstood. On the basis of a study of maternity care in one Health Board area in Scotland, we present an example of the type of economic data which are needed to make policy decisions on resource allocation in hospital maternity care. Differences between the two unit types are presented in terms of their unit costs, their cost structures and their inpatient cost profiles.

Introduction

TWO important recent trends in obstetric policy have been the move towards a 100 per cent rate of hospital delivery and the increasing proportion of deliveries taking place in specialist hospitals rather than general practitioner (GP) units. These trends, coupled with the ever-increasing pressure on the NHS to make the best use of its resources, have focussed attention on the roles and performance of specialist and GP units. This interest has been reflected in a series of articles published in recent volumes of this journal (Loudon, 1972; Elstein *et al.*, 1975; White, 1978; Zander *et al.*, 1978; Owen, 1981; Wood, 1981).

Despite this interest, there is still misunderstanding about the economics of hospital maternity care. This is primarily due to lack of information, a fact which was acknowledged by Tew (1977):

> "Because general practitioner units have no resident medical staff and are provided with less technical equipment, one might expect the cost for each discharged case or birth to be lower than consultant units. On the other hand their provisions are used less intensively and they had a higher discharge/birth ratio, certainly in recent years. Unfortunately the published data on costs in maternity hospitals do not distinguish general practitioner from consultant units and so do not make it possible to establish how much the one influence is offset by the other."

Aim

The purpose of our paper is to try to answer these questions and to suggest an appropriate framework for viewing the economic aspects of these two different types of unit.

Method

We have used the results from a study of the maternity services provided by one Health Board in Scotland. The area contains about 450,000 people and includes one conurbation with a population of over 200,000. Changes in the area's population structure have been typical of national trends—a falling birth rate and an increasing proportion of elderly. From a level of just over 7,000 births in 1971, the maternity units in the area delivered just over 5,500 babies in 1979.

In the Health Board under study the objective of 100 per cent hospital deliveries has been virtually attained. Seventeen hospital units provide maternity inpatient services. One of these is a specialist/consultant teaching hospital which has two small specialist-controlled units associated with it (these will be referred to as 'the specialist unit'). There are two single specialty obstetric units controlled by general practitioners and a further 12 GP obstetric units within mixed specialty GP hospitals. Over 27 per cent of deliveries occur in the GP units,

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Table 1. NHS Expenditure in a Health Board area by phase of care and supplier.

	Ante-natal care		Labour/ delivery care	Post-natal care		Total	
	£000s	Per cent	£000s	£000s	Per cent	£000s	Per cent
Primary care	81	*8*	-	25	*2*	106	*3*
Community care	175	*18*	-	191	*11*	366	*12*
Hospital	713	*74*	533	1,442	*87*	2,688	*85*
Total	969	*100*	533	1,658	*100*	3,160	*100*

a rather higher figure than the Scottish average of 19 per cent; this difference is due largely to the geographical distribution of the population. The Board operates a policy of 48-hour post-natal discharges from the specialist units to the surrounding GP units.

There are benefits and drawbacks in concentrating on one area in a study such as this. However, the overwhelming advantage of intensive study of a single area is that for any particular region the maternity services are an integrated system. Because services are integrated, the complete system of provision must be investigated. Integration also determines the policy choices for the decision-making health authority. The general results and implications are also potentially relevant elsewhere, and certainly the questions which our study posed are universally appropriate.

Only NHS expenditure is included, though it is accepted that family and other social costs are an important (though often unquantifiable) consideration.

Apportioning costs

In terms of resource allocation, different weights can be given to the three phases of maternity care (ante-natal, labour and post-natal). Setting out expenditure for the three separately can provide a basis for considering questions related to the balance between, for example, ante- and post-natal care; it also makes it possible to consider issues such as in which phase priority should lie if more resources were to become available or where reductions should be made if expenditure were to be cut. The purchase of a fetal scanner, for instance, would mean that a larger proportion of maternity expenditure went towards ante-natal care (assuming no overall increase in the maternity budget), but also that the resources available for post-natal care or delivery would decrease. Decision-makers, when presented with this evidence, might feel that the balance of care had shifted too much towards the ante-natal phase. However, decision-makers would be unable to make such an assessment without an appropriate framework for evaluation.

The data

All our data refer to the running costs of hospitals. They do not include capital expenditure, which is a distinct category of data and does not relate to the objectives of our paper. As it is often impossible to find out from published figures how much of the total maternity expenditure in a mixed specialty unit is spent on obstetrics, we used our own survey data.

In the case of fees paid to general practitioners for maternity care, it was necessary to analyse a sample of claims from the Central Fund and to extract figures for the amounts paid for ante-natal, delivery and post-natal care. Payments made for complete maternity care were broken down into their constituent parts on the basis of the individual size of fee (for example, 58 per cent of the complete maternity fee is designated for ante-natal care). For hospital costs, variable, patient-related expenditures (for instance catering, laundry, bedding, pharmacy) were allocated pro rata with occupied bed-days; fixed costs, such as cleaning and domestic services, heating, power and light and rates, were allocated in relation to the area dimensions of the units, the ante-natal and post-natal wards and the labour suite; finally, nursing and medical staff expenditures were allocated by means of diaries kept by the nursing and medical staff themselves. These diaries recorded all their activities in relation to the three phases of maternity care and it was therefore possible to allocate their salaries in proportion to the time spent in each phase (a fuller methodology for allocating and estimating expenditures is available in Gray and Steele, 1979).

It should be noted that our cost figures relate to resource costs and not accounting costs, that is they include the costs of actual inputs into maternity care. Thus for GP units, payments to general practitioners for deliveries are included but maternity nursing staff time spent with other patients is not. (Where occupancy rates in GP units are low, some maternity nursing staff time is frequently spent elsewhere.)

Results

In 1976/77 over £3 million (Table 1) was spent on maternity care in the Health Board area we studied. Of this sum, ante-natal care accounted for almost 31 per cent (£1 million) and post-natal care over 52 per cent; the remaining 17 per cent went to the labour/delivery period. The hospital sector was, not unexpectedly, by far the largest spender, taking almost 85 per cent of all maternity monies.

The involvement of the primary care sector appears from Table 1 to have been small. Only 8 and 2 per cent

of ante- and post-natal care respectively was given by this sector. The overall estimation of 3 per cent is in a sense incomplete, however, in that payments to general practitioners for deliveries could have been included either in the primary care sector or in the hospital sector. We decided that since all deliveries were carried out in hospital in this region, we would adopt the latter approach. The payments were therefore included as hospital expenditure. Nevertheless, general practitioner costs were fairly small. Approximately 78 per cent (almost £2 million) of all hospital expenditure went to the specialist unit, leaving about £600,000 to maintain the 14 GP units.

Table 2 shows that the distribution of costs was quite different within GP and specialist units. On average a much greater proportion of GP unit maternity expenditure (nearly 30 per cent) was incurred on fixed costs, compared with 11 per cent for the specialist unit; variable costs represented only 22 per cent of GP unit costs as against the specialist unit figure of nearly 40 per cent. Nursing and medical staff costs in both kinds of unit were a similar proportion of total expenditure (almost 50 per cent). It can be seen, therefore, that in the GP units a much larger proportion of expenditures was in general devoted to maintenance or keeping themselves open, whereas a larger proportion of specialist unit costs varied directly with the throughput of patients.

Expenditure in the GP units was also heavily weighted towards post-natal care—almost 70 per cent of all inpatient expenditure. Only 12·5 per cent was spent on the labour/delivery period. Expenditure in the high technology specialist unit was weighted towards the ante-natal and labour/delivery periods (Table 3). The cost profile of a patient moving from ante-natal admission to post-natal discharge thus differed, depending on whether a GP or a specialist unit was involved.

The Figure shows the average day-cost profile of such patients. (Because a profile of this type is 'dynamic', fixed costs are excluded.) The costs per day for GP and specialist units were similar and also fairly typical in that they were relatively low during the first and third phases of care, and greatly increased in the second. However, as the Figure clearly shows, the relative costs in the two unit types for each phase differed significantly. The average cost per ante-natal day in GP units was only some 51 per cent of the corresponding cost in the specialist unit; the cost per labour day in the GP units was even lower at 32 per cent of the equivalent in the specialist unit; and the GP unit cost per post-natal day was 59 per cent of that in the specialist unit.

Table 2. Proportion of fixed, variable and nursing/medical costs in GP and specialist units (per cent).

	Fixed costs	Variable costs	Nursing/ medical costs	Total
GP units	*29.7*	*22.1*	*48.2*	*100.0*
Specialist units	*11.3*	*39.7*	*49.0*	*100.0*

Discussion

In the quotation in the introduction to this paper, Tew makes two observations: the first is that due to the absence of resident medical staff and technical equipment, average costs may be lower in GP than consultant units; the second is that the costs might, on the contrary, be higher because of lower occupancy rates and because of a higher discharge/birth ratio.

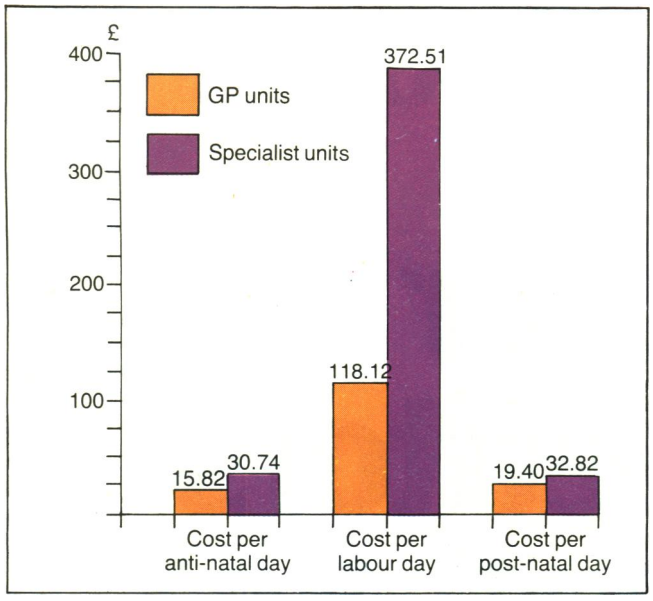
In our study the average cost per delivery in a GP unit was found to be £393 compared to £484 in the specialist unit (1976/77 figures); thus costs per delivery in a GP unit were some 81 per cent of those in the specialist unit. Costs per inpatient day were closer in the two types of unit (£47 and £52 respectively).

These cost figures are not directly comparable with any previous studies. The closest comparisons would appear to be with Babson (1971) and Ferster (1973). Their results showed that deliveries which involve intervention cost more than those without intervention, but this is hardly surprising. Ferster's findings on GP and specialist unit costs, while not showing a consistent pattern, if anything indicate that GP units are more expensive than specialist units.

It is clear, however, that in comparing such average costs we are not comparing like with like. In our study, high-risk mothers were generally booked into a specialist unit; mothers booked into the GP units were low-risk cases with expectations of a normal delivery. Women delivered in the specialist hospital were on average

Table 3. Expenditure on ante-natal, labour/delivery and post-natal care by GP and specialist units.

	Expenditure on ante-natal care		Expenditure on labour/ delivery care		Expenditure on post-natal care		Total maternity inpatient expenditure	
	£000s	Per cent	£000s	Per cent	£000s	Per cent	£000s	Per cent
GP units	108	*18.0*	75	*12.5*	415	*69.5*	598	*100.0*
Specialist units	486	*24.8*	459	*23.4*	1,014	*51.8*	1,959	*100.0*



Cost profile of maternity care in GP and specialist units.

significantly older and smaller than those in the GP units and had a modal parity figure of zero compared with one for the GP units. Moreover, only 14 per cent of deliveries in the GP units were induced, compared with 40 per cent in the specialist unit. As far as measures of outcome are concerned, both birth weight and Apgar score showed significant differences between the two unit types. Differences in average costs must be viewed in the light of these differences in outcomes and risk probabilities. Perhaps the first point by Tew should therefore be answered in the form of a query: are the cost differences between the unit types justified by their clinical differences?

Tew, and others, believe that the costs of maternity care increase where the inputs are used less intensively. In part this belief reflects our finding that overheads in GP units represent a large proportion of total costs and that average costs are therefore reduced by spreading them over a larger number of deliveries. However, if total costs can also be reduced, it is not necessarily the case that costs will be higher when occupancy rates fall. There are two conflicting forces, one likely to increase costs and one likely to reduce them. In the GP units in our study, there was an inverse correlation of 0·4 between the average cost per delivery and the occupancy rate. This suggests that as occupancy rates fall then average costs do tend to increase, but that the effect is not a very strong one.

Tew's final point was the higher discharge/birth ratios of GP units, which again were expected to lead to higher costs. Yet it is not at all clear why higher costs should be expected. Tew felt that the higher discharge/birth ratio was caused by the ante-natal period, but it is more likely to be due to the increasingly common policy of 48-hour discharges following delivery.

Given the finding (see Figure) that the cost of a post-natal day in a GP unit was 59 per cent of the cost in a specialist unit, it would be cost-effective to operate a 48-hour discharge policy between units. Moreover, since a post-natal day in a GP unit was found to be only some 42 per cent of average daily costs, an increase in the number of post-natal stays, though increasing total costs, would probably reduce average costs, rather than increase them as Tew suggested.

Conclusions

The aim of our paper was to point to the differential costs between GP and specialist units. The cost per delivery and per occupied bed-day in the two unit types was found to be different but not widely so. However, the cost structures of the two unit types were found to be very different: the fixed cost element of total running costs was much larger in GP units than in the specialist unit, while combined nursing and medical expenditures were about the same proportion of total costs.

The distribution of expenditure in GP units was weighted towards post-natal care; this was partly a consequence of the integrated nature of care within the area we studied. As was noted earlier, the specialist unit carries out deliveries of all high-risk mothers. As a result, occupancy rates in this unit are high and there is often pressure on beds. A policy of 48-hour discharge is therefore practised, with mothers either being sent home and domiciliary care given or, more often, being transferred to their local GP unit for their post-natal care. The effects of this practice are fourfold: first, it increases the occupancy rates in the GP units and probably makes their unit costs lower than they would otherwise be (though it has been argued that they are already abnormally low because of the booking policy practised by consultant obstetricians); secondly, it lowers the social costs to the mother and her family as far as distance and inconvenience are concerned; and thirdly, it releases pressure on beds in the specialist unit. Finally, given the day costs shown in Figure 1, the policy of post-natal lying-in appears to be cost effective.

Given the absolute costs of maintaining a GP unit relative to the costs of a specialist unit, closure of GP units will not generate large savings. It may be that a re-examination of the role of the GP unit should emphasize that its post-natal care is cost-effective and that increased occupancy rates are likely to reduce the average costs per delivery. A relaxation of booking criteria might achieve this end. Because the specialist units absorb such a large proportion of maternity expenditure in comparison with the GP units, potential savings are much greater in this sector. For example, the mean length of stay for specialist units in Scotland is just over seven days, although there is considerable variation around this mean. In comparison with other countries, notably the USA, the length of stay is long and could be reduced. The cost savings of reducing length of stay by

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THE PRACTICAL APPROACH TO AUDIT

one day in a specialist unit is approximately £40. Across all specialist units in Scotland this would result in a saving of about £2¼ million (at 1976/77 prices). Some of this saving would be offset by costs incurred elsewhere (midwife visits, post-natal lying-in in GP units, and so on) but the savings would still be substantial. If savings are to be sought in the maternity sector, it is probably to the specialist units rather than the GP units that we must look.

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Perinatal mortality

The English and Welsh figures for children who die before their first birthday continue to show the trends which were given detailed consideration in the Black Report. Five thousand children were stillborn in 1979, another 4,000 died within a week of birth and a further 1,000 in the next three weeks; within the next 11 months, almost 3,000 more died, making a total of over 13,000 children. The social class gradient remains very striking, with the stillbirth rates for illegitimate births in social class 5 being double (10 per thousand total births) those in social class 1. Post-neonatal deaths (over 28 days of age and under one year) were eight per thousand and three per thousand live births in the same groups.

Source: *OPCS Monitor,* DH3 81/1.