Obstetric hospitals and general-practitioner maternity units—the statistical record

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SUMMARY. The share of general-practitioner units in the provision of maternity services, though minor, has increased since 1956, but their facilities have consistently been used less intensively than those of consultant obstetric hospitals. Their fetal and neonatal mortality rates, however, have consistently been much lower than in obstetric hospitals, a disparity which the higher proportion of births in hospital, recorded as being at above average risk, is not nearly enough to explain. These facts should be important considerations in any review of maternity services occasioned by changes in the birthrate.

Introduction

THE consultative document *Priorities for Health and Social Services in England,* issued in 1976 by the Department of Health and Social Security, drew attention to the decline in the birthrate and to the consequent need for a stringent review of the maternity services with a view to reducing their cost. For "between 1970 and 1973, the total number of births fell by 5·0 per cent a year, the number of (hospital) inpatient-cases fell by an average of 1·6 per cent a year, and the number of outpatient attendances by 2·6 per cent a year . . . the cost of the (hospital) service has risen by about four per cent a year and staff numbers have increased proportionately . . . The average cost per case rose by about six per cent a year in real terms" (para 4.24).

It was suggested (para 4.27) that "In some (localities) there may be a case for reducing levels of provision in consultant units; in others a better course would be to make available the resources of general-practitioner maternity units to other services which need them urgently. This, though naturally involving disappointment for general practitioners and those of their maternity patients who would prefer to have their babies in such units, would have the advantage of leaving intact the corpus of specialist expertise."

No evidence on costs or performance was put forward by which the relative merits of the two institutions might be judged and an informed policy of 'rationalization' developed. In some respects this omission can be made good by an analysis of published data, but in others published data cannot be separated by institution or do not exist at all.

The hospital services

Trends in births and in the provision and use of hospital services are shown in Table 1. In 1975 in England there were 4,273 maternity beds available in general-practitioner units and 16,984 in consultant units, equivalent respectively to 7·4 and 29·5 per 1,000 of the nation's births. Between 1970 and 1975 the total number of maternity beds fell, but the number of births fell much more so that, relative to births, provision became more generous in 1975. This is the reverse of what happened between 1960 and 1965, when provision failed to keep up with the increase in births. The secular increase in the number of beds was relatively greater in general-practitioner units: in 1956 they supplied 15 per cent, and in 1975 20 per cent of all maternity beds. Their share of inpatient discharges increased rather less, from 14 per cent of the total in 1956 to 18 per cent in 1975.

The number of patients using each available bed was always less in general-practitioner units than in consultant hospitals because, though in the former the average stay was also less, the average turnover interval—the period between the discharge of one patient and the admission of the next—was considerably longer. Longer turnover intervals are more likely in smaller units serving smaller catchment areas. Thus the proportion of the year when beds were occupied has been consistently lower in general-practitioner units. In 1975 it was only 42 per cent, compared with 67 per cent in the consultant units, i.e. the inpatient provisions of general-

Table 1. Births, provision, and use of hospital maternity services in England and Wales (1975 England only).

	Hospital	1956	1960	1965	1970	1975
Total births (thousands)		717	801	877	795	575
Available beds per 1,000 births	Consultant	23.0	20.0	19.5	23.3	29.5
	GP units	4.1	4.6	4.8	6.5	7.4
Discharges per 1,000 births	Consultant	599	592	681	847	1,000
	GP units	98	128	163	229	221
Average duration of stay (days)	Consultant	11.7	10.3	8.6	7.5	7.2
	GP units	10.8	9.5	7.6	6.1	5.2
Turnover interval (days)	Consultant	2.4	2.0	1.9	2.6	3.6
	GP units	4.2	3.6	3.1	4.3	7.1
Patient throughput per available bed	Consultant	26.0	29.5	34.9	36.3	33.9
	GP units	24.2	28.0	34.3	35.3	29.8
Beds occupied (percentage)	Consultant	*83.2*	*83.4*	*81.8*	*74.3*	*66.7*
	GP units	*71.8*	*72.6*	*71.2*	*58.8*	*42.0*
Births in hospital (percentage)	All NHS	*60.7*	*61.6*	*70.0*	*84.7*	*93.8*
Discharges per hospital birth	All NHS	1.15	1.17	1.21	1.26	1.30

Sources: Registrar General's Annual Statistical Reviews, Part II; OPCS *Population Trends;* Ministry of Health *Annual Reports;* DHSS Health and Personal Social Services Statistics and unpublished return for 1975.

practitioner units are much less intensively used.

Implementing official policy has rapidly increased the proportion of all births taking place in NHS hospitals at the expense of home deliveries. Of the total, those in general-practitioner units amounted to about 12 per cent until 1969, but by 1975 had fallen to seven per cent, whereas those in consultant units increased steadily from 49 per cent in 1958 to 88 per cent in 1975.

In 1956 there were 1·15 hospital discharges for every hospital birth; by 1975 this ratio had risen to 1·30, but the increase, at least from 1969, occurred only in general-practitioner units, where the ratio rose from 1·8 to 3·0; in consultant units it remained constant at 1·1. This means that beds in general-practitioner units have increasingly been used for antenatal inpatient care (or care of mothers delivered of fetuses too immature to count as births). Alternatively, discharges may include mothers admitted to general-practitioner units before or after, or indeed before and after, delivery, but transferred to obstetric units for delivery—a practice which must have increased since 1969 if it is to account for the rising discharge/birth ratio.

Costs

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.

Mortality

Standards of efficiency and quality of service are virtually impossible to measure and hence to compare, except in so far as they are reflected in mortality. Though there are no practical obstacles to recording the mortality of mothers, fetuses, and infants by place of delivery, it has not been routinely done.

The Reports of Confidential Enquiries into Maternal Deaths (1967 to 1969 and 1970 to 1972) give estimates of mortality by place of initial booking but, since less than one third of the fatal cases initially booked for general-practitioner units were actually delivered there for various reasons, these data cannot be used in assessing mortality by place of confinement.

Perinatal mortality

For infant and fetal mortality the published statistics

Table 2. Perinatal survey (1958)—proportional distribution of births.

Births	Consultant hospitals	General-practitioner units	Home	Number* (=100%)
All	*49.0*	*12.4*	*36.1*	16,994
Above average risk				
Parity 0	*64.9*	*16.2*	*16.2*	6,284
Parity 3+	*38.0*	*7.2*	*53.9*	2,842
Social classes 4, 5 and illegitimate	*49.3*	*11.5*	*38.2*	4,020
Toxaemia (all except mild)	*44.2*	*17.0*	*33.2*	3,329

*Includes a small number of births elsewhere. Source: Butler and Bonham (1963).

are sounder, but they are still far from complete, so that inferences drawn from them can be no more than indicative. In 1958 the perinatal experience of a nationwide cohort of births was surveyed (Butler and Bonham, 1963). For singletons the perinatal mortality rate was found to be 50·1 per 1,000 births in consultant hospitals, compared with 20·3 in general-practitioner units, and 19·8 at home. Hospitals, of course, have higher rates, not only because they admit emergency cases, unbooked or transferred late in pregnancy or in labour from general-practitioner units and home, but also because their stated policy is to book cases which, because of certain characteristics, are expected to be at higher than average risk. The survey quantified several of these characteristics, but related only three of them to place of delivery, parity and social class, which are known at the start of pregnancy, and maternal toxaemia, which develops during pregnancy. As regards these particular characteristics, the hospital population, apart from its preponderance of first births, had barely its fair share of above average risk cases (Table 2).

Table 3 shows perinatal mortality rates in broad sub-groups of parity, social class, and toxaemia in consultant and general-practitioner units. In all cases the former rate is much higher. I have compared elsewhere perinatal mortality rates of deliveries in consultant hospitals and at home (Tew, 1977a). To allow for differences in the proportion of births in each sub-group in consultant and general-practitioner units, a standardized rate can be calculated for general-practitioner units, assuming that they had the same proportion in each sub-group as the consultant hospitals. Standardizing thus in each of these three risk factors makes it clear that only a very small part of the disparity in rates can be explained by the greater proportion of high risk cases delivered in consultant hospitals.

Other maternal characteristics, such as age, health

Table 3. Perinatal survey (1958). Mortality rates per 1,000 births by place of birth and risk factors.

	Parity				
	0	1, 2	3+	All	Standardized rate
Consultant hospitals	43.2	47.6	83.2	50.1	50.1
General-practitioner units	24.1	16.2	19.5	20.3	20.9
	Social class				
	1, 2	3	4, 5, illeg.	All	
Consultant hospitals	38.9	48.6	58.6	49.4*	49.4*
General-practitioner units	17.7	18.7	25.6	20.1*	20.3*
	Toxaemia				
	None	Mild	Other	All	
Consultant hospitals	38.6	37.7	85.1	49.7**	49.7**
General-practitioner units	15.1	20.2	31.5	19.3**	20.3**

*Excludes 'not known'.
**Excludes 44 (out of 8,333) hospital births and 144 (out of 2,114) births in general-practitioner units for which detailed analysis is not given.

Table 4. Perinatal survey (1958). Proportion of births and mortality rates per 1,000 in risk groups, by gestation, birthweight, and place of birth.

	*High risk**		*Low risk***		*All*	
	%	Rate	%	Rate	Rate	Standardized rate
Gestation						
Consultant hospitals	*12.5*	220	*87.5*	24	47.9‡	47.9‡
General-practitioner units	*8.5*	78	*91.5*	13	18.6‡	21.3‡
Birthweight						
Consultant hospitals	*8.9*	328	*91.1*	22	49.5‡	49.5‡
General-practitioner units	*5.7*	137	*94.3*	12	19.3‡	23.3‡

*Gestation less than 38 weeks, birthweight 2,500 g and less.
**Remainder.
‡Excludes 'not known'.

status, and obstetric history were shown by the survey to be strongly associated with variations in perinatal mortality. Mothers with adverse experience may well have been concentrated in consultant units. But these factors were not analysed by place of delivery, so no data were provided to substantiate the repeated claim by the authors of the report that the high mortality in consultant hospitals is to be explained by the preponderance there of mothers at high risk. Analysis now in progress of the original material reveals that the consultant units did have a rather lower proportion of births at minimal predelivery risk (Fedrick, 1977).

The proportion of births occurring after short gestation (less than 38 weeks) or of low birthweight (2,500 g and less) was greater in consultant than in general-practitioner units, but again not to a degree which compensated for their much higher mortality rates (Table 4).

In 1970 a fresh cohort of births was investigated and for this sample the perinatal mortality rate was found to be 5·4 in general-practitioner units, 9·5 in general-practitioner beds in consultant hospitals, and 27·8 in obstetric beds in consultant hospitals (Royal College of Obstetricians and Gynaecologists and National Birthday Trust Fund, 1975). Because of the small number of deaths outside hospital, detailed analysis by place of delivery was not undertaken, but the wide disparity between rates in general-practitioner and obstetric consultant units, twice as great as in 1958, could be explained only by an overwhelming proportion of risk factors among the deliveries in consultant units.

Yet, unless the births in general-practitioner units were an unrepresentative sample, some must have been to mothers in the high risk categories, for of all births in general-practitioner units in 1970, 16 per cent were to mothers aged 30 and over, 46 per cent to mothers of parity 0 and 3 upwards, and six per cent were illegitimate, compared with 24, 51, and nine per cent respectively in consultant hospitals (Registrar General, 1970).

However, the sample may not have been representative, for its stillbirth rates were much lower than the Registrar General's rates for the year 1970, and the difference between its rates in general-practitioner and consultant units was even greater than for the total population in any year between 1969 and 1975. These manifold differences are illustrated in Table 5; standardizing the rate in general-practitioner units to allow for the smaller proportion of births there to mothers in high risk categories makes only a small contribution towards explaining the difference.

So far the available data have permitted standardization for only one risk factor at a time. The Registrar General's cross-classification of stillbirths by age and parity of mother shows that for those who are at high risk in both categories the rate is higher, but not so very much higher, than in at least one of the single high risk groups (Table 5). But it also shows that the proportion of births in the double high risk category is much lower than in either of the single high risk groups. Thus the net effect on the total average is small. For example, if (as in 1975) the mortality rate for 21 per cent of births (single high risks) is 13·7 and 10·3 for the remaining 79 per cent, the total average will be 11·0; if the mortality rate for 79 per cent is 10·3, for 11 per cent at single high risk it is 13·7, and for ten per cent at double high risk it is 16·8, then the total average will be 11·3. By including this double high risk group the total average increases by less than three per cent.

Cross-classification of perinatal mortality by more than two risk factors is rarely done, and then not by place of delivery. The Registrar General of Scotland regularly cross-classifies perinatal mortality by maternal age, parity, and social class, and the perinatal survey of 1958 also yielded a cross-classification of these three characteristics (Butler and Bonham, 1963) and one by

Table 5. Proportion of births and stillbirth rate per 1,000 in high risk groups, total stillbirth rates, actual and standardized, by place of delivery in England and Wales.

	Age		*Parity*		*Age/parity*	
Hospital	Consultant	GP unit	Consultant	GP unit	Consultant	GP unit
1969						
High risk*						
Percentage	*25.2*	*16.6*	*62.0*	*54.5*	*14.2*	*6.6*
Rate	21.4	7.0	17.4	5.3	23.2	9.3
All risk						
Rate actual	16.6	4.5	16.6	4.5	16.6	4.5
standardized	16.6	5.1	16.6	4.9	16.6	5.6
1972						
High risk*						
Percentage	*21.8*	*13.4*	*58.9*	*48.4*	*11.5*	*4.3*
Rate	18.1	3.6	15.2	3.2	20.6	5.8
All risk						
Rate actual	14.0	2.6	14.0	2.6	14.0	2.6
standardized	14.0	3.0	14.0	3.0	14.0	3.2
1975						
High risk*						
Percentage	*20.9*	*14.7*	*55.8*	*43.1*	*10.0*	*4.1*
Rate	13.7	3.0	12.4	3.3	16.8	5.0
All risk						
Rate actual	11.0	2.5	11.0	2.5	11.0	2.5
standardized	11.0	2.6	11.0	2.9	11.0	3.1

*Age 30 and over; parity 0 and 3 + and illegitimate.
Source: Registrar General's Annual Statistical Reviews Part II, and 1975 unpublished return.

maternal age, parity, and height (Butler and Alberman, 1969). Each of these demonstrates the principle that for births which are at high risk in all three categories the mortality rate is higher, but not so very much higher, than the rate for those at high risk in any two, while the proportion of births at triple high risk is much lower than in any of the double high risk groups. Thus their net effect on the total average is very small. For births that are at high risk on account of more than three factors, one can infer that their mortality rates are still higher, but the proportion of the total so affected still lower. The very high rate of a very small proportion of the total raises the total average only slightly.

The reason that the rate for the group at high risk, on account of both age and parity, does not greatly exceed the rate for the high risk age group is because the risks of age overlap to a considerable extent with those of parity. Other characteristics associated with perinatal mortality include the general health and stature of the mother, previous obstetric history, social class, diseases such as toxaemia arising during the pregnancy, and birthweight of the infant.

All these are to a greater or lesser degree interdependent. Multiparous mothers tend to be older and have had more time to accumulate an adverse obstetric history or to develop diseases, such as hypertension; mothers in social classes 4 and 5 tend to be shorter with poorer general health and a relatively large proportion have four children or more; toxaemia occurs most often in first, fourth, or subsequent pregnancies; low birthweight babies are born most often to mothers of low social class and of small stature and least often to those aged 20 to 29 or having their second or third babies.

Taking account of the risks associated with age and parity probably takes account of the greater part of the risk associated with one or more additional characteristics; as the multiplicity of high risk factors suffered increases, mortality rates increase, but by diminishing margins. At the same time, the proportion of births affected will decrease, so that the net effect on overall averages will be small.

By 1975, 88 per cent of all births were in consultant hospitals and, of these, 32 per cent were to mothers aged between 20 and 29 having their second or third legitimate baby—in fact 90 per cent of all mothers in this age/parity group. It is extremely unlikely that this substantial proportion at minimal risk was so heavily

outweighed by the proportion at very high risk that the total average was raised to a level 4·4 times the average rate in general-practitioner units.

The view has already been challenged (Tew, 1977b) that all births are safer in consultant hospitals than at home—the rationale of the official policy of providing for 100 per cent hospital confinements. Like those in general-practitioner units, perinatal mortality rates at home (when significant numbers of births took place there) were consistently much lower than in consultant hospitals and, so far as published data permit the analysis to be done, the disparity could be explained only to a very small extent by the greater proportion of births at high risk in hospital.

In Holland where there are financial obstacles to having normal deliveries in hospital, births which do take place there are at relatively high risk; yet it is doubted that this preponderance is sufficient to explain why, in 1970, for example, the perinatal rate for the 43 per cent of births in hospital was nearly five times as high as that for the 57 per cent of births at home (Huygen, 1976).

It is notoriously difficult to predict future trends in the birthrate and hence to make adequate but not excessive provision for the maternity services. But before deciding where to retrench, official policy should give full consideration to the record of each branch of the service, and to its cost in money and mortality.

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