Papers and Originals

Perinatal Mortality and the Organization of Obstetric Services in the Oxford Area in 1962

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Obstetrics is fortunate among the medical specialties in having available in the maternal and perinatal mortality rates statistics which can be used as indices of performance readily definable in terms of a population at risk. However, the maternal mortality rate is now happily so low that its effectiveness as an indicator is severely limited and increasing attention is being paid to perinatal mortality. The comprehensive analysis of a sample of perinatal deaths occurring in England and Wales in 1958 recently published by Butler and Bonham (1963) has emphasized the importance of ensuring that mothers with a high risk of perinatal mortality are booked for delivery in consultant units. It is now generally accepted that all mothers over the age of 35 years, grand multiparae (having had four or more children), nulliparae over the age of 30 years, and women with a history of complications in previous pregnancies should be included in this category (Ministry of Health, 1963). To these groups some authorities would add all women from social classes IV and V not included in the above (Godber, 1964).

In this paper a study is first made of the perinatal mortality experienced in the Oxford area in 1962 in relation to the place of confinement and the type of antenatal care which mothers received, and, secondly, of the variation in the use of consultant obstetric services by general practitioners, the factors which influence this, and its possible relationship to perinatal mortality.

Material and Method

In 1962 the population of the Oxford Record Linkage Study (O.R.L.S.) area consisted of the residents of the County Borough of Oxford, Oxfordshire (except Henley), and of the Municipal Borough and Rural District of Abingdon in Berkshire, comprising approximately 325,000 persons. Since January 1962, thanks to the co-operation of the obstetricians in the area, and to the three local medical officers of health, a record has been received for each confinement, whether at home or in hospital, and for each stillbirth and death.

In 1962 6,048 babies were born within the study area to resident mothers. Of these, 5,893 resulted from single births, while the remaining 155 were the result of multiple pregnancies. To simplify the analysis multiple births have been excluded. Standard information about each delivery was obtained, including identification data and important items of medical and social interest, by linking copies of the birth certificates and death certificates with extracts of the hospital or domiciliary maternity record.

In addition to the 6,048 babies mentioned above there were 379 born to mothers resident in the area for whom details of the delivery were not obtained. Of these, 333 were born outside the area and 46 were born in non-N.H.S. hospitals or nursing-homes within the area. There were 10 perinatal deaths in this group, giving a perinatal mortality rate of 26 per 1,000, which is almost identical to the figure of 25 per 1,000 experienced in the remaining cases.[1] In view of this and the small numbers involved these 379 cases are also excluded from the remainder of the analysis.

The data recorded on the birth and death certificates and maternity records were coded and punched on to eighty-column cards, and a summary card was prepared for each baby, including material selected from each source document. The analysis was carried out on business machines, supplemented where necessary by amplifying or confirmatory data obtained from the original records.

Obstetric Services

The obstetric services for the area consist of consultant units at the Teaching Hospital Group, which performed 48% of the deliveries, a combined consultant and G.P. unit at a district hospital (11%[2] of the deliveries), and three G.P. units, together accounting for 14% of the deliveries. The remaining 27% of deliveries took place at home.

It will become apparent from the text that one of the key factors in determining the pattern of obstetric care in general practice is the presence or absence of a local G.P. maternity unit. As indicated above, there are four such units of approximately equal size (varying from 10 to 12 beds) in the O.R.L.S. area, which in general provide the same facilities but differ in some of their characteristics. One unit is housed in the same building as a consultant unit, but the remainder are situated in small towns varying from 6 to 12 miles (9.5 to 19 km.) from the nearest consultant unit. General-practitioner units do not have a resident medical officer, and, with the exception made above, have no blood bank. Limited operating and anaesthetic facilities may be available, such as would permit the application of forceps or the use of surgical induction procedures, but caesarean sections are clearly out of the question in these units. The advantages that they offer compared with domiciliary practice are that a trained midwife is always immediately available, they have labour rooms, and they are more accessible to the ambulance and flying-squad services, a consideration which may be of great importance in bad weather. From the mother's point of view they offer an alternative to home delivery without the need to travel long distances from her own home.

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[1] Perinatal mortality is defined here as mortality occurring at birth and in the first week of life (that is, stillbirths and first-week deaths). All rates are expressed per 1,000 live and stillbirths.

[2] Six per cent. in the consultant beds; five per cent. in the G.P. beds.

A term which will be used in this study and requires definition is "place of booking." Ideally this should describe the type of obstetric care (consultant, G.P. unit, or G.P. domiciliary) for which the mother is selected at the time of her *first* contact with her doctor during pregnancy, and in the majority of cases it has been possible to classify mothers in this way. Thus, for example, the important group of mothers initially selected (booked) for G.P. care but later admitted as emergencies for delivery in consultant obstetric units are classified as "booked for G.P. care." However, it has become clear that there is also a small but important group of mothers initially selected for G.P. care who, after the development of a complication of pregnancy or for some other reason, are later booked for delivery under a consultant. In the present paper this group unfortunately cannot be distinguished from those cases selected for consultant care in the first instance, but it will be distinguished in future studies. We are satisfied that this shortcoming, if it has any material effect, will bias the issue in favour of G.P. care and will not vitiate any of the conclusions drawn here.

Results: Part I

In this section the perinatal mortality for the area is considered in relation to place of delivery and to the type of care for which mothers were booked.

Relationship of Place of Delivery to Perinatal Mortality

Table I shows the number of babies delivered at home, in G.P. units, and in consultant units, together with the perinatal mortality rate for each group. The proportion of the deliveries carried out in each type of centre is also shown. The proportion performed at home (27.3%) was slightly less than the national figure of 32% for 1962 (Registrar-General, 1964). In the majority of these the senior person present at the time of delivery was one of the midwives of the obstetric departments of the local authorities. Of the total deliveries 19.4% took place in G.P. units under the supervision of general practitioners, while the remainder (53.3%) occurred in consultant obstetric units. As might be expected, the perinatal mortality is lower for deliveries at home and at G.P. units (the slight difference between these two groups is not significant) than in consultant units. An important factor here is the selection of complicated cases for delivery in consultant hospitals.

TABLE I.—*Perinatal Mortality by Place of Delivery—Single Births, O.R.L.S. Area, 1962*

Place of Delivery	Perinatal Deaths	Deliveries		Perinatal Mortality Rate per 1,000
		No.	%	
Consultant units	111	3,140	53·3	35
G.P. units	12	1,141	19·4	11
Home	12	1,612	27·3	7
All births	135	5,893	100	25

Considerable caution is necessary in interpreting Table I. While it may appear commendable that so few babies are dying after delivery at home or in G.P. units in the area, this type of analysis cannot provide an adequate picture of the relative performance in the three groups of cases. Thus some patients are transferred to consultant care when a complication of pregnancy or labour has arisen, and in Table I the perinatal mortality associated with such cases is attributed to the consultant units.

In Table II perinatal mortality is shown according to the place for which the mothers were selected for their care throughout pregnancy and delivery (place of booking). Mothers booked for delivery at home or in G.P. units have been consolidated into one group, described as "booked for G.P. care." The miscellaneous group contains a small but important group of mothers who had not been booked for any form of care and who thus received no antenatal supervision, a small group of cases booked for delivery in non-N.H.S. nursing-homes or in hospitals outside the area but who were subsequently delivered as emergencies in one of the consultant units, and a further small group of mothers delivered as emergencies in consultant units for whom the type of booking could not be determined. The mothers booked for each form of care have been classified into three "risk groups," according to features apparent at the time of booking. The classification used is as follows:

Group I (high risk): all mothers over the age of 35 years, nulliparae over 30, multiparae having had four or more children, and mothers with a past history of stillbirth.

Group II (intermediate risk): all nulliparae not included in the above.

Group III (low risk): all other mothers.

Several important factors that influence perinatal mortality have been omitted from this classification because of lack of appropriate information in 1962. Thus group III contains a number of mothers who had suffered from toxaemia, haemorrhage, or other complications in earlier pregnancies. Nor has any account been taken of the mother's social class.

If the last column of Table II is considered first it can be seen that the perinatal mortality rate of cases booked for G.P. care (15 per 1,000 or 65% of the average) is significantly lower than that experienced in the consultant units (26 per 1,000 or 113% of the average) ($t=2.89$, $P<0.01$). In the National Birthday Trust Survey of 1958 (Butler and Bonham, 1963) the perinatal mortality of the consultant- and G.P.-booked cases was more closely similar (103% and 88% respectively) in spite of the fact that the proportion of cases booked for consultant care was slightly less. This other striking observation from this column is the particularly high perinatal mortality of the miscellaneous group. This is largely due to mothers who received no antenatal care, who, though amounting to only 0.7% of all cases, contributed 9% of the perinatal deaths.

The mortality of cases booked for consultant units (26 per 1,000) is less than that of deliveries that actually took place under consultant care (35 per 1,000). This is due not only to the delivery in consultant units of the small but dangerous group of cases with no antenatal care, but also to the transfer-in of cases booked for delivery at home or in G.P. units. Conversely, the perinatal mortality of cases booked for delivery in G.P. units or at home (15 per 1,000) is higher than the mortality

TABLE II.—*Perinatal Mortality of Mothers in Each Risk Group Booked for Consultant Units, G.P. Units, and Home Confinement*

Place of Booking for Delivery	Perinatal Mortality											
	Risk Group I			Risk Group II			Risk Group III			Total I–III		
	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000
Consultant care	22	715	31	27	1,081	25	23	1,025	22	72	2,821	26
G.P. care	11	525	21	18	744	24	17	1,740	10	46	3,009	15
Miscellaneous	6	17	353	7	26	269	4	20	200	17	63	270
Total	39	1,257	37	52	1,851	28	44	2,785	16	135	5,893	23

of those actually delivered under these circumstances (9 per 1,000). These opposing trends indicate that between the initial selection procedure (booking) and delivery a group of cases with a high perinatal mortality have been transferred from G.P. to consultant care. This group amounted to 256 babies (including 21 deaths).

For risk group I the mortality for G.P. cases is lower than that for consultant cases, but the difference is not statistically significant. This may well be due to selection within the group of the highest risk cases for consultant care, and it cannot safely be deduced from these figures that it is optimal for mothers in risk group I to be booked for G.P. care. It is noteworthy that the perinatal mortality of the G.P.-booked risk group I cases is twice that experienced by risk group III cases, though this difference is not statistically significant ($t=1.59$, $0.2>P>0.1$).

In risk group III the perinatal mortality for G.P.-booked cases is significantly lower than for the cases booked for consultant care. Again this probably reflects selection of complicated cases for consultant care, for, as has already been remarked, it was not possible from our 1962 data to exclude from this group young mothers with a complication of pregnancy or labour in their previous pregnancies.

Risk group II (young nulliparae) provides an interesting contrast to the others, as the perinatal mortality was identical in both consultant- and G.P.-booked cases. When illegitimate births are removed from both groups the figures become 21 per 1,000 for consultant cases and 24 for G.P. cases—despite the fact that selective factors are also likely to be operating against the consultants within this group. Thus cases initially selected for G.P. care but who were subsequently booked for delivery under consultant care because of the development of a complication of pregnancy appear in Table II as booked for consultant care, while nulliparous mothers with general medical diseases, such as diabetes and rheumatic heart disease, are also likely to be booked for consultant care. Moreover, an analysis of booking by social class shows that there was a tendency for social classes IV and V to be booked more commonly for consultant than for G.P. care. In those circumstances the fact that the perinatal mortality was equal in the two groups in 1962 was unsatisfactory. However, it would be premature to draw definite conclusions on this point from one year's data.

Cases Transferred as Emergencies from G.P. to Consultant Units

Cases originally booked for delivery at home or in a G.P. unit but eventually transferred to consultant units as emergency admissions carry an extremely high perinatal mortality (82 per 1,000). The emergency transfers to consultant care for each risk group expressed as a proportion of the number originally booked for delivery at home or in G.P. units were as follows: risk group I, 10% ; risk group II, 13.3% ; risk group III, 6%. It is interesting that young nulliparae (risk group II) had the highest risk of emergency transfer (13.3%), followed by group I (10%) and 6% in group III. These differences, which are significant ($\chi^2=35.2$, D.F.$=2$, $P<0.001$), clearly indicate the greater likelihood of the higher-risk cases developing complications that demand transfer to a consultant unit, and lend further weight to the importance of defining risk at time of booking on the basis of age, parity, etc.

Results: Part II

The remainder of this paper is devoted to a study of the variation in the use of consultant obstetric services by G.P.s, the influence of the relative accessibility of G.P. and consultant obstetric units on this variation, and its possible relationship to perinatal mortality. Fifty-five practices were selected for inclusion in this study. The criteria were that at least one partner should be registered to provide maternity services and that 95% or more of the mothers registered with the practice as resident in the area were delivered within the area. Nine practices on the fringe of the area and seven central practices in which neither partner was registered to provide maternity services were excluded. Mothers from each practice were included in the study irrespective of whether they received their obstetric care from their G.P.s or at a consultant hospital. It was not possible to identify mothers who were referred for their obstetric care to a colleague in general practice registered to provide maternity services, so that any such cases appear as belonging to the practice undertaking their obstetric care. As the women so referred would tend to be those suitable for domiciliary confinement it is possible that this would bias the results of the practices involved. It was thought that this would be minimized by the exclusion of practices in which no partners were registered to provide maternity services.

In all, 5,188 of the 5,893 single births and 116 of the 135 related perinatal deaths that occurred in the area during 1962 were included in the study. The overall perinatal mortality for the cases included (22 per 1,000) was almost identical to that of the excluded cases (25 per 1,000).

In Table III practices have been grouped into four classes according to the proportion of mothers booked for delivery in consultant units. Thus Class 1 contains practices booking less than 26% of mothers to consultant units. Class 2, those booking 26–50% ; Class 3, those booking 51–75% ; and Class 4, those booking over 75% of mothers. The number of practices in each class is shown in column 2, while the number of mothers belonging to each class is shown in column 3. In the last four columns are shown the proportions of all mothers and of the mothers in each risk group booked for consultant care for each class of practice. A wide variation is seen in the proportion of women booked for consultant care in different practices. Thus 18% of the practices, representing 24% of mothers in the survey, booked less than 26% of mothers for consultant care, while 15% of practices, representing 8% of the mothers, booked over 75% for consultant care. The largest proportion of practices (45%, representing 42% of mothers) booked from 51 to 75% of mothers for consultant care.

TABLE III.—*Practices Classified According to the Proportion of Mothers Booked for Consultant Care, Showing the Numbers of Practices and Mothers in Each Class, Together with the Proportion from Each Risk Group Booked for Consultant Care*

Class	No. of Practices	No. of Cases	Proportion of Cases Booked for Consultant Care			
			Risk Group			All
			I	II	III	
1. 0–25% booked for C.U.	10 (18%)	1,227 (24%)	28%	21%	15%	18%
2. 26–50% booked for C.U.	12 (22%)	1,372 (26%)	55%	55%	32%	42%
3. 51–75% booked for C.U.	25 (45%)	2,160 (42%)	65%	75%	49%	61%
4. 76–100% booked for C.U. ..	8 (15%)	429 (8%)	84%	88%	72%	79%
All groups ..	55 (100%)	5,188 (100%)	55%	57%	36%	46%

When the proportion of mothers booked for consultant care from each risk group is examined for each class of practice, a wide variation is also observed for each risk group separately. The factors which influence G.P.s when they determine their booking policy may therefore have important implications.

In Tables IV–VI two such factors are considered—namely, the distance that mothers have to travel to consultant units for antenatal care, and the presence locally of alternative hospital facilities where mothers can be delivered under the care of their own G.P.

Effect of Distance and Presence of Local G.P. Units in Booking of Mothers for Delivery Under Consultant Care

In Table IV practices have been divided into two groups according to the presence or absence of easily accessible G.P.-unit beds. Practices were classified as having access to G.P. units when the distance to such a unit was less than the distance to the nearest consultant unit. In the special case where G.P. and consultant beds are housed in the same unit the local practices were included in the group having access to G.P. units. Each of these two main groups of practices has been further subdivided according to the distance between the surgery and the nearest consultant unit. As an index of distance, the actual travelling-time by public transport from the address of each practice to the nearest consultant unit was obtained from the official bus time-table. It is important to note that this time does not represent door-to-door travelling-time, which in many instances would be much longer than that shown. This would apply particularly in the rural areas, where, in addition, infrequency of services undoubtedly adds to the travelling difficulties of mothers having to make regular visits to consultant hospitals for their antenatal care. The number of practices contained in each of these divisions, the total number of births and perinatal deaths, the number and proportion of cases booked for consultant care, and the perinatal mortality rate per 1,000 births for each subdivision are also shown.

Table IV shows that the proportion of mothers booked for consultant care when G.P. units are accessible (28%) is considerably less than when such facilities are not available (53%). Moreover, the perinatal mortality in the practices with access to G.P. units (28 per 1,000) is significantly higher than in the practices without access to G.P. units (19 per 1,000) ($t=2.22$, $0.05>P>0.01$).

When the effect of distance from consultant units is considered it is seen that where G.P. beds are available booking of mothers for consultant care decreases rapidly as the distance increases. There is also a significant trend for perinatal mortality to increase in association with this ($\chi^2=8.73$, D.F.$=2$, $0.02>P>0.01$). In contrast, when G.P. facilities are not available, distance appears to exert little influence on the proportion of mothers booked for consultant care. Neither is there any material variation in perinatal mortality with distance in this group.

In Fig. 1 the proportion of mothers from each risk group booked for delivery in consultant units (hatched), G.P. units (stippled), or at home (white) is shown for practices with access to G.P. units (on the left of the Figure) and for those without (on the right). In Fig. 2 the same information is shown for the same groups of practices further subdivided by distance from the nearest consultant unit.

Fig. 1 shows that in practices with access to G.P. units 38% of risk group I mothers are booked for consultant care, followed by 29% from risk group II, and 24% from risk group III. For practices without access to G.P. units the corresponding figures are 66%, 71%, and 43%. Thus for each risk group separately a smaller proportion of mothers is booked for consultant care from practices with access to G.P. units than from those without. It is thus clear that for practices where there is convenient access to a G.P. unit the latter is used to some extent as an alternative to consultant units. On the other hand, the presence of an accessible G.P. unit also leads to a reduction in the proportion of mothers from each risk group booked for confinement at home.

The additional effect of distance on the booking for consultant units is examined in Fig. 2. In practices without access to G.P. units the overall bookings for those which are 21–40 minutes and over 40 minutes from a consultant unit are only slightly less than for practices 0–20 minutes from a consultant unit, and the proportion of risk group I mothers is virtually identical. In other words, mothers are obviously prepared to travel long distances to hospital for their antenatal care and delivery if no alternative facility is available locally. In contrast, it is seen that when G.P. beds are available, booking for consultant units for all risk groups declines sharply as distance increases. For practices 0–20 minutes from a consultant unit the proportion of the highest-risk mothers so booked (53%) is in fact not much less than for practices without access to G.P. units (62%), but the proportion falls to 38% for practices 21–40 minutes from a consultant unit and to only 12% for practices over 40 minutes from such unit. In the case of the first two groups of practices the highest proportions booked for consultant care are from risk group I, followed by risk group II and risk group III. However, in the case of the practices 40 minutes from a consultant unit the proportions of mothers selected for consultant care from the three risk groups are identical. Thus distance makes no appreciable difference to the proportion of high-risk mothers booked for consultant units when the only alternative is domiciliary confinement; but when G.P. beds are available locally distance has a profound effect on the booking of all risk groups of mothers for consultant care.

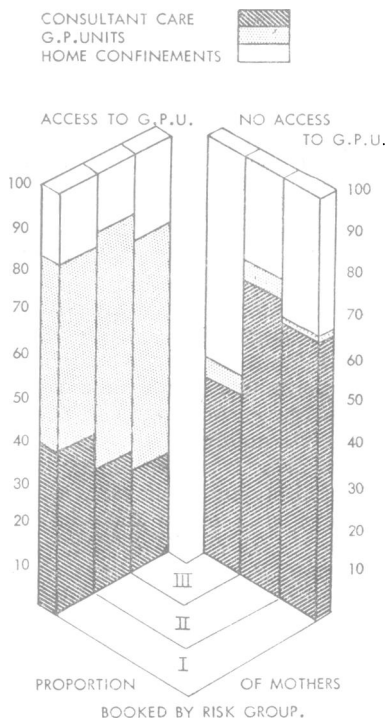

FIG. 1.—Proportion of mothers booked for delivery in consultant units, G.P. units, and at home, by risk group for practices with and without access to G.P. units.

In Table V the perinatal mortality is shown for each risk group in practices with and without access to G.P. units. As shown in Table IV, the overall perinatal mortality for practices

TABLE IV.—*Proportion of Cases Booked and the Perinatal Mortality Rate by Travelling Time to the Nearest Consultant Unit for Practices with and without Access to G.P. Units*

Travelling-time to Consultant Unit	Practices with Access to G.P. Units				Practices without Access to G.P. Units			
	No. of Practices	No. of Cases	Cases Booked for Consultant Care	Perinatal Mortality Rate per 1,000	No. of Practices	No. of Cases	Cases Booked for Consultant Care	Perinatal Mortality Rate per 1,000
0–20 minutes	4	537	42%	20	25	2,057	60%	18
21–40 ,,	8	1,078	27%	28	6	693	49%	22
Over 40 ,,	5	293	9%	44	7	530	52%	21
Total	17	1,908	28%	28	38	3,280	53%	19

with access to G.P. units is significantly greater than for practices without access to G.P. units. The perinatal mortality in risk group I mothers from practices with access to G.P. units (47 per 1,000) is significantly higher than for the remaining practices (19 per 1,000) ($t=2.54$, $0.02>P>0.01$). For group II mothers the perinatal mortality is also slightly higher for the practices with access to G.P. units than for those without, but the difference is not significant ($t=1.76$, $0.1>P>0.05$). In the case of risk group III mothers, however, there is virtually no difference in perinatal mortality between the two groups of practices.

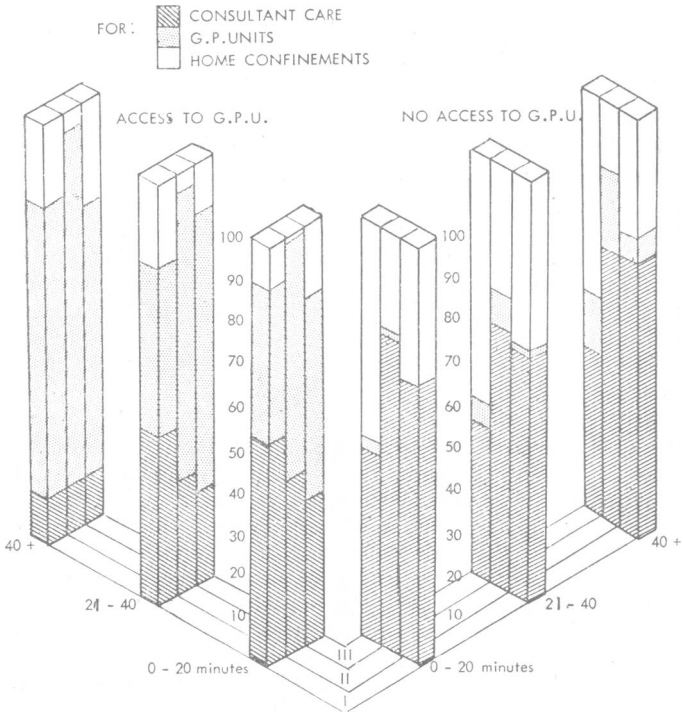

FIG. 2.—Proportion of mothers booked for delivery in consultant units, G.P. units, and at home by risk group, and distance from the nearest consultant unit, for practices with and without access to G.P. units.

The important issue raised by Table V and Figs. 1 and 2 is to what extent the higher perinatal mortality of the practices with access to G.P. units is related to the type of care experienced by high-risk mothers in these practices and to what extent to the existence of a less favourable population from the obstetric point of view.

To indicate whether or not the mothers in each of the groups of practices in Table V are in fact comparable, the distribution by perinatal risk group (as previously defined) for each group is shown in Fig. 3. It is virtually identical.

When a similar comparison was made by social class it was found that there were minor differences between the two main groups of practices. However, these were such that from the obstetric point of view they would tend to act in favour of the practices with access to G.P. units.

In Fig. 4 the distribution of birth weight of the babies born in the two groups of practices is shown. It can be seen that there was no material difference between the two in the proportions of babies in each birth-weight group. The higher perinatal mortality of practices with access to G.P. units can therefore not be explained by a greater proportion of premature babies.

A comparison was also made between the causes of perinatal death in the two groups of practices. A detailed study was impracticable because the number of deaths was small and because of differences in the necropsy rate. However, no material differences were found in the number of deaths due to major congenital malformations nor in the number of macerated stillbirths. Further comparison will be made as new data accumulate.

Perinatal Mortality and Type of Obstetric Care

In the previous section it has been shown that practices with and without access to G.P. units are closely comparable in respect of the proportions of mothers in the various risk groups, in their social class structure, in the distribution of birth weight, and the proportions of perinatal deaths attributed to congenital malformations and macerated stillbirths. In view

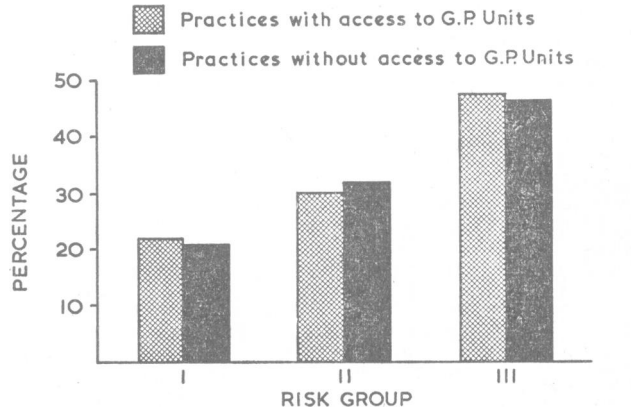

FIG. 3.—Proportions of each risk group in mothers from practices with and without access to G.P. units.

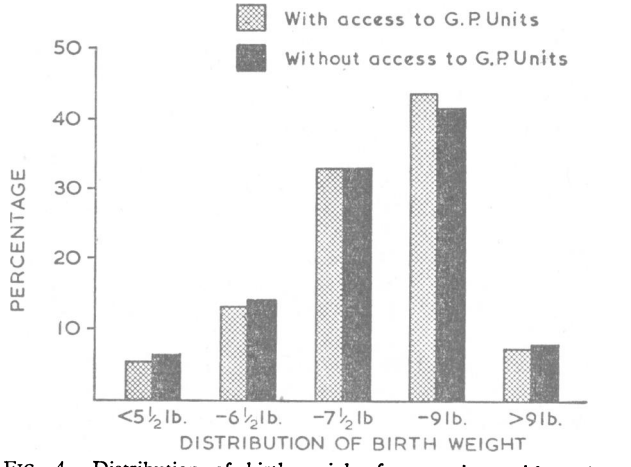

FIG. 4.—Distribution of birth weight for practices with and without access to G.P. units.

TABLE V.—*Perinatal Mortality by Risk Group for Practices with and without Access to G.P. Units*

Type of Practice	Risk Group I			Risk Group II			Risk Group III			Total I-III		
	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000	Perinatal Deaths	All	Perinatal Mortality Rate per 1,000
Practices with access to G.P. units	20	425	47	22	581	38	12	902	13	54	1,908	28
Practices without access to G.P. units	13	678	19	24	1,059	22	25	1,543	16	62	3,280	19
Total	33	1,103	30	46	1,640	28	37	2,445	15	116	5,188	22

of this evidence against there being important differences in the overall obstetric risk of the two populations the possibility was examined that the higher perinatal mortality in practices with access to G.P. units might be due to less satisfactory obstetric care.

Table VI shows the perinatal mortality in the two classes of practices according to the type of care for which the mother was booked. Mothers in risk groups I and II have been combined and are shown separately from the remainder. The Table shows that for high-risk mothers perinatal mortality is twice as high (42 per 1,000) in practices with access to G.P. units as in practices without (21 per 1,000) ($t=2.8$, $0.01>P>0.001$). For risk group III mothers, however, the perinatal mortality is similar in the two classes of practice. A further interesting feature is that for practices with access to G.P. units the perinatal mortality is three times higher for mothers at risk (42 per 1,000) than the remainder (13 per 1,000), while for practices without access to G.P. units there is very little difference in the mortality of the two groups (21 and 16 per 1,000).

TABLE VI.—*Perinatal Mortality for High-risk and Low-risk Mothers for Practices with and without Access to G.P. Units According to Place of Booking*

Type of Booking	Risk Groups I and II			Risk Group III		
	Perinatal Deaths	All Births	Mortality Rate per 1,000	Perinatal Deaths	All Births	Mortality Rate per 1,000
Practices with Access to G.P. Units						
Booked for consultant care ..	16	327	49	5	212	24
Booked for G.P. care	20	670	30	7	687	10
Other	6	9	660	0	3	0
Total ..	42	1,006	42	12	902	13
Practices without Access to G.P. Units						
Booked for consultant care ..	22	1,194	18	13	651	20
Booked for G.P. care	9	528	17	11	887	12
Other	6	15	400	1	5	0
Total ..	37	1,737	21	25	1,543	16

The other comparisons between the practices possible from Table VI—that is, between the mortality of cases booked for consultant and G.P. care—are complicated by two factors. The first is that, as has already been stressed, the proportions of mothers booked for consultant care are very different in the two classes of practices. Thus in practices with access to G.P. units, where only 33% of mothers at risk were booked for consultant care, the very high perinatal mortality (49 per 1,000) as compared with the other group of practices, where 69% of mothers at risk were booked (18 per 1,000), may be due to the fact that selection for consultant care was limited to the most unfavourable cases.

The second difficulty is that further analysis by date of booking showed that practices with access to G.P. units on average booked cases for consultant care later in pregnancy than did other practices. The possibility arises that, where G.P. units are available, booking for consultant care sometimes represents a secondary selection of cases after the development of a complication of pregnancy (see introductory section). Under these circumstances the figure for the perinatal mortality of mothers at risk booked for G.P. care in practices with access to G.P. units (30 per 1,000) may underestimate the true state of affairs. Nevertheless the fact remains that the analysis in Table VI does not show any positive evidence that the differences in perinatal mortality experienced between the two groups of practices are due to differences in the quality of obstetric care; neither does the analysis exclude this possibility. It is hoped that further study will clarify the issue.

Discussion

Perhaps one of the most important contributions of the first report of the National Birthday Trust (Butler and Bonham, 1963) was to distinguish in its analysis the consultant maternity unit from the obstetric unit run by general practitioners (G.P. unit). As the authors point out, the lack of operating and anaesthetic facilities, of a blood bank, or of a resident medical officer in these units makes it more appropriate to consider them as "collective domiciliary obstetrics under good conditions rather than as an obstetric hospital." Up to this time the distinction made had been between hospital obstetrics and domiciliary obstetrics, and neither in the Cranbrook Report (Ministry of Health, 1959), nor in the Hospital Plan for England and Wales (National Health Service, 1962), nor in a recent circular to all maternity liaison committees from the Ministry of Health (Godber, 1964) are general-practitioner and consultant beds dealt with separately, nor is it implied that these types of bed have different functions.

According to Butler and Bonham (1963) 13% of the births in their national sample took place in G.P. units. A proper delineation of the function of G.P. units is thus vital to the whole future planning of the maternity services. In the Oxford area this type of unit accounted for almost one-fifth of the deliveries in 1962, and this and the existence of a system of linked records give us a special opportunity to make a contribution in this field.

This study raises two major points concerning the use of the G.P. obstetric services. The first concerns the optimal place of booking of young mothers having their first hospital confinement, who contribute about one-third of all births. The evidence in the literature is unsatisfactory. The Cranbrook Report stresses the wide differences of opinion submitted in evidence to the committee, and gives no guidance on this point. Butler and Bonham (1963), dealing with nulliparous women of all ages, found a survey mortality ratio of 100% in women booked for G.P. units as compared with a figure of 98% for consultant hospital bookings and 105% for home bookings. Such figures could be regarded as satisfactory only if the cases delivered under these three differing sets of circumstances were comparable as regards obstetric risk. Unfortunately information on which the degree of selection for consultant care can be judged is lacking, though it is clear from other tables that the consultant units had to deal with a disproportionate number of illegitimate births. In Butler and Bonham's material 23% of all the nulliparous mothers booked for care in G.P. units or at home had to be transferred to consultant care either late in pregnancy or in labour.

The results reported in this paper for young nulliparae are similar to those of Butler and Bonham. The perinatal mortality of cases booked for consultant and G.P. care is similar, and the emergency transfer rate is higher than for the other two groups. However, the numbers are at present too small to permit any statements with regard to policy.

The second issue raised by this study concerns the effect of the presence of an accessible G.P. unit in the booking policy of G.P.s. There is definite evidence that in this area G.P. units are used as an alternative not only to domiciliary care but also to consultant care (Figs. 1 and 2), and that this use of these beds extends to mothers whom it is generally agreed should be cared for where full obstetric facilities are available. It is also clear that where no G.P. unit is accessible, practitioners are able to persuade mothers to attend for consultant care as frequently when this involves a long journey as when the consultant unit is conveniently placed. In contrast, where a G.P. unit is accessible to patient and practitioner the proportion of mothers selected for consultant care falls off sharply with distance. It is difficult to be certain to what extent this failure reflects the attitude of the mother or the attitude of the G.P. to the relative merits of consultant and G.P. care. This merits further study.

Summary and Conclusions

The perinatal mortality for 5,893 single births occurring in the Oxford area in 1962 has been studied in relation to the local organization of maternity services. The perinatal mortality rate for single births was 23 per 1,000, and 25 per 1,000 for all births, results which compare favourably with those in other parts of England and Wales.

Of the mothers 48% had been booked for consultant care, 51% for care under general practitioners either at home or in G.P. maternity units, and a little under 1% had not been booked for any type of care. When the mothers were classified into three risk groups according to features evident at the time of booking (maternal age, parity, and a previous history of stillbirth) it was found that 57% of risk group I (all women aged 35 years or more, nulliparae aged 30 years or more, multiparae having had four or more children, and women with a past history of stillbirth), 58% of risk group II (nulliparae under 30 years), and 37% of the remainder had been booked for consultant care.

For risk groups I and III the perinatal mortality rate was higher in consultant- than in G.P.-booked cases, a situation which at least in part reflects selection of difficult cases for consultant care within these groups. For young nulliparae, however (risk-group II), the perinatal mortality for legitimate births in 1962 was slightly higher in mothers booked for G.P. care (24 per 1,000) than in those booked for consultant care (21 per 1,000). This group also experienced the highest rate of emergency transfer to consultant care late in pregnancy or in labour (13%).

In a study of 55 general practices a wide variation was found between practices in the proportions of mothers booked for consultant care. This was also present when each risk group was considered separately. Two important factors which influenced this variation were found. Firstly, the presence of a local G.P. obstetric unit greatly reduced the proportion of mothers booked for consultant care in each risk group. Secondly, when a G.P. obstetric unit was accessible to practices, increasing distance from a consultant unit further depressed the proportion of mothers in each risk group booked for consultant care. A reduction in consultant bookings with distance did not occur where no G.P. unit was accessible to practices.

The perinatal mortality was significantly higher in practices with access to G.P. units (28 per 1,000) than in those without such access (19 per 1,000), and further analysis showed that this difference was limited to mothers in risk groups I and II. No evidence was found to support the hypothesis that the higher mortality in practices with access to G.P. units was due to an inherently less favourable population from the obstetric point of view, nor was it possible to show that differences in the arrangements for obstetric care were responsible.

We wish to thank the medical officers of health, obstetricians, general practitioners, midwives, and matrons of the maternity units in the Oxford Record Linkage Study area for their helpful co-operation, without which this study would not have been possible. We are particularly grateful to Miss A. M. Lamb, Miss P. Millar, and Miss E. Richards, the supervisors of the three domiciliary midwifery services of the area, for their assistance in the collection of information about mothers who received domiciliary obstetric care.

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Plasma Renin Concentration in Human Hypertension III: Renin in Relation to Complications of Hypertension

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We have previously shown, in a large series of patients with hypertension, that plasma renin concentration is inversely related to plasma sodium, and that this relationship is apparently independent of aetiology, severity of the hypertension, and treatment. A separate analysis has also been made of plasma renin in relation to aetiology (Brown *et al.*, 1965a, 1965b, 1965c). In the present paper we consider variations in renin and sodium in relation to certain complications of the hypertension—namely, the malignant phase, cardiac failure, and renal failure.

The clinical material and the methods used in this study are as given previously (Brown *et al.*, 1965b). As the hypertensive series has enlarged progressively since the previous papers were prepared, data on additional cases have been included (cf. Brown *et al.*, 1965b, 1965c; Barraclough *et al.*, 1965). The present results are based on a study of 293 hypertensive patients.

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I. Malignant Phase of Hypertension

The term "malignant hypertension" has been used in slightly different senses by previous writers, but generally implies severe elevation of the blood-pressure with very limited prognosis if untreated. Ophthalmoscopically, the malignant phase is characterized by retinal haemorrhages, exudates, and papilloedema. Histologically the essential lesion is fibrinoid arteriolar necrosis, especially of the afferent glomerular arterioles.

(a) Relationship between Retinopathy and Renal Histology

Renal histology was studied in 104 patients, in nearly all instances on biopsy material. Fibrinoid arteriolar necroses were found in 11 out of 16 cases with bilateral retinal haemorrhages,