HOME BIRTHS SURVEY :

THE RISK OF PERINATAL DEATH BY INTENDED PLACE OF DELIVERY FOR BIRTHS AT HOME IN 1979

RONA CAMPBELL

Submitted for degree of Doctor of Philosophy

London School of Hygiene and Tropical Medicine

Faculty of Community Medicine

London University

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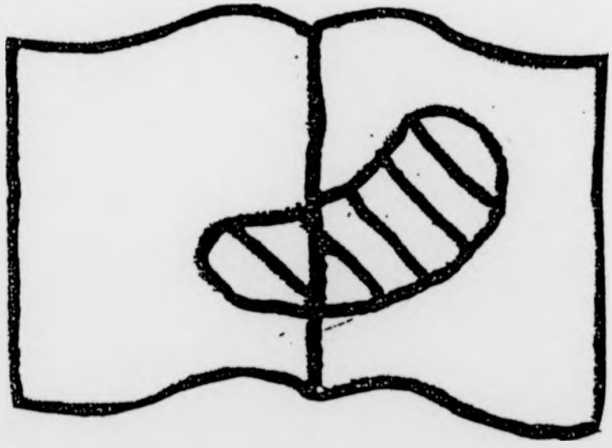

ABSTRACT

Births occurring at home in England and Wales declined from 85 per cent of all births in 1927 to 1.2 per cent in 1980. During this period successive committees recommended further reductions and eventually the phasing out of home births on the grounds that hospital deliveries were safer. Perinatal and infant mortality rates for place of delivery have only been available for England and Wales since 1975. These data showed that the perinatal mortality rate for home births was rising and from 1977 onwards had risen to a level above that for hospital births. It was suggested that this apparent increase in the risk of perinatal death for babies born at home was artifactual; the result of an increase in the number of unplanned births at home (carrying a high risk of perinatal death) relative to the number of planned home deliveries.

Having described the historical background this thesis reports on a survey which was carried out to establish the intended place of delivery of the 8856 births which occurred at home in 1979 as these data were not collected routinely. The results of the survey showed that 67 per cent of these births had been booked for delivery at home, 21 per cent had been booked for delivery in hospital, 3 per cent were unbooked and for 9 per cent the intended place of delivery was unknown. Perinatal mortality varied almost 50 fold according to the intended place of delivery. The rate for those planning to give birth at home was 4.1 per 1000 while for those who were unbooked the rate was 196.6 per 1000. For mothers booked for delivery in consultant units the rate was 67.5 per 1000.

Births booked for delivery at home included the smallest proportion of babies weighing 2500 grams or less at birth: 2.5 per cent compared with 18 per cent for those booked for delivery in consultant units. Within the low birthweight band perinatal mortality was lowest for planned home births. Among babies who weighed more than 2500 grams at birth perinatal mortality was uniformly low irrespective of the intended place of delivery; the only exception was unbooked deliveries. In all groups perinatal mortality was significantly higher for nulliparous than for parous women.

When data derived from the survey were used to standardise the overall perinatal mortality rate for births occurring at home, the results suggested that perinatal mortality among home births declined at about the same rate as that for all births.

The results of the survey showed clearly that women planning to give birth at home were a select group, and indeed some may have transferred to hospital during labour and thus were not included in the survey. Nevertheless, these data suggest that planned delivery at home is compatible with a low risk of perinatal death.

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DEDICATION

To Alistair and Doreen my parents

and Gabriel my friend.

Glossary of Terms

Place of delivery

This is the place in which the birth actually occurs. In the Home Births Survey only births occurring at the mother's normal home address or those births occurring outside hospital and at an address other than the mother's normal home address were considered.

Intended place of delivery

This is the place in which it is intended that the mother give birth. For the purposes of the Home Births Survey, this was defined as the intended place of delivery immediately before the onset of labour. Thus, the intended place was that noted on midwifery notes as to where it was planned that the delivery take place.

Booking for delivery

When it is established that a woman is pregnant and antenatal care sought, the mother is "booked" for delivery. This means that the appropriate services are booked for the time around the estimated date of delivery.

Unbooked

This means that no booking for delivery has been made.

Home birth

This is simply a birth which occurs at home whether it was intended that the baby should be born there or not.

"Elsewhere" births

These are births occurring outside hospital and at an address other than the mother's normal home address. This category includes births occurring at an address other than the mother's normal home address and those occurring in transit while the mother is in labour and on her way to hospital.

Concealed pregnancy

This is a pregnancy which is successfully hidden by the mother often until a time close to the actual date of delivery and sometimes even the delivery itself is concealed.

Stillbirth

A stillborn child is defined as "a child which has issued forth from its mother after the 28th week of pregnancy and which did not at any time after being completely expelled from its mother breathe or show any signs of life". In addition to the statutory definition there is an explanatory note on the stillbirth certificate which says "A child which has breathed or shown any other sign of life, such as the beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles is considered as liveborn for statistical purposes".

Perinatal mortality rate

Is the number of stillbirths plus the number of deaths occurring during the first week of life per 1,000 total births, i.e. live and stillbirths.

Parity

Total number of previous livebirths and stillbirths.

Gravidity

Total number of previous pregnancies.

Gestational Age

This was calculated as the number of complete weeks which had elapsed since the first day of the last menstrual period to the date of birth.

Birthweight

This was recorded in grams. Low birthweight was defined as any baby weighing less than 2501 grams.

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Historical Background

> " Midwifery is an unusually emotive subject so a priori a very high standard of statistical analysis would not be expected. Even so it is surprising how successive committees have been content to accept trends as something God-given which must be followed, instead of demanding a more rigorous analysis looking into causality." (1)

In 1927 in England and Wales 85 per cent of deliveries occurred at home. The remainder took place in hospitals, nursing homes, maternity homes and poor law institutions (2). A survey of all births taking place in one week in 1946 revealed that 54 per cent of mothers were being delivered in hospital (3) and by 1983 only 1.0 per cent of deliveries occurred at home. (4)

The move from home delivery to hospital delivery has been accompanied by a change in the type of hospital care provided, the trend being towards care in large specialised obstetric units. Clearly, such a change in emphasis, both in the move from home to hospital and the progression towards consultant care, together with an increasing stress on antenatal care and the advent of preconceptional care, is suggestive of a change in the way in which our society views pregnancy and childbirth.

This idea has found expression in the hypothesis of the medicalisation of pregnancy and childbirth (5) which postulates that there has been a shift from a conception of pregnancy and childbirth as essentially natural events requiring minimal intervention, to the concept of pregnancy and childbirth as hazardous events in which medical assistance and intervention is often required. (6)

This alteration in attitude towards childbirth and hence towards the place of birth, is well illustrated in the wording of a series of policy documents on the maternity services in Britain.

In 1936 the view of the British Medical Association was that normal deliveries should be conducted at home:

> " all the available evidence demonstrates that normal confinements and those which show only a minor departure from normal, can be more safely conducted at home than in hospital" (7)

This echoes a previous recommendation by the British Medical Association, made in 1929, that doctors should examine all their maternity cases between the 32nd and 36th week of pregnancy and decide whether:

> " (a) the case appears to be normal and can probably be safely attended at home by the midwife;
> (b) there are such conditions as make it desirable that the doctor should be present at the confinement at the patient's home;
> (c) that future antenatal examinations or treatment are necessary;
> (d) that there are such abnormalities present as make it desirable that delivery should take place in hospital." (8)

At this time hospital delivery seems to have been viewed as a last resort but by 1944 the Royal College of Obstetricians and Gynaecologists was recommending that 70 per cent of all deliveries should take place in hospital (9), a suggestion which was adopted by the Cranbrook Committee in 1959 when it recommended that:

> " sufficient hospital maternity beds to provide for a national average of 70 per cent of all confinements to take place in hospital should be adequate to meet the needs of all women in whose case the balance of advantage appears to favour confinement in hospital" (10)

This desired level of 70 per cent was achieved at the end of 1964. (11)

The advent of the Peel Report in 1970 saw the first indication of a vision of the maternity service without the option of home delivery. It also stated explicitly the belief that hospital delivery is safer than home for all women.

> " We consider that the greater safety of hospital confinement for mother and child justifies the objective of providing sufficient hospital facilities for every women who desires or needs to have a hospital confinement. Even without specific policy direction the institutional confinement rate has risen from 64.6 per cent in 1957 to 80.7 per cent in 1968, and shows every sign of continuing to rise, so that discussion of the advantages and disadvantages of home and hospital is in one sense academic." (11)

The Peel Committee went on in a later paragraph to say that

> " we think that sufficient facilities should be provided to allow for 100 per cent hospital delivery. The greater safety of hospital confinement for mother and child justifies this objective"

The Peel Committee's evidence to support this recommendation consisted of an allusion to the declining perinatal mortality rate and an increase in the proportion of deliveries taking place in hospital. The casual nature of this temporal association has been disputed and subsequent statistical and epidemiological analysis suggests that the relationship is coincidental. (12 - 14)

The failure of the Peel Committee to produce detailed evidence to support its claims, highlights one of the most regrettable features of the long, intense debate on the most appropriate and safest place for a mother to give birth. This is the absence of a rigorous evaluation of the available statistical and epidemiological evidence. Had such a review ever taken place however, it is by no means certain, given "the relative power of overt political factors such as that possessed by a group of

clinicians or the treasurer's department compared with the power of evidence derived from scientific enquiries" (15) that the pattern of maternity care in Britain today would be any different.

The following review takes a critical look at the various attempts to produce estimates of the relative risk of perinatal death in alternative places of delivery, under different systems of care.

Criteria and Evaluation

To achieve unbiased comparisons between the outcome for a mother giving birth at home and that associated with delivery in locations other than the mother's home, a number of considerations have to be taken into account, notably:-

1. The outcome measurements to be used.
2. The different delivery locations and how these equate with the different types of care provided, and in particular, the importance of the distinction between the actual and intended place of delivery.
3. The biological, social and medical processes operating which may influence the choice of place of delivery. These can act as confounding factors, being related to both the place of delivery and the outcome, and as such need to be taken into account when making comparisons.

Measurements of Outcome

Broadly speaking the outcome of a series of births may be measured in terms of the mortality of both mother and baby, morbidity and the level of parental satisfaction. As a measurement of outcome, mortality has the advantage of being a definitive event; morbidity and levels of satisfaction are notoriously difficult to measure.

Perinatal Mortality

The crude perinatal mortality rate is a composite statistic detailing the numbers of stillbirths and early neonatal deaths in a defined population of live and stillbirths. It is often used as an indicator of the quality of obstetric care. This can be misleading as the incidence of lethal congenital malformations and the proportion of low birthweight babies, both powerful determinants of perinatal mortality, vary according to a whole range of demographic, social, economic and biological factors which are mainly beyond the control of the health services. (16) Congenital malformations have been reported to account for 20 per cent of perinatal deaths in England and Wales, (17) 26 per cent in Scotland and 34.1 per cent in Bristol. (18) (19) Furthermore, excluding deaths resulting from congenital malformations, 67 per cent of perinatal deaths in England and Wales in 1983 were to babies weighing less than 2500 grams. (20)

As currently, many severe congenital abnormalities cannot be prevented once the mother has conceived, such abnormalities should be excluded from analyses investigating the effectiveness of obstetric care around the time of delivery.

Three different methods of birthweight standardisation have been suggested. The simplest of these, proposed by Chalmers et al, (21) divides births into two groups, those weighing 2000 grams or less and those over 2000 grams. The other methods (22) (23) involve the use of a greater number of birthweight intervals. This is clearly more satisfactory as birthweights at the lower end of the spectrum are associated with a significantly higher mortality. In 1980 11.5 per cent of all babies under 2,500 grams, weighed less than 1500 grams. Yet the

mortality in the group weighing less than 1500 grams accounted for 56.7 per cent of the deaths to low birthweight babies. (24)

As Macfarlane and her colleagues point out, standardisation is useful in providing a summary statistic but it tends to obscure mortality trends within birthweight groups. (17) Clearly, the "sine qua non" is to make comparisons between birthweight specific mortality rates from which infants with severe congenital malformations have been excluded. Given the limitations of routine data collection and the statistical problems associated with small numbers of deaths, this may not always be possible.

Maternal Mortality

Today thankfully, maternal death is a rare event. In 1981 the maternal mortality rate was 10 per 100,000 total births.

TABLE 1.1 INITIAL BOOKING ARRANGEMENTS FOR MATERNAL DEATHS IN THE PERIODS 1970-1972, 1973-1975 and 1976-78.

Initial booking arrangements	1970-72		1973-75		1976-78		
	No.	%	No.	%	No.	%	
Domiciliary	44	7.3	10	2.6	6	1.4	
G P Unit (i) separate	67	11.1	38	9.7	13	3.0	
					52		12.1
(ii) with consultant unit					39	9.1	
Private nursing home	3	0.5	1	0.3	1	0.2	
Consultant unit	319	52.6	264	67.7	280	65.6	
Services hospital	4	0.7	2	0.5	2	0.5	
No booking made	153	25.2	71	18.2	84	19.7	
No information about booking	16	2.6	4	1.0	2	0.5	
TOTAL	606	100	390	100	427	100	

Since 1952 the Ministry of Health and later the Department of Health and Social Security have conducted a series of Confidential Enquiries into Maternal Deaths in England and Wales. A report is published triannually and the table above is taken from the latest report. (25) It gives the initial booking arrangements for maternal deaths for the last three

triennia. The table shows that the percentage of mothers booked for home delivery (i.e. domiciliary) who died, has declined substantially, as has the percentage of deaths to mothers for whom there was no information about booking.

Of the six mothers, who between 1976 - 78 were initially booked for delivery at home, only three actually delivered there. These three mothers had normal deliveries at home but were transferred into hospital after the birth, where one died of haemolytic streptococcal septicaemia, and one of pneumonia. The other death was attributed by the report to deep vein thrombosis. A fourth mother died at 43 weeks of pregnancy from an air embolism in labour. The other two mothers had their booking changed to a consultant unit during pregnancy.

It is to be regretted that information on the intended place of delivery is not currently collected for births. In their report the Steering Group on Health Service Information commented that: (26)

> " Many deliveries do not occur in the place initially intended. The initial intention for place of delivery is that designated by the general practitioner and midwife or general practitioner and hospital staff and this should be recorded. This decision is normally made when the mother is assessed for delivery and, as a result of this, formal arrangements are made. The classification of the originally intended place of delivery should be the same as that used for the actual place of delivery."

The report continues:

> " If the place of delivery is different from the place initially intended, we recommend that the reason for change be classified as follows:-
> a. Decision made during pregnancy because of change of address.
> b. Decision made during pregnancy for clinical reasons.
> c. Decision made during pregnancy for other reasons.
> d. Decision made during labour for clinical reasons.
> e. Decision made during labour for other reasons.
> f. Occurred unintentionally during labour."

Morbidity

With the reduction in perinatal mortality, epidemiological interest has become increasingly focused on perinatal morbidity and how this might be a possible indicator of the quality of obstetric care. (27) The precise nature of the relationship between perinatal mortality and morbidity is contentious. Some authors have assumed a parallel assocation; that is that the decline in the crude perinatal mortality rate would be accompanied by a similiar reduction in the incidence of handicap. (28) (29) This use of the crude perinatal mortality rates as "surrogate measures of the incidence of handicap" has been severely criticised by Chalmers and Macfarlane. (16) Others have argued that although new obstetric technology may have saved the lives of babies who might otherwise have died, thus contributing to the decline in perinatal mortality, (30) it permits the survival of severely handicapped children and may also produce iatrogenic illness. (31) Here a decline in perinatal mortality is interpreted as leading to an increase in morbidity.

Elbourne lists three problems associated with morbidity measurement:-

1. The division between health and illness is arbitrary.
2. Diagnostic standards are subject to considerable variation.
3. Unlike death illness can recur in the same individual. (32)

The 1970 British Births Survey is the most recent source of national information on perinatal morbidity by place of delivery. (33) Table 1.2 shows that consultant units have a slightly higher percentage of unfit babies than other delivery locations. Of those babies defined as unfit, babies born at home suffered more from jaundice and minor infections than those born in N.H.S. hospitals and General Practitioner Maternity Units.

TABLE 1.2 : NUMBER AND PERCENTAGE OF BABIES IN 1970 BRITISH BIRTHS SURVEY AND ILLNESSES AND CONDITIONS EXPERIENCED DURING THE SURVEY WEEK.

	Home		N.H.S. Hospital				N.H.S. G.P. Unit		Private		Unattended Births		Remainder		Total	
			Cons. Bed		G.P. Bed											
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Fit	1,382	66.9	7,018	64.8	368	70.6	1,857	72.3	124	61.4	62	58.5	97	70.8	10,908	66.4
Congenital malformations	21	1.0	316	2.9	22	4.2	50	1.9	4	2.0	2	1.9	5	3.6	420	2.6
Jaundice	331	16.0	1,407	13.0	66	12.7	330	12.8	36	17.8	14	13.2	16	11.7	2,200	13.4
Fits 'cerebral signs'	4	0.2	72	0.7	1	0.2	14	0.5	-	-	-	-	-	-	91	0.6
Minor Infections	140	6.8	628	5.8	31	6.0	124	4.8	11	5.4	5	4.7	8	5.8	947	5.8
Cephalhaematoma, etc	9	0.4	77	0.7	2	0.4	19	0.7	1	0.5	-	-	-	-	108	0.7
Breathing difficulties	13	0.6	103	1.0	2	0.4	18	0.7	2	1.0	1	0.9	-	-	139	0.8
Feeding difficulties	8	0.4	66	0.6	2	0.4	12	0.5	2	1.0	-	-	1	0.7	91	0.6
Remainder	24	1.2	183	1.7	4	0.8	14	0.5	4	0.2	7	6.6	1	0.7	237	1.4
More than one one of above group	135	6.5	959	8.9	23	4.4	132	5.1	18	8.9	15	14.2	9	6.6	1,291	7.9
TOTAL	2,067	100.0	10,829	100.1	521	100.1	2,570	99.8	202	100.0	106	100.0	137	99.9	16,432	100.2

(After Chamberlain R, 1975)

Conversely, babies born in these institutions had a larger percentage of more serious conditions, for example, congenital abnormalities, fits, cerebral signs and respiratory difficulties. Of babies born at home 42 (2 per cent) were transferred to hospital during the first week of life, of which 25 (1.2 per cent) were transferred on the first day. This excludes babies who were transferred to hospital because of maternal morbidity. Unfortunately, information on maternal morbidity is not given.

The dearth of comparative data on perinatal and maternal morbidity by place of birth for Britain necessitates the consideration of material from the United States and Holland. These two countries could be thought of as lying at either end of a spectrum with respect to their provision for birth at home. Holland still has a substantial, though declining, proportion of deliveries taking place at home (approximately 40 per cent), whilst in the United States a policy of 100 per cent hospital delivery has been vigorously pursued. Unlike Holland, where the midwife is responsible for all women having a normal pregnancy and delivery, licensed midwives are a rarity in the United States. The result of this policy in the United States has been the emergence of alternative birthing centres and lay midwives.

A study involving 1692 mothers who delivered in Groningen municipality in Holland in 1981 (34) showed that maternal morbidity was substantially less in those women who opted to deliver at home, even when parity was taken into account. Mothers in the study population had a free choice as to whether they delivered in hospital (a one day stay or full hospitalisation) or at home. If some abnormality arose during pregnancy amongst those booked to deliver at home, the booking was changed to a hospital booking. Morbidity amongst neonates was lowest in those delivered at home and greatest in those babies whose mothers had

a clinical delivery and post-natal hospital care.

Two studies have been carried out by Mehl in the United States to compare the type of delivery and outcomes for similar groups of women giving birth at home and in hospital. In the most recent study, (35) 1046 mothers having a home birth were matched (case by case) with 1046 hospital births. Mothers were matched for age, parity, gestational length, education, socio-economic status and other obstetric risk factors. Home deliveries included only those who intended, immediately before the onset of labour, to deliver at home.

Analysis showed that labour was noticeably longer for parity 0 and 1 births at home. Hospital births were associated with significantly more frequent use of oxytocin and forceps. Despite the incidence of episiotomy being nine times greater for hospital deliveries there was a significant excess in the number of 2nd, 3rd and 4th degree tears in hospital delivered mothers compared with those delivered at home.

Babies born in hospital had more birth injuries, more neonatal infections (contrary to the findings of the British Births Survey), and more respiratory distress. There were however, no significant differences in mortality or neurological impairment. Of those delivered at home six mothers were transferred into hospital and six neonates were taken to neonatal intensive care units. The incidence of maternal infection was the same for both groups.

The Place of Delivery and Type of Care Provided

Many authors have assumed a straightforward division between home and hospital. (36-39) From a sociological stance such a distinction may be valid. Clearly, the structural relations between the care providers, (doctors and midwives) and the recipients of care, (mothers) are quite different in the mothers' homes, where doctors and midwives are essentially guests, than those operating in an institutional setting.

From an epidemiological perspective, however, such a delineation is an over simplification. The place of delivery is not synonymous with the type of care provided. For example, a mother giving birth in a hospital will not necessarily be delivered by a hospital midwife under the care of a consultant obstetrician. She may receive her ante-natal care in the community from a domiciliary midwife and a general practitioner and enter hospital to be delivered by her midwife, under the care of her general practitioner. In isolated general practitioner units where consultant and special baby care facilities are not readily available, delivery may take place in a setting akin to that of a domiciliary delivery.

One of the unfortunate consequences of making this false dichotomy is that it has tended to polarise debate. This is well reflected in the lay and medical press where the sports metaphor "Home v Hospital" delivery is all too evident. (37-39)

Ideally, statistics on the outcome of delivery for a particular place of birth should reflect the type of care received.

Consumer Preference

The obvious conclusion to draw from the rapid and sustained decline in the proportion of births at home is that mothers prefer to have their babies in hospital. On the contrary, however, all the available research suggest that the opposite is true. (Table 1.3)

Unfortunately, most of the surveys conducted to determine mothers' preferences with respect to the place of delivery, have involved small, non-random groups of women. It is also indicative of the perceived importance of this issue that two of the surveys were opportunist, one arose as a consequence of a hospital strike, which led to women booked for hospital delivery giving birth at home, the other was an adjunct to a questionnaire survey investigating neonatal staphlococcal infections (43, 40).

Despite the methodological limitations of four of these surveys summarised in table 3.1, the consistency of their results does suggest a real preference for home delivery.

The most recent and comprehensive study comparing mothers' experiences of home and hospital deliveries was a postal questionnaire survey conducted by the Institute of Social Studies in Medical Care in 1975. The study population consisted of a series of 2400 births from 24 registration districts in England and Wales (44). The response rate was 90.9 per cent.

Institutional deliveries accounted for 95.5 per cent of births in the sample. Eighty five per cent of the mothers said that they were happy

about the initial booking but only 56 per cent of mothers booked for hospital delivery felt that they had a choice about the place of delivery compared with 87 per cent of those who had a home birth. Of mothers who had their last baby in hospital but this baby at home, 92 per cent stated a preference for home birth. Of those who delivered in hospital this time but had their last baby at home, 23 per cent preferred hospital this time.

TABLE 1.3 TABLE SUMMARISING THE RESULTS OF VARIOUS SURVEYS ENQUIRING INTO MOTHERS' PREFERENCES WITH RESPECT TO THE PLACE OF DELIVERY

Year	Place where survey was conducted	Number in sample	Composition	Person administering questionnaire	Question	Response
1957-8	Ilford	1552	336 mothers who had experienced both home and hospital	Health Visitor	Did mothers prefer home or hospital delivery?	19 6% No preference 48 14% Preferred hospital 269 80% Preferred home
1964-5	Northampton	503	270 previously given birth in isolated GPU and 233 at home	Midwives	Where would mothers prefer to have next baby	184 37% Hospital 317 63% Home 2 Not known
1965	Rutland and Fulham and Hammersmith	208	34 previously given birth at home 174 in hospital	Self	If mother had baby in hospital/home last time would she prefer a delivery elsewhere next time and if so where	Last delivery in hospital 2 (1.2%) Another hospital 17 (10%) Home 155 (98.8%) Hospital Last delivery at home 1 (3%) Hospital 33 (97%) Home
1973	Ashton-Under-Lyme	65	All originally booked for hospital delivery but delivered at home because of a strike by hospital ancillary staff	Midwives	Where would mothers prefer to have their next baby	52 (80%) Home 13 20% Hospital

The Relationship Between Trends in the Crude Perinatal Mortality Rate and the Trend Towards Delivery in Consultant Obstetric Units

The epidemiological evidence produced in the Peel Report to support its recommendation of 100 per cent hospital delivery was described by Cochrane as "very thin evidence on which to base a demand for 0.5 beds per 1000 of the population". (1) The "evidence" consisted of an allusion to the declining perinatal mortality rate and the declining proportion of deliveries at home. (11)

Scrutiny of the Cardiff Births Survey (12) showed that despite an 88.6 per cent reduction in the proportion of births at home between 1965 and 1973, there was no significant improvement in the perinatal mortality rate, nor in deaths from causes deemed to be preventable. Analysis of the maternity records of mothers booked for delivery in specialist hospitals and at home in Newcastle-Upon-Tyne showed that the perinatal mortality rate declined uniformly in both groups. (13)

Fryer and Ashford (14) carried out a regression analysis to study the relationship between the perinatal mortality rate and the increase in hospital delivery rates between 1956 and 1973. The results showed that from 1956 to 1967 local authorities with above average hospital delivery rates had below average perinatal mortality rates. The strength of this relationship, however, decreased over time and reversed in 1968 and 1969, after which time further increases in the percentage of hospital deliveries did not contribute to a reduction in perinatal mortality.

Analysis was also conducted on two birthweight bands, those weighing

2,501 grams and those above it. This showed that higher hospital delivery rates were associated with lower mortality in the under 2,501 gram group throughout the entire period.

Clearly, the results of these studies suggest that the temporal association between the declining crude perinatal mortality rate and the falling proportion of births at home is unlikely to be causal.

The Importance of Ante-Natal Risk Assessment and Selection in Studies of Perinatal Mortality by Actual Place of Delivery

Until 1975 perinatal mortality rates by place of delivery were only available from cross sectional surveys. Despite the variations in the scale and locations of these surveys they all consistently reveal a substantially lower crude perinatal mortality rate for domiciliary deliveries.

Cahalane et al (45) reported a perinatal mortality rate for domiciliary deliveries of 14.7 per 1,000 in the period 1958 to 1959 at a time when the overall rate in the Galway region of Eire was 33.2 per 1,000. Fifty one percent of mothers were delivered at home. Included as domiciliary deliveries were births in two nursing homes and two hospitals staffed by GPs.

An analysis of all 19,841 births which took place in Glasgow in 1967 produced the following results. (46)

TABLE 1.4 PERCENTAGE OF BIRTHS AND PERINATAL MORTALITY RATES BY PLACE OF DELIVERY FOR ALL BIRTHS IN GLASGOW IN 1967.

Place of	Number of births	Percentage	Crude perinatal mortality rate
Hospital	16,767	84.5	32.8
Nursing Home	278	1.4	14.5
Home	2,719	13.7	17.8
Total	19,841	100	31.3

The British Births Survey results also showed a substantially lower crude perinatal mortality rate for births at home and in isolated general practitioner maternity units, 4.34 and 5.42 per 1,000 births respectively, and a very high mortality for unattended deliveries. (47)

Clearly, the findings of these surveys do not represent unbiased estimates of the risk of perinatal death associated with the place of delivery as no account has been taken of the complex process of biological, medical and social selection which influences the choice of the place of delivery. As was stated earlier in this chapter factors governing selection can confound analyses by being related to both the place of delivery and the outcome.

TABLE 1.5 PERINATAL MORTALITY BY PLACE OF DELIVERY (SINGLETONS) BRITISH BIRTHS SURVEY. (Compiled using data from British Births, Volume 1, Table 2:19)

Place of delivery	Number of singletons	Percentage	Number of perinatal deaths	Crude perinatal mortality rate
Consultant Unit	11,139	66.3	210	27.83
Integrated GPU	526	3.1	5	9.51
Isolated GP Unit	2,584	15.4	14	5.42
Private	206	1.2	4	19.94
Home	2,076	12.4	9	4.34
BBA/ unattended	119	0.7	13	109.92
Other	142	0.8	5	35.52
Total	11,792	100	360	21.44

Standardising perinatal mortality rates according to the place of delivery to take account of the proportion of mothers (48) or babies (54, 55) possessing certain characteristics associated with an increased risk of perinatal death has been the technique most commonly used to control for selection biases.

Marjorie Tew, a strong advocate of this approach, has, by making extensive use of published data from the 1958 birth surveys, carried out a number of different standardisations in which she has attempted to account for the high risk status of mothers delivering in hospital under consultant care.

Firstly, using data from the 1958 survey she standardised the crude perinatal mortality for consultant units and isolated general practitioner maternity units (48) and then for births in consultant units and at home (49) to take into account, singley, certain maternal risk factors known to be associated with a greater risk of perinatal death. These are nulliparity and high parity, membership of social classes 4 and 5, illegitimacy and the presence of toxaemia.

Despite these standardisations the disparity between the mortality rates persists. Standard errors for the standardised ratios are not given so it is not clear whether the observed differences are statistically significant. These standardisations only permit individual risk factors to be taken into account. Thus, it is possible that the combined effect of all the risk factors might have explained the discrepancy between crude perinatal mortality rates.

In the 1970 Births Survey (47) an ante-natal scoring system (Antenatal

Predication Score APS) was developed from data identified in the 1958 births survey as being "related to the biological and social factors constituting risk". Perinatal mortality rates were shown to rise with an increasing APS in the 1970 births survey.

When births in consultant units and those occurring elsewhere are compared with respect to the proportion of mothers in various risk categories, as suggested by the APS, consultant units did have a preponderance of mothers at high and moderate risk. Standardising the crude perinatal mortality rate for consultant units and those births occurring elsewhere, by the proportions in each of the three risk groups suggested by the APS, (50) Tew found that she could only explain "a very small part of the excess mortality in hospital, as is shown by a comparison of the actual and standardised rates. The difference between the standardised rate remains highly significant ($p < 0.001$)." (51) The results of this procedure are shown below.

TABLE 1.6 PERCENTAGE DISTRIBUTION OF BIRTHS BY ANTENATAL PREDICTION SCORE (APS) FOR EACH PLACE OF DELIVERY, WITH STANDARDISED MORTALITY RATIOS.

Place of delivery	Number of Births	Antenatal Prediction Score 0 - 2	3 - 7	8 plus	Perinatal mortality per 1,000 births Actual (a)	Expected (b)	Standardised Mortality Ratio (100 x a/b)
		%	%	%			
Consultant bed	11,156	47.0	44.5	8.5	27.8	22.4	124
GP bed	526	65.0	32.9	2.1	9.5	19.4	49
GPMU	2,584	64.9	32.7	2.4	5.4	19.4	28
Home	2,076	69.1	26.8	4.1	3.4	19.3	22
Total	16,815	53.3	40.0	6.7	21.4	21.4	100

(Reference 52 gives the corrections for Tew's original calculations. These corrections are included in the table presented above).

The APS has not been validated using other data sets and therefore its predictive power is largely unknown. It may well be that the lack of predictive ability in the APS (developed from the births survey conducted in 1958) accounts for some of the observed differences between the standardised rates.

In a further attempt "to reconcile the actual differences observed between mortality rates in obstetric hospitals on the one hand and GPMUs on the other" Marjorie Tew uses the proportion of low birthweight babies for each place of delivery as an indicator of high risk. (53) (Table 1.7)

TABLE 1.7 STANDARDISATION FOR THE PROPORTION OF LOW BIRTHWEIGHT BABIES IN OBSTETRIC HOSPITALS AND IN GENERAL PRACTITIONER MATERNITY UNITS AND HOME IN THE 1970 BRITISH BIRTHS SURVEY USING THE 1970 STILLBIRTH RATE FOR ENGLAND AND WALES.

	Hospital			GPMU & Home		
Birthweight	Proportion of births	Stillbirth rate per 1000 births	Product	Proportion of births	Stillbirth rate per 1000 births	Product
Low birth weight < 2500	0.09	126.7	11.4	0.03	66.0	2.0
Normal birthweight > 2500	0.91	5.1	4.6	0.97	2.6	2.5
All	1.00		16.0*	1.00	4.5*	

* Stillbirth rate for England and Wales

Marjorie Tew notes that these data in the table show that the stillbirth rate for babies of a normal weight in hospital (5.1) is higher than that for all babies born at home or in a GPMU (2.6). In addition, Marjorie Tew points out that if the risk of death for a low birthweight baby born

in hospital (126.7) is applied to a baby born at home (126.7 x 0.03 = 3.8), it would imply a stillbirth rate of 0.7 per 1,000 births for the 97 per cent born at home with a normal weight. (53)

The validity of this analysis is questionable on two counts. Firstly, Tew uses the crude stillbirth rate for the whole of England and Wales in 1970 as opposed to the survey rates. As she herself points out, the stillbirth rates in the 1970 survey were much lower than the Registrar General's figure for that year. (46) Secondly, no account is taken of the distribution of birthweights, particularly in the low birthweight band, or of cause of death. In the 1970 births survey, babies weighing less than 1000 grams had a perinatal mortality rate of 931 per 1,000 births, whilst those weighing 2001 to 2500 grams had a mortality rate of 69.1 per 1,000. With respect to babies of low birthweight 31 per cent of babies born in consultant units weighed less than 2001 grams as opposed to only 0.3 per cent of babies born at home or in a GPMU.

Marjorie Tew's thesis is supported by Senn (54) who, using data on live and stillbirths registered in Kent for the years 1973 to 1977, found that after standardising using the whole of the birthweight distribution, the higher stillbirth rate in consultant units could not be accounted for. Unfortunately, stillbirths of babies with lethal malformations were not excluded before standardisation.

These findings are consistent with a much earlier study on 50,000 births which took place in the 10 local authorities in South West England in 1965. (55) For the region as a whole 43 per cent of the births took place in consultant units, 28 per cent in GP units, 26 per cent at home and 1.5 per cent in nursing homes. There were, however, marked

variations in the percentages between local authorities. Variations in perinatal mortality rates between local authorities were also observed. The perinatal mortality rate in consultant units varied from 31 to 68 per 1,000 births, in GP Units from 4 to 14 per 1,000 births and at home from 0 to 14 per 1,000 births. Although the percentages of low birthweight babies delivered in consultant units were substantially higher (12.4 per cent in consultant units, 4.3 per cent in GP units and 3.5 per cent at home) standardisation using the whole of the birthweight spectrum did not explain the differences in the crude perinatal mortality rates.

Analyses based on the actual place of birth discussed thus far are not only frustrated by selection biases but they also fail to recognise that some women may not deliver in the place they intended. The importance of the distinction between the actual and intended place of delivery is addressed in the next section of this chapter.

The Importance of the Intended Place of Delivery and Transfers Between Delivery Locations in the Attribution of Risk of Perinatal Death According to Place of Delivery

The studies discussed so far have only considered the actual place of delivery. Here selection biases were controlled by statistical adjustments to make allowances for the varying proportions of mothers (51) or babies (54, 55) with certain quantified characteristics, delivering in hospital or in a variety of domiciliary settings. The actual and intended place of delivery may be different, however, and this is most likely when some unpredictable and possibly hazardous event takes place during pregnancy or labour. Consider these two hypothetical cases:-

1. A mother, booked for delivery at home has an antepartum bleed and placenta abruptio is diagnosed. Her booking is changed to that of a consultant unit.
2. A nulligravid mother, booked for a consultant unit delivery, fails to recognise her premature labour. She gives birth at home unaided, after 32 weeks of pregnancy.

In such cases should the outcome of the pregnancy be attributed to the actual or intended place of delivery? Certainly groups of births categorised according to the intended place of delivery will be less affected by the selective forces which operate as confounding factors in analyses based on actual place of delivery.

Attributing births and deaths to the place of booking as opposed to the actual place of delivery, as the data in Table 1.8 illustrate, tends to decrease the crude perinatal mortality rate for consultant units and increase it for GPMUs and births at home.

TABLE 1.8 PERINATAL MORTALITY BY PLACE OF DELIVERY AND PLACE OF BOOKING : THE RESULTS FROM FOUR STUDIES

Study, Authors, Location and Year	Crude perinatal mortality rate			Crude perinatal mortality rat		
	Place of delivery			Place of booking		
	Hospital	G.P.M.U.	Home	Hospital	G.P.M.U.	Home
Fredrick, J. & Butler, N.R. Britain 1958*	11.5	10.7	6.8	8.7	12.0	9.3
Cookson Gloustershire 1953-1962	46.9		7.4	28.1		23.4
Hobbs, Acheson, Oxford 1962-1964	23.2+	11.0		19.0	20.0	
Wood, L. Gwynedd 1946-1970	52.0	8.4	18.9	36.7	23.7	19.7

* See text for exclusions from the numerator and denominator of these rates.
\+ Includes a small proportion of deliveries for which there was no intended place of delivery.

(References 56 - 59)

In the practice audit by Wood (59) the original figures from which the rates are derived are not given, so it is not possible to tell whether the observed differences between delivery locations according to actual place of delivery and place of booking are statistically significant. Numbers were given, however, in the studies by Hobbs and Acheson and by Cookson. (52) (58)

In the Cookson study the observed differences between the rates for births at home and in hospital are statistically significant ($p < 0.001$). This difference does not reach a conventionally significant result when the births are classified by the original place of booking. Similarly, for the Hobbs and Acheson study observed differences between mortality rates for consultant units and those occurring in the GPMU or at home are statistically significant ($p < 0.001$) but not when births by place of booking are considered.

The data presented in Table 1.8 from the 1958 Perinatal Mortality Survey is rather different for a number of reasons and as such cannot be directly compared with the other studies. When attempting to explore the importance of the place of booking as compared with the actual place of delivery the authors restrict their analysis to three groups of women:-

i. primiparous mothers who remained normotensive throughout pregnancy.
ii. primiparous mothers who did not remain normotensive through pregnancy.
iii. multiparous women (up to para 4) who remained normotensive throughout pregnancy.

By restricting the analysis in this way, bias, resulting from the selection of women at high risk for hospital delivery, should have been reduced.

The authors report

> "Analysis according to whether the mother had been booked for domiciliary delivery or not showed that booking for NHS hospital delivery was associated with a consistently lower death rate ($p < 0.001$) than booking for domiciliary or some other type of confinement. The differences between booking for domiciliary care, private care, or delivery in a general practitioner unit were marginal"

The results presented in this paper are of great interest and warrant detailed scrutiny. The relevant table from the paper is reproduced below.

TABLE 1.9 DEATH RATES BY PLACE OF DELIVERY AND BOOKING

(After Butler and Golding, 1978) (57)

Place of Delivery	Group A		Group B		Group C	
NHS hospital	8.7	(95)	18.3	(156)	7.8	(60)
Home	10.6	(45)	13.3	(22)	5.2	(89)
GP Unit	11.7	(43)	17.1	(37)	5.1	(5)
Private ward or nursing home	17.5	(12)	9.0	(4)	5.1	(5)
Place of booking						
NHS hospital	7.7	(81)	14.5	(105)	4.4	(32)
Home	12.7	(58)	20.9	(54)	6.6	(114)
GP Unit	11.5	(43)	20.0	(49)	6.2	(19)
Private ward or nursing home	15.0	(11)	21.9	(10)	5.8	(6)
Total (including other)	10.0	(196)	17.2	(220)	5.9	(171)

In a detailed critique of this analysis Majorie Tew points out that the high level of statistical significance reported by the authors ($p < 0.001$) is only obtained by comparing the rates for births booked for NHS hospitals with aggregate rates for bookings at all other places of delivery. (60) If the perinatal mortality rates for Groups A, B and C are combined for each type of delivery booking, then the perinatal mortality rate for booked hospital births is not significantly less than that for booked home births. Indeed the rates for booked NHS hospital deliveries are only significantly lower in Groups A and B when compared with bookings for all other places of delivery. Births in these two groups only constitute 6 per cent of the total births surveyed. (61)

Butler and Golding (previously Fredrick) have reportedly repeated the same type of analysis on the 1970 British birth data as was carried out on the 1958 data but found that "the findings did not support our earlier 1958 findings of an excess of deaths to women booked at places other than NHS hospitals". (61) Regrettably these findings have never been published.

There is no general agreement about whether the intended place of delivery should be defined as that originally booked for delivery or that intended immediately before the onset of labour. In this chapter, only those studies where the intended place of delivery has been defined as the place of booking have been considered. Studies where the intended place of delivery is defined as the place intended immediately before the onset of labour are considered in Chapter XII.

Marjorie Tew has long maintained that it is only valid to compare

perinatal mortality rates by actual place of delivery because women booked for delivery at home who deliver in hospital have an increased perinatal mortality rate as in consequence of the interventionalist techniques employed by obstetricians. (62) Marjorie Tew's contention is not supported by the findings of a survey comparing outcomes of low risk women delivering in two different systems of maternity care; shared care (consultant unit) and community care (integrated GP unit). In this study the investigators found that women transferred from the GP unit to the consultant unit as the result of some emergency arising during labour, had outcomes which were as good as or better than those low risk women booked for delivery in the consultant unit. (63)

Randomised Controlled Clinical Trial

Only a randomised controlled clinical trial could produce unequivocal scientific evidence of the mortality and morbidity risks associated with the place of birth. (64) The only ethically acceptable way of conducting such a trial would be, without randomisation, allow low risk women to choose between a home or hospital delivery and compare outcomes in the two groups. In terms of mortality it has been estimated that in order to have an 80 per cent chance of detecting a difference between perinatal mortality rates for home and hospital births, significant at the 5 per cent level, a randomised controlled clinical trial would require the following number of cases: (65)

Number of Cases Required	Perinatal Mortality Rate
70,000	5 - 4 / 1,000
163,000	11 - 10 / 1,000
43,000	12 - 10 / 1,000
20,000	13 - 10 / 1,000
12,000	14 - 10 / 1,000
7,700	15 - 10 / 1,000

Recent Policy Statements Regarding the Place of Delivery

In 1978 the Office of Population Censuses and Surveys published, for the first time, perinatal mortality rates by place of delivery for England and Wales for the years 1975 to 1977. (66) (These data will be discussed in some detail in the succeeding chapter).

FIGURE 1.A

PERINATAL MORTALITY BY PLACE OF CONFINEMENT
1975 - 1977

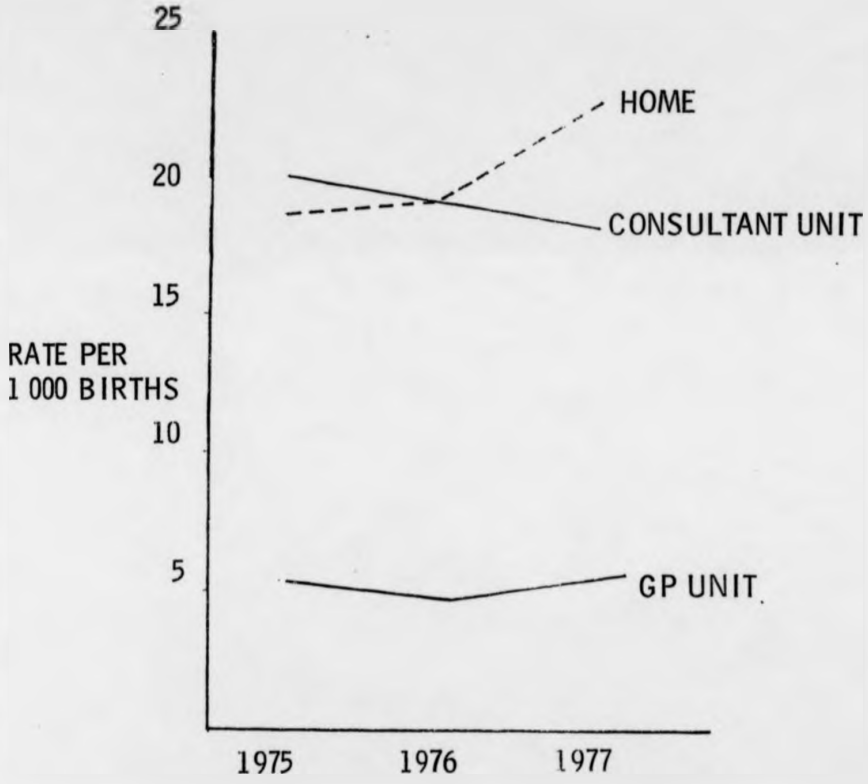

Figure 1.A was also reproduced in the Social Services Committees report on Perinatal and Neonatal Mortality, published in 1980. (28) The committee commented that it was "most serious" "that by 1977 perinatal mortality in home deliveries was actually higher than in consultant units. The report continues "although these include a proportion of women who deliberately eshewed hospital care, these data must increase the concern about the safety, for any mother, of home delivery" and recommends that "home delivery is phased out further".

It is unfortunate, given the intense debate that resulted from the scant evidence produced by the Peel Committee to support its recommendations with respect to home births, that 10 years later another committee is making similar recommendations, based on equally inadequate crude perinatal mortality rates.

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C H A P T E R II

Place of Delivery and Perinatal Mortality 1975-1979

"The problem with using statistics is that they are seen in different ways by different people. Information written in numerical form can sometimes mystify or frankly terrify certain people, while others, with equally poor comprehension of the figures, invest them with an authority that they would not have afforded to the same data written in words. The middle road is to accept that statistics can be used as a tool to simplify and clarify, but only with an understanding of how the numbers were obtained and what they purport to show, and by implication, what they omit. A healthy scepticism is a prerequisite for interpreting statistics" (1)

Data sources

It is a statutory requirement that a live birth or a stillbirth must be registered within six weeks of the event. At registration details about the birth, including the place of delivery, and information about the parents (age, marital status, date of marriage, father's occupation and the previous legitimate parity of the mother) are recorded. In addition to this the cause of death is recorded for all stillbirths.

If a live born infant dies then this event is registered seperately. Since 1975 the Office of Population Censuses and Surveys (hereafter OPCS) have routinely linked the death registration record of an infant dying within the first year of life, to the corresponding birth record. This has allowed more detailed information about the cicumstances of infants who die within the first year of life, including mortality rates by place of delivery, to be produced.

Official statistics produced by the OPCS differentiate between five places of delivery (see Table 2.1). Hospital deliveries are grouped into three categories. NHS A hospitals are those where deliveries are conducted under

the jurisdiction of a General Practitioner and where no consultant care is available. These are sometimes referred to as isolated general practitioner units or general practitioner maternity units. Correspondingly, NHS B hospitals are those where consultant obstetric care is available, although mothers delivering in such institutions may be cared for entirely by their own general practitioners. Hospitals classified as "other" are those outside the NHS. Births at home are deliveries which occur at the mother's normal place of residence. The few births which take place in psychiatric hospitals do not appear in the NHS hospital catagories but are classified as elsewhere deliveries. This group also encompasses births which occur outside a hospital, at a location other than the mother's normal home address and includes births in remand homes, reception centres, mother and baby homes as well as births which occur in ambulances while the mother is on route to hospital.

Trends in the Place of Delivery 1975-1979

The most distinct overall trend has been one towards delivery in NHS B hospitals. (See Table 2.1) In 1975 87.9 per cent of all deliveries took place in such institutions and by 1979 this had risen to 92.3 per cent. During this time there was a corresponding reduction in deliveries in NHS A hospitals (7.2 per cent to 5.1 per cent) and in the percentage of home deliveries which more than halved from 3.2 per cent to 1.4 per cent.

Perinatal mortality by place of delivery

The mortality rates presented in Table 2.2 show that between 1975 and 1979 there was a 24 per cent decline in the crude perinatal mortality rate.

TABLE 2.1 BIRTHS BY PLACE OF DELIVERY 1975-1979

Place of delivery	1975 Number	1975 Per Cent	1976 Number	1976 Per Cent	1977 Number	1977 Per Cent	1978 Number	1978 Per Cent	1979 Number	1979 Per Cent
All	609 740	100.0	589 979	100.0	574 664	100.0	601 526	100.0	643 153	100.0
NHS A Hospital	43 862	7.2	45 458	7.7	39 019	6.8	35 645	5.9	32 700	5.1
NHS B Hospital	536 091	87.9	520 856	88.3	516 894	89.9	548 796	91.2	593 964	92.3
Other Hospital	9 502	1.6	8 360	1.4	7 318	1.3	6 921	1.2	7 041	1.1
At Home	19 504	3.2	14 667	2.5	10 940	1.9	9 608	1.6	8 904	1.4
Elsewhere	781	0.1	629	0.1	493	0.1	556	0.1	554	0.1

Source (3)

TABLE 2.2 PERINATAL MORTALITY RATES PER 1 000 BIRTHS BY PLACE OF DELIVERY, 1975-1979

Place of delivery	1975		1976		1977		1978		1979	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
All	11 716	19.2	10 416	17.7	9 717	16.9	9 313	15.5	9 402	14.6
NHS Hospital A	218	5.0	191	4.2	202	5.2	176	4.9	122	3.7
NHS Hospital B	10 944	20.4	9 785	18.8	9 164	17.7	8 821	16.1	8 939	15.0
Other hospital	134	14.1	118	14.1	77	10.5	67	9.7	70	9.9
At home	362	18.6	272	18.5	250	22.9	200	20.8	216	24.3
Elsewhere	58	74.3	50	79.5	24	48.7	49	88.1	55	101.1

Source (3)

However, this decline was apparently restricted to deliveries in hospital. There was a 24 percent rise in the crude perinatal mortality rate for births at home and a 26.5 per cent rise amongst births in the elsewhere group.

The very low perinatal mortality for babies born in NHS A hospitals can be largely attributed to selection. That is to say, mothers thought to be at higher risk of perinatal death are selectively referred to units where consultant obstetric care is available. Likewise women who have planned deliveries at home are a very select group.

For mothers who plan to deliver at home the selection process operates in two different ways. The first type of selection is a social process. As it is now standard practice for mothers to be booked for delivery in hospital, any mother wishing to have her baby at home will have to specifically request such care and in many areas of the country may experience great difficulties in exercising her choice. (2) Such a process is likely to favour more articulate women, probably of social classes I or II, who would be at lower risk of perinatal death than mothers from the other classes. Selection also operates according to medical criteria. Mothers who choose a home delivery, may, as a result of developing complications during pregnancy which increase the risk of perinatal death, change to a hospital booking for delivery.

Thus, it would be expected that delivery at home would be associated with a low risk of perinatal death. Bearing this in mind, it is then odd that the crude perinatal mortality rate for this group, should have risen at a time when the overall rate was declining, and when previous cross sectional studies have consistently revealed a low level of perinatal mortality for births at home. (4-6)

A possible expla nation for this high, and rising level of mortality might be an adverse change in the composition of the population of mothers giving birth at home. This would require that an increasing proportion of mothers, at high risk of having a perinatal death, were delivering at home, despite selection. A closer examination of the statistics in Table 2.3 and summarised in Graphs 2.A and 2.B do indicate some compositional change with respect to maternal age and legitimacy.

Maternal Age

Data presented in Graph 2.A show an increase in the percentage of deliveries at home to mothers under 20, when the trend for all deliveries is one of a decreasing percentage. The percentage of births at home to mothers in the 25 to 29 and 30 to 34 year age groups is greater than the corresponding percentage for all deliveries. This percentage has decreased over time in the 25 to 29 year age group but has increased in the 30 to 34 year age group, for both births at home and all deliveries. There is some slight suggestion of an increase in the percentage of mothers aged 35 and over giving birth at home compared with the percentage for all deliveries.

Perinatal deaths by age of mother, place of delivery and legitimacy, 1975–79

England and Wales

Place of delivery	Legitimacy	1975		1976		1977		1978		1979	
		No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
Mothers all ages											
All places	All	11,736	19.2	10,436	17.7	9,717	16.9	9,313	15.5	9,402	14.6
	Legitimate	10,240	18.5	9,093	17.0	8,481	16.2	8,020	14.8	8,034	14.0
	Illegitimate	1,468	26.4	1,323	24.3	1,206	23.3	1,293	21.1	1,368	19.5
NHS A hospitals	All	210	3.0	191	4.2	202	5.2	176	4.9	122	3.7
	Legitimate	198	4.7	173	4.0	186	5.1	159	4.5	111	3.6
	Illegitimate	22	9.2	18	7.3	16	7.0	17	7.9	11	4.9
NHS B hospitals	All	10,944	20.4	9,785	18.8	9,164	17.7	8,821	16.1	8,939	15.0
	Legitimate	9,661	19.8	8,579	18.2	7,984	17.1	7,633	15.5	7,691	14.6
	Illegitimate	1,333	26.0	1,206	23.9	1,200	22.9	1,188	20.6	1,248	18.8
Other hospitals	All	134	14.1	118	14.1	77	10.5	67	9.7	70	9.9
	Legitimate	127	13.9	109	13.5	75	10.7	65	9.8	67	9.9
	Illegitimate	7	20.3	9	34.9	2	7.2	2	6.5	3	10.3
At home	All	362	18.6	272	18.5	250	22.9	200	20.8	216	24.3
	Legitimate	273	15.1	200	14.8	172	17.3	128	15.8	130	16.4
	Illegitimate	89	65.1	72	61.4	78	76.5	72	68.6	86	86.3
Elsewhere	All	58	74.3	50	79.5	24	48.7	49	88.1	55	101.1
	Legitimate	41	66.8	32	73.4	14	41.2	35	86.2	35	89.5
	Illegitimate	17	91.9	18	93.3	10	65.4	14	95.3	20	130.7
Mothers aged under 20 years											
All places	All	1,302	23.4	1,358	23.2	1,267	23.0	1,177	20.8	1,179	19.7
	Legitimate	935	21.5	815	21.2	740	21.3	683	19.7	669	18.9
	Illegitimate	578	27.5	543	27.1	527	26.0	494	22.6	510	21.0
NHS A hospitals	All	26	6.7	21	5.9	20	6.6	22	8.3	10	4.5
	Legitimate	17	5.3	14	5.0	14	6.2	15	7.6	7	4.4
	Illegitimate	9	11.0	7	9.1	6	8.1	7	10.4	3	4.8
NHS B hospitals	All	1,265	23.3	1,243	23.2	1,170	22.9	1,084	20.5	1,089	19.3
	Legitimate	858	21.9	762	21.9	695	21.8	645	20.1	657	19.1
	Illegitimate	507	26.0	481	25.5	475	24.7	439	21.1	432	19.4
Other hospitals	All	12	17.1	12	18.3	6	11.4	3	2.1	7	15.9
	Legitimate	10	16.9	8	14.8	6	14.0	1	2.6	6	16.7
	Illegitimate	2	18.2	4	47.1	0	0.0	0	0.0	1	12.2
At home	All	84	111.6	70	115.1	66	141.3	56	124.2	59	146.4
	Legitimate	40	82.1	26	71.6	23	90.6	17	88.5	15	81.1
	Illegitimate	44	164.8	44	180.3	43	204.9	39	150.6	44	204.8
Elsewhere	All	18	122.4	12	104.3	5	65.8	14	126.1	14	150.5
	Legitimate	10	142.9	5	131.6	2	100.0	5	116.3	4	133.3
	Illegitimate	8	103.9	7	90.9	3	53.6	9	132.4	10	158.7
Mothers aged 20–24 years											
All places	All	3,555	18.5	3,141	17.4	2,968	16.8	2,785	15.1	2,864	14.7
	Legitimate	3,139	18.0	2,755	16.5	2,564	16.2	2,408	14.7	2,446	14.3
	Illegitimate	396	23.1	386	22.9	404	23.0	377	19.0	418	18.1
NHS A hospitals	All	77	5.0	68	4.4	72	5.5	60	5.0	36	3.3
	Legitimate	71	4.9	62	4.2	67	5.5	57	5.1	30	3.0
	Illegitimate	6	6.9	6	6.5	5	6.1	3	3.6	6	7.3
NHS B hospitals	All	3,385	19.7	2,941	18.2	2,795	17.7	2,636	15.7	2,725	15.2
	Legitimate	2,955	19.3	2,582	17.7	2,417	17.1	2,280	15.3	2,342	14.8
	Illegitimate	360	23.1	359	23.2	378	23.1	356	19.1	383	17.5
Other hospitals	All	46	16.1	39	15.6	25	11.9	19	9.3	22	10.6
	Legitimate	44	15.8	37	15.2	25	12.2	18	9.1	21	10.6
	Illegitimate	2	25.6	2	31.7	0	0.0	1	13.7	1	12.3
At home	All	95	18.4	77	20.1	69	25.1	56	25.5	59	29.7
	Legitimate	72	15.1	62	17.7	50	20.4	40	20.8	37	21.7
	Illegitimate	23	57.9	15	44.5	19	61.8	16	59.5	22	79.7
Elsewhere	All	22	74.1	16	64.0	7	43.5	14	76.1	22	108.8
	Legitimate	17	72.6	12	64.9	5	43.1	13	95.6	16	100.0
	Illegitimate	5	79.4	4	61.5	2	44.4	1	20.8	6	130.4

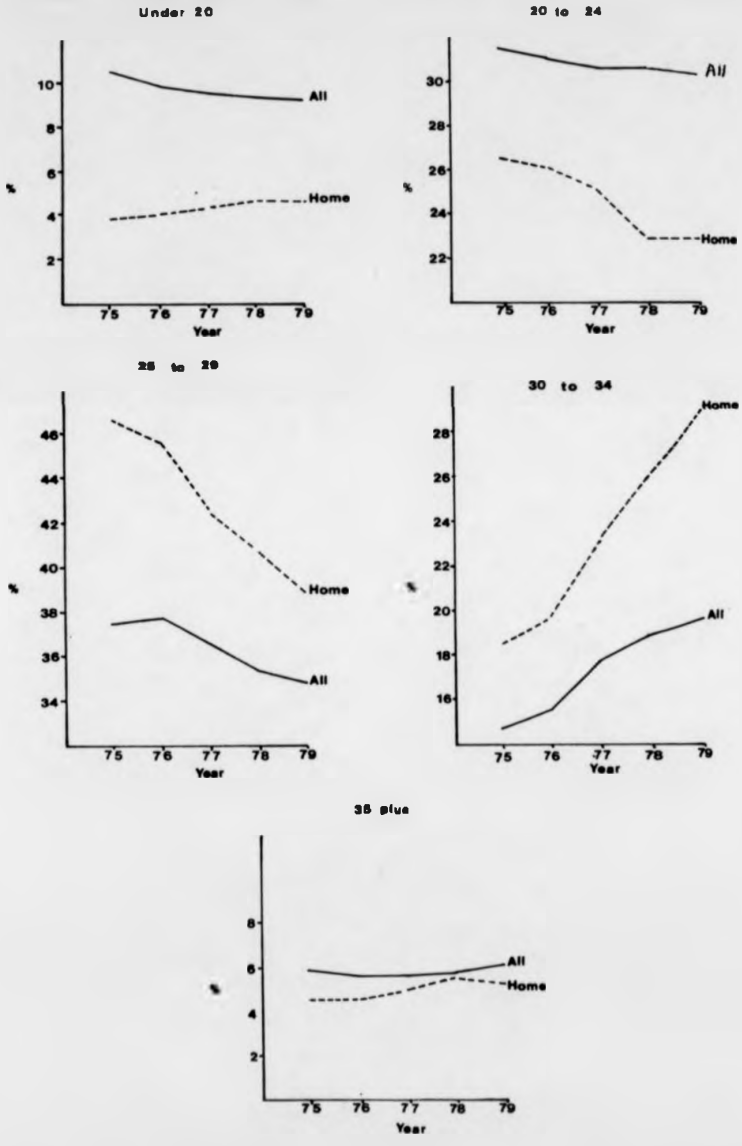
*Rate per 1,000 live and still births

Place of delivery	Legitimacy	1975		1976		1977		1978		1979	
		No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
Mothers aged 25–29 years											
All places	All	3,881	17.0	3,414	15.3	3,103	14.8	2,934	13.8	2,837	12.7
	Legitimate	3,636	16.7	3,228	15.2	2,917	14.6	2,728	13.5	2,628	12.4
	Illegitimate	245	24.6	186	19.0	186	18.9	206	19.5	209	16.8
NHS A hospitals	All	75	4.1	71	3.7	73	4.6	56	4.0	51	3.9
	Legitimate	72	4.1	68	3.6	70	4.5	53	3.9	50	4.0
	Illegitimate	3	6.8	3	5.7	3	6.5	3	7.2	1	2.0
NHS B hospitals	All	3,638	18.5	3,226	16.7	2,933	15.8	2,785	14.5	2,709	13.2
	Legitimate	3,416	18.2	3,052	16.6	2,761	15.6	2,592	14.2	2,512	13.0
	Illegitimate	222	24.6	174	19.7	172	19.1	193	19.7	197	17.0
Other hospitals	All	46	12.3	40	12.4	27	10.0	28	11.6	18	7.7
	Legitimate	45	12.3	40	12.6	26	9.9	27	11.5	17	7.5
	Illegitimate	1	12.8	0	0.0	1	15.9	1	15.2	1	16.7
At home	All	111	12.2	69	10.3	63	13.6	51	13.0	48	13.9
	Legitimate	93	10.7	63	9.9	55	12.6	43	11.8	40	12.5
	Illegitimate	18	42.5	6	16.9	8	27.9	8	28.6	8	30.2
Elsewhere	All	11	48.2	8	46.2	7	42.4	14	96.6	11	79.1
	Legitimate	10	48.8	5	35.2	5	37.9	13	102.4	9	78.3
	Illegitimate	1	43.5	3	96.8	2	60.6	1	55.6	2	83.3
Mothers aged 30–34 years											
All places	All	1,687	18.9	1,576	17.2	1,604	15.8	1,604	14.1	1,722	13.6
	Legitimate	1,538	18.2	1,469	16.9	1,491	15.5	1,466	13.6	1,584	13.2
	Illegitimate	149	31.0	107	22.3	113	21.2	138	23.1	138	19.8
NHS A hospitals	All	28	5.1	22	3.7	29	4.8	32	5.2	20	3.4
	Legitimate	27	5.1	21	3.7	28	4.8	29	4.8	20	3.5
	Illegitimate	1	5.6	1	5.3	1	5.4	3	16.2	0	0.0
NHS B hospitals	All	1,596	20.3	1,496	18.4	1,537	16.8	1,534	14.8	1,647	14.2
	Legitimate	1,454	19.6	1,396	18.1	1,431	16.5	1,407	14.3	1,518	13.8
	Illegitimate	142	32.6	100	22.8	106	21.5	127	22.9	129	19.9
Other hospitals	All	24	14.3	21	13.7	8	5.3	15	9.8	16	9.5
	Legitimate	23	14.1	20	13.4	7	4.7	15	10.2	16	9.8
	Illegitimate	1	21.3	1	27.8	1	25.6	0	0.0	0	0.0
At home	All	35	9.7	30	10.4	26	10.2	19	7.5	33	12.7
	Legitimate	31	9.1	26	9.6	23	9.7	13	5.5	25	10.4
	Illegitimate	4	20.1	4	23.8	3	18.5	6	34.7	8	42.1
Elsewhere	All	4	56.3	7	111.1	4	57.1	4	48.8	6	70.6
	Legitimate	3	50.8	6	115.4	2	36.4	2	28.2	5	72.5
	Illegitimate	1	83.3	1	90.9	2	133.3	2	181.8	1	62.5
Mothers aged 35 years and over											
All places	All	1,088	30.2	927	27.9	775	24.2	813	23.4	800	20.8
	Legitimate	980	29.8	826	27.3	699	24.1	735	23.2	707	20.2
	Illegitimate	108	34.5	101	34.1	76	25.6	78	25.8	93	26.9
NHS A hospitals	All	12	12.1	9	9.2	8	8.9	6	7.7	5	6.0
	Legitimate	9	9.7	8	8.7	7	8.4	5	6.8	4	5.3
	Illegitimate	3	45.5	1	17.9	1	14.9	1	25.0	1	13.0
NHS B hospitals	All	1,030	30.6	879	28.3	729	24.2	782	23.8	769	21.0
	Legitimate	928	30.3	787	27.8	660	24.2	709	23.6	682	20.5
	Illegitimate	102	34.6	92	32.8	69	24.5	73	25.3	87	26.4
Other hospitals	All	6	11.6	6	13.5	11	23.2	4	8.6	7	13.6
	Legitimate	5	10.2	4	9.5	11	24.2	4	9.1	7	14.3
	Illegitimate	1	35.7	2	80.0	0	0.0	0	0.0	0	0.0
At home	All	37	41.8	26	39.6	26	48.2	18	34.1	17	36.2
	Legitimate	37	45.9	23	39.2	21	43.8	15	32.7	13	30.8
	Illegitimate	0	0.0	3	42.9	5	83.3	3	43.5	4	83.3
Elsewhere	All	3	78.9	7	250.0	1	47.6	3	88.2	2	95.2
	Legitimate	1	35.7	4	210.5	0	0.0	2	69.0	1	58.8
	Illegitimate	2	200.0	3	333.3	1	250.0	1	200.0	1	250.0

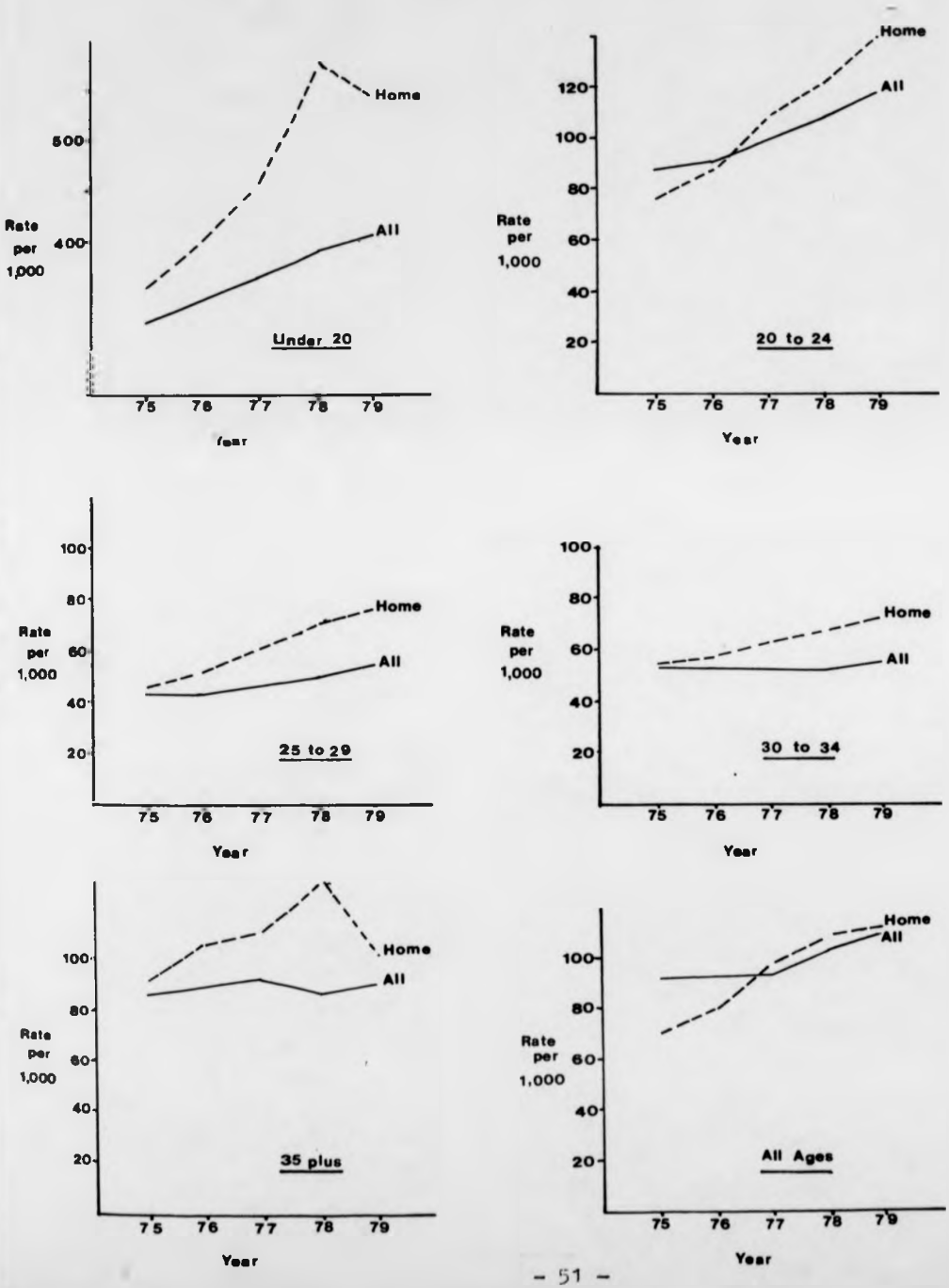
*Rate per 1,000 live and still births

TABLE 2.3

GRAPH 2. A GRAPHS ILLUSTRATING THE PERCENTAGE OF DELIVERIES IN FIVE YEAR MATERNAL AGE GROUPS FOR ALL BIRTHS AND THOSE OCCURRING AT HOME, 1975–1979



GRAPH 2.8 GRAPHS ILLUSTRATING ILLEGITIMACY RATES PER 1,000 BIRTHS, BROKEN DOWN INTO FIVE YEAR MATERNAL AGE GROUPS, FOR ALL BIRTHS AND THOSE OCCURRING AT HOME, 1975–1979



Illegitimacy

Examination of Graph 2.B shows that the illegitimacy rate for teenage mothers giving birth at home is rising more rapidly than the corresponding rate for all births. This pattern persists in the age group 20 to 24. For mothers aged 25 to 29 and 30 to 34 the illegitimacy rate is higher for births at home, but rates for illegitimacy are rising both for births at home and all deliveries. There is no consistent pattern for births to mothers aged 35 and over in either category.

Table 2.3 reveals that the perinatal mortality rate to mothers under 20 giving birth to illegitimate babies at home is far higher than the corresponding rate for all deliveries and is rising at a time when the rate for all deliveries is falling. This pattern is maintained in the older age groups.

Perinatal mortality by place of delivery, age of mother and legitimacy

As the foregoing discussion would suggest, and as is shown in Table 2.3, the risk of perinatal death for a mother of less than twenty years of age having an illegitmate birth at home is very high with approximately one in five births resulting in a perinatal death. The risk for the same group delivering in an NHS B hospital is far lower with approximately one in fifty births resulting in a perinatal death. Conversely, perinatal mortality rates to mothers aged 25 to 29 and 30 to 34 delivering at home compare favourably with their counterparts giving birth in NHS B hospitals.

Explanation of the rise in the crude perinatal mortality rate for births at home

Since the composition of the population of mothers giving birth at home has increasingly come to include a greater proportion of older women having illegitimate births, it is possible that these characteristics, normally associated with poor pregnancy outcome, could explain the rise in the crude perinatal mortality rate for births at home. One possible way of testing the hypothesis that the rise in the crude perinatal mortality rate for births occurring at home is attributable to changes in the age and marital status of the population of mothers giving birth at home, is to control for such effects by standardisation.

Using an indirect standardisation procedure, the crude perinatal mortality rate for legitimate and illegitimate births in five year age groups, were applied to the index population of births at home. In this way expected numbers of deaths to births occurring at home were estimated. The ratio of observed to expected deaths, for each year, was expressed as a standardised perinatal mortality ratio (SPMR). (See Table 2.4)

TABLE 2.4 STANDARDISED PERINATAL MORTALITY RATIOS FOR BIRTHS AT HOME 1975 - 1979

Year	Standardised perinatal mortality ratios
1975	99
1976	109
1977	130
1978	137
1979	170

These ratios were then applied to the crude perinatal mortality rate for all births, in order to produce perinatal mortality rates for births at home standardised for maternal age and legitimacy. Indirect rather than direct standardisation was used as the standard errors of an indirectly standardised rate can be shown to be less when sample sizes in the index population are small. (7)

TABLE 2.5 PERINATAL MORTALITY RATES FOR BIRTHS AT HOME, 1975-1979, STANDARDISED FOR MATERNAL AGE AND LEGITIMACY USING MATERNAL AGE AND LEGITIMACY SPECIFIC PERINATAL MORTALITY RATES FOR ALL DELIVERIES

Year	Crude perinatal mortality rate for births at home per 1 000 births	Perinatal mortality rate for births at home standardised for maternal age & legitimacy	Standard error for standardised rates
1975	18.6	19.2	1.0
1976	18.5	19.2	1.1
1977	22.9	21.9	1.3
1978	20.8	21.3	1.4
1979	24.3	24.9	1.7

* (Standard error of a standardised rate = smpr/ r where r=number of deaths in the index population)

The results of the standardisation presented in the Table 3.5 above show only small differences between the indirectly standardised perinatal mortality rates for births occurring at home, and the actual rates. Any differences that do exist can clearly be attributed to chance.

Thus, any changes in the composition of the population of women giving

birth at home with respect to maternal age and marital status, are not sufficient to explain the rise in the crude perinatal mortality rate.

The rise in the proportion of teenage mothers giving birth to illegitimate infants at home may be an indication of an other important compositional change. It is unlikely that such mothers would have been booked for delivery at home. The OPCS classifies all births occurring at the mothers normal place of residence as a home birth. No account is taken of whether it was intended that the birth should occur there.

Unplanned births at home will include mothers who are booked for a hospital delivery but because of a rapid or unrecognised labour are unable to reach hospital on time. This group will also include mothers experiencing a pre-term delivery carrying a high risk of perinatal death. Births may also occur at home in the absence of any other formal delivery plans if the mother has not been in contact with the maternity services. This may be because the mother is attempting to conceal her pregnancy or because the pregnancy is of a relatively short duration.

There has been a rapid decline in the absolute number of births at home from 19 504 in 1975 to 8 904 in 1979. This will be due largely to a decrease in the number of planned home births. Evidence from the Cardiff Births Survey (8) suggests that the overall number of unplanned births at home changes little over time. Thus, with the decline in the number of planned births at home unplanned births may have formed an increasing proportion of deliveries at home. This may account for the apparent increase in the risk of perinatal death to births at home.

Marjorie Tew has estimated that approximately 2,000 births at home a year are high risk, which she defines as births which are "unattended accidentally or deliberately, and some to mothers who, though at high predicted risk on account of age, parity, social class or of being unmarried, resist going to hospital." (9) Although it is not explicitly stated how the estimate of 2,000 was arrived at, it is approximately equal to the sum of the number of births at home each year to women who are unmarried, teenage or having a first baby.

The importance of the intended place of delivery with respect to births at home is well demonstrated in a study carried out in North Carolina. For the period 1974 to 1976, the crude neonatal mortality rate for all births was 12 per 1,000 while for births at home it was 30 per 1,000. However, when births at home were classified according to the planned place of delivery, the neonatal mortality for planned home births was 6 per 1,000 while the rate for unplanned births at home was 120 per 1,000. (10).

Home Births Survey

As the intended place of delivery is not recorded at birth registration (although the Steering Group on Health Services Information is proposing that it be collected in future) (11) it is not possible to produce perinatal mortality rates by intended place of delivery for births occurring at home in England and Wales. In order to collect this information it was necessary to mount a special survey.

Deliveries Elsewhere

These deliveries only accounted for 0.1 per cent of all births in the period 1975 to 1979 but they are associated with a very high death rate which increased 26.5 per cent in the five year period. The small numbers involved make it difficult to discern any notable trends when the births are broken down by maternal age and legitimacy.

As this is a group with a high and rising mortality, and little is known about its composition, it was decided to include them in a survey to determine their intended place of delivery.

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C H A P T E R III

The Survey Procedure

Survey population

The survey attempted to obtain information on the 9369 births which were registered as occurring outside hospital in 1979. 8877 of these live births and stillbirths were registered as having taken place at the mother's normal place of residence. The remaining 492 were 'elsewhere' deliveries.

A list of all these deliveries (which were registered in 1979 or early in 1980) was abstracted from the computer files held by the OPCS. Using this list it was then possible to extract the abridged draft live birth (309) and stillbirth (308) entry forms completed by the local registrar. Specimen copies of these forms are appended. (Appendices 1 & 2)

The draft is the record used in the compilation of official birth statistics. Certain confidential particulars, obtained under the Population (Statistics) Act of 1938, are recorded on the draft but not entered on the register. These include parents' date of birth, the date of their marriage if the child is legitimate, whether the mother has been married before and how many legitimate children she has previously given birth to. The birth drafts provided for the purposes of the survey were abridged in that the confidential particulars had been blocked out.

After extraction, these drafts were sorted by health district and within a health district each draft was numbered sequentially. The draft was checked to ensure that the birth should be included in the survey. Identifying details from the draft (mother's name and address and the date of birth) were transcribed onto questionnaires. Each mother was given a seven digit identity number which was entered on the questionnaire. This was a composite number consisting of the health

district code, the within health district sequence number and a code indicating whether it was a live birth or a stillbirth at home or an 'elsewhere' delivery. Questionnaires were then sent to the most senior supervisor of midwives, usually the Divisional Nursing Officer, Midwifery, in each of the 210 health districts in England and Wales. Names and addresses of the midwifery supervisors were obtained from the Central Midwives Board.

The survey was conducted under the auspices of the National Perinatal Epidemiology Unit, Oxford in co-operation with the London School of Hygiene and Tropical Medicine and the Office of Population Censuses and Surveys.

Pilot survey

A pilot survey, based on a sample of births which occurred during the last quarter of 1978, was carried out in the spring of 1981. The aim of the pilot survey was to test the feasibility of the survey procedure, not to produce perinatal mortality rates by intended place of delivery. The emphasis was therefore placed on having questionnaires distributed as widely as possible. This was achieved by using a stratified but non-random sample. Two home births were selected from each Area Health Authority and these together with 44 elsewhere deliveries, were the births for which additional information on the intended place of delivery was sought in the pilot survey.

A further aim of the pilot survey was to test whether midwifery records contained the required information. The main rationale for conducting the survey using midwifery, rather than other types of medical record, was that midwives had a professional structure which would permit the easy dissemination of questionnaires.

The overall response rate achieved in the pilot survey was extremely high. 92 per cent of questionnaires were returned. This suggested that the procedure of distributing questionnaires to midwives was very successful and that midwives appeared to be interested in the survey and thus sufficiently motivated to complete the questionnaires.

There was a slightly higher return for home births than for 'elsewhere' deliveries. This may have been because elsewhere deliveries were given health district codes according to the mother's normal place of residence. Thus, the supervisor of midwives in that district may have been unaware of the birth if it had taken place in another health district.

One other slight problem which emerged in the the pilot survey was that midwifery management areas did not always coincide with statutory health districts and therefore questionnaires were sometimes sent to the wrong supervisor of midwives.

The results of the pilot survey (Table 3.1) confirmed suggestions from smaller, local studies and one national survey, that about one third of the births occurring at home were unintentional. (1-3)

TABLE 3.1 INTENDED PLACE OF DELIVERY FOR BIRTHS OCCURRING AT HOME IN THE HOME BIRTHS PILOT SURVEY

Place of Delivery	Number	Percentage
Consultant Unit	33	20.6
GP bed in Consultant Unit	9	5.7
GP Unit	9	5.7
Home	98	61.3
Not booked	11	7.0
Total	160	100.0%

The excellent response rate and high quality of information contained in questionnaires returned in the pilot survey, particularly impressive considering that these deliveries had taken place more than two years before, suggested that it was appropriate to send questionnaires to midwifery supervisors.

A few minor alterations were made to the questionnaire but the survey procedure remained unchanged.

The Questionnaire

A copy of the questionnaire is appended (Appendix 3). The primary aim of the questionnaire was to ascertain the intended place of delivery immediately prior to the onset of labour. The main question asked was

> "Where was this mother booked for delivery (ie. the intended place of delivery) immediately before the onset of labour?"

Other supplementary questions were asked about each mother but the questionnaire

was kept deliberately brief as some health districts were to be asked to complete over 250 questionnaires.

The main question was followed by a supplementary question applicable to only those cases where the actual and intended place of delivery differed. This question sought an explanation for that discrepancy, and was an attempt at identifying those women who, although booked for a hospital delivery (possibly to appease midwifery and medical staff), always intended to deliver at home. A further question was included to cover those women for whom no booking had been made.

In addition to information on the intended place of delivery, details on birthweight, gestational age, who delivered the baby and the mother's reproductive history, were requested.

To prevent the restriction of outcome measurements for births in the survey to mortality, an attempt was made to obtain information on maternal and infant morbidity. Two questions were included to elicit such information. Firstly, midwives were asked whether there was any discernable abnormality present in the baby at birth. A second question asked if the mother or baby were transferred to hospital after the delivery, and if so why.

The questionnaire was not designed to identify possible social or medical risk factors, as it was never intended that there be any assessment of the suitability of the intended place of delivery.

Questions pertaining to home births and elsewhere deliveries were identical but the questionnaires were colour coded to avoid confusion.

Confidentiality and Approval

Approval for the survey was sought and obtained from the Royal College of Midwives, the Central Midwives Board and the General Medical Services Committee of the British Medical Association.

Before the main Home Births Survey went into the field, letters were sent to all Local Medical Committees and Regional, District and Area Nursing Officers explaining the aims of the survey and informing them that it would shortly be taking place. These letters were sent out well in advance of the questionnaires, allowing sufficient time for local ethical committees to approve the survey if that was deemed necessary.

Several steps were taken to ensure confidentiality. Birth drafts supplied for the Home Births Survey did not contain confidential particulars. The Population (Statistics) Act only allows those working for the Office of Population Censuses and Surveys to have direct access to these details.

Identifying particulars entered on the questionnaire (mother's name, address, date of birth and the baby's name and place of birth) were written on a tear-off strip at the side of the questionnaire. When questionnaires had been filled in midwives were asked to remove these strips. The seven digit identity number, entered on the main body of the questionnaire was then used to link the questionnaire with the appropriate birth draft.

Data Collection

The full survey began in June 1981 with questionnaires being dispatched throughout the two succeeding months. The majority of questionnaires were returned by October 1981 but questionnaires were still trickling back as late as January 1982.

All midwives have a statutory responsibility to retain the records of all the deliveries for which they have been responsible, for a period of twenty years after the birth. In some health districts, for the purposes of the survey, records had to be centrally collected or questionnaires forwarded to individual midwives by midwifery supervisors.

Two health districts, Southend and Norwich had in excess of 270 deliveires in 1979. Field visits were made to these districts to aid in the completion of questionnaires. This also provided an opportunity to monitor the quality and completeness of midwifery records from which information was being abstacted. Field visits were also made to Nuneaton, Leicester and Ealing where acute staff shortages meant that they were unable to complete the questionnaires without help.

Midwifery records, in the districts visited, appeared to have been kept meticulously and the information required to complete each questionnaire was readily available.

Midwives were asked to return questionnaires by a FREEPOST system to the National Perinatal Epidemiology Unit, Oxford. Questionnaires were then transferred to the London School of Hygiene and Tropical Medicine for

processing.

All registered births are given a health district coding which is based on the usual address of the mother. However, although a mother may have resided within a certain statutory health district her delivery may have been managed by an adjacent health district. Similarly with 'elsewhere' deliveries; these births may have occurred in an entirely different health district from that in which the mother was normally resident. In such cases the questionnaires were redirected to the appropriate health district for completion.

Response

Only two of the 210 health districts in England and Wales failed to respond to the survey. Within health districts it was not always possible to trace the necessary recor ds and the percentage of incomplete questionnaires varied from zero to 50 per cent. Overall, information additional to birth registraton data was obtained for 93 per cent of all deliveries included in the survey.

Data compilation and coding

Births

Completed questionnaires were sorted by health district and attached to the appropriate birth registration draft containing the birth registration number. For every birth included in the survey the OPCS provided a listing of birth registration numbers and a corresponding ten digit hache (random number) and sequence number which was to be used in the data linkage procedures. The listing also contained social class and occupational codes

for ten per cent of the parents. These details from the listing and information from the questionnaire were coded for every birth.

Deaths

There were 318 stillbirths and infant deaths to births occurring at home and among 'elsewhere' deliveries in 1979. A list of these deaths together with the corresponding birth registration numbers was supplied by the OPCS. The death registration of an infant dying within the first year of life is routinely linked to the corresponding birth registration using the NHS number of the dead baby. Details of the death registration are forwarded by the registrar to the National Health Service Central Register in order that it can be amended. NHS numbers are based on birth registration information. The list supplied by the OPCS contained details of the cause of death (International Classification of Disease 9th Revision), age at death and the social class of the father (or the mother if the child was illegitimate). Again using birth registration numbers each death was attributed the corresponding hache and sequence number. Details of the coding schedule are appended. (Appendix 4)

Data editing

Coded data was punched and verified and compiled on magnetic tape. Cases were sorted using SORTMERGE (3). The raw data was cleaned using a FORTRAN program which checked the ranges for each value as well as completing a range of consistency checks on each case. (Appendix 5)

Cases for which error messages appeared were checked against data in the original questionnaires and editing was performed using ALTAPE (4).

Data Linkage

In order to achieve the overall aim of the research, perinatal mortality rates by intended place of delivery for all births occurring at home in 1979, it was necessary to link three sources of data together: birth registration, death registration and information generated by the Home Births Survey.

Confidential particulars collected at birth registration can only be accessed directly by the OPCS personnel. Information on births derived from the Home Births Survey and death registration details were linked together at the London School of Hygiene and Tropical Medicine. A magnetic tape containing this information was then supplied to OPCS where it was linked to the corresponding birth information.

References

(1) Bull M J V. **Letter to J. Royal College of General Practitioners** 1980; 30 : 208-215.

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(3) O'Brien M. Home and hospital confinements : a comparison of the experience of mothers having home and hospital confinements. **J. Royal College of General Practitioners** 1978; 28: 460-466.

(4) **International Classification of Diseases**, 9th Revision Geneva : W.H.O. 1978.

(5) **SORT/MERGE** Instant CDC Publication No. 60497600.

(6) Greenwood L. **ALTAPE**, London School of Hygiene Tape Library, 1975.

C H A P T E R IV

Analysis of Research Data

Introduction

The numbers included in the survey differ slightly from the previously published figures as it was necessary to make a number of minor alterations to the original file of home and 'elsewhere' deliveries registered in 1979. Also, after the survey, some further reclassification of cases was required. Details of these changes are documented in this chapter.

Births excluded from the Home Births Survey

Eighty-two births which appeared on the list of births registered in 1979 as occurring at home or which were classified as 'elsewhere' deliveries and were therefore included in the published figures for that year (1-2) were excluded from the Home Births Survey. Table 4.1 gives a detailed breakdown of the births involved and the reason for their exclusion. Fourty-two births occurring at home in 1979 but registered in 1980, and eight 'elsewhere' deliveries registered in 1980 but which occurred in 1979, were included in the survey.

The two births recorded as not surveyed in Table 4.1 should have been included in the survey but the drafts for these births were either not extracted or mislaid. Consequently, questionnaires were not sent out.

In birth statistics published by the OPCS, the category labelled 'elsewhere' includes deliveries in psychiatric institutions, reception centres, remand homes and homes for unmarried mothers, in addition to those occurring at private addresses and in ambulances. For the purposes of this survey only deliveries occurring at an address other than the mother's normal home address, and those births occurring in transit (ambulances, taxis etc.), were included.

TABLE 4.1 TABLE SHOWING BIRTHS WHICH WERE EXCLUDED FROM THE HOME BIRTHS SURVEY AND THE REASONS FOR THEIR EXCLUSION

HOME BIRTHS

Excluded Reason for Exclusion	Live Birth	Stillbirth
Punched* incorrectly as home	9	
Births prior to 1978	21	
1978 births registered in 1979	36	1
Not surveyed	2	
Total	68	1
Added		
From 1980 birth registrations	41	1

ELSEWHERE DELIVERIES

Excluded Reason for Exclusion	Live Birth	Stillbirth
Punched / coded incorrectly	2	
Name and address of mother unknown		9
1978 birth registered in 1979	2	
TOTAL	4	9
Added		
From 1980 birth registration	8	

*Incorrectly entered onto computer

Births which were reported to have occurred at home in 1979 but which were not included in the Home Births Survey

During the data collection stage of the survey, midwives reported on twenty-six births said to have occurred at home, which were not included in the survey. Details of these births were forwarded to the National Health Service Central Register, in an attempt to trace their birth registration numbers. Registration numbers were obtained for nineteen of these births, and the original draft birth registraton forms were then extracted. Table 4.2 details what was recorded on the birth draft about the place of delivery.

TABLE 4.2 TABLE SHOWING THE PLACE OF DELIVERY ACCORDING TO THE DRAFT BIRTH REGISTRATION FORM FOR BIRTHS REPORTED BY MIDWIVES TO HAVE OCCURRED IN 1979 BUT WHICH WERE NOT INCLUDED IN THE HOME BIRTHS SURVEY

Place of delivery as recorded on birth draft	Number
Hospital	7
Home delivery but incorrectly coded as hospital delivery	2
Elsewhere delivery but incorrectly coded as hospital delivery	1
Home delivery correctly coded but incorrectly punched	9
Unable to trace registration number	7
Total	26

Of these 26 deliveries at least 12 should have been included in the survey. The effect of all these changes are detailed in Table 4.3

TABLE 4.3 PUBLISHED FIGURES FOR 1979 COMPARED WITH NUMBER OF BIRTHS INCLUDED IN THE SURVEY

Place of birth	Published figures for 1979	Births excluded	Births included	Final total of births surveyed
Home				
Live births	8797	68	41	8770
Stillbirths	107	1	1	107
Elsewhere				
Lives	513	51	8	470
Stillbirths	31	9	-	22
Totals	9448	129	50	9369

Consistency checks between Home Births Survey data and registration details

As a consequence of the linkage of information gathered in the survey with birth and death registration details, it was possible to perform some additional consistency checks.

Birthweight

Birthweight is not recorded at birth registration but is documented when the birth is notified to the local health authority. Birth notification should take place within 36 hours of delivery and it is the legal responsibility of the birth attendants to ensure that this is done. A list of all notified births and their corresponding birthweights are supplied to local registrars, who then forward the details to the Vital Statistics Branch of OPCS. (3) Birthweight is now available for 96 per cent of registered live births, (4) but in 1979 it was only available for 60 per cent of live births.

Table 4.4 is a crosstabulation of birthweight from birth notification, with birthweight as recorded by midwives on the Home Births Survey questionnaires. This table demonstrates that birthweight from the "OPCS linked file" was only available for 53.5 per cent of home or "elsewhere" births compared with the 88.6 per cent recorded in the survey. There is an 86 per cent agreement (within 500 gram groups) between the two records of birthweight.

The potential for error would seem to be greater in birthweight used by OPCS as it does not come directly from medical records but a secondary source. Given this, and the limited availablity of birthweight data from OPCS sources, all analyses have been carried out using survey birthweight.

TABLE 4.4 BIRTHWEIGHT AS RECORDED FOR ALL HOME AND ELSEWHERE DELIVERIES IN THE HOME BIRTHS SURVEY

OPCS birthweight	Survey birthweight											
	Less than 501 grams	501 to 1000 grams	1001 to 1500 grams	1501 to 2000 grams	2001 to 2500 grams	2501 to 3000 grams	3001 to 3500 grams	3501 to 4000 grams	4001 to 4500 grams	4501 grams & over	Not known	All
Less than 501 grams	2	-	-	-	-	1	-	-	-	-	1	4
501 to 1000 grams	-	14	-	1	-	1	1	-	-	-	7	24
1001 to 1500 grams	-	1	34	-	1	-	2	-	-	-	15	53
1501 to 2000 grams	-	1	3	50	3	2	1	1	-	-	14	75
2001 to 2500 grams	-	-	1	2	181	13	5	3	1	-	33	239
2501 to 3000 grams	-	-	-	1	22	652	41	16	2	-	100	834
3001 to 3500 grams	-	-	1	1	9	42	1423	103	6	1	178	1764
3501 to 4000 grams	-	-	1	-	-	11	87	1178	38	5	137	1457
4001 to 4501 grams	-	-	-	-	2	2	7	17	360	7	43	438
4501 grams & over	-	-	-	-	-	2	1	4	7	82	12	108
Not stated	-	20	34	42	145	585	1446	1130	371	70	530	4373
All	2	36	74	97	363	1311	3014	2452	785	165	1070	9396

Parity

Only mothers' previous legitimate parity is recorded at birth registration. For this reason a question on mothers' pregnancy history was included on the survey questionnaire. Table 4.5 shows the information on maternal parity from the questionnaires crosstabulated with details of legitimate parity recorded at birth registration. 7 368 births were to mothers whose previous parity was recorded on the questionnaire, and who had had at least one legitimate birth recorded at the registration of the current birth. There is an 89.8 per cent agreement between information from those two different sources. With only legitimate parity recorded at birth registration, previous maternal parity according to OPCS sources will be under recorded. This is shown in Table 4.5 where 4.1 per cent of births appear above the leading diagonal, ie. when the number of previous live births recorded at registration is greater than the number reported by midwives in the survey. A higher percentage (6.1 per cent) appears below the leading diagonal. These are cases where parity as recorded on the questionnaires is greater than that recorded at registration.

TABLE 4.5 SURVEY PARITY CROSSTABULATED WITH PARITY AS RECORDED AT BIRTH REGISTRATION

Survey parity (previous number of births)	OPCS parity (number of previous births)												
	Illegitimate	0	1	2	3	4	5	6	7	8	9	10 or more	All
0	288	393	33	16	1	1	-	-	-	-	-	-	732
1	260	79	3068	114	13	1	-	-	-	-	-	-	3535
2	187	30	143	2267	60	12	-	-	-	-	-	-	2699
3	79	6	15	82	682	17	1	1	-	-	-	-	883
4	53	3	6	7	30	123	10	1	-	-	-	-	233
5	13	-	1	-	2	14	47	6	2	1	-	-	86
6	9	-	1	2	-	4	8	23	-	-	-	-	47
7	1	-	2	-	-	1	-	4	11	2	-	-	21
8	1	-	-	-	1	-	1	-	6	5	3	2	19
9	1	-	-	-	-	-	-	-	-	-	-	1	2
10 or more	-	-	-	-	-	-	-	-	1	-	1	1	2
Not stated	219	83	384	291	92	24	6	5	5	-	-	-	1008
All	1111	594	3653	2779	881	197	73	40	25	8	4	4	9369

Disputes

A case could be coded as a "dispute" if :-

1. It was noted that the coding of the place of delivery, as shown on the draft birth or stillbirth registration form, was incorrect but in such a way that the birth should still be included in the survey, ie. deliveries which had been coded as home births but were elsewhere deliveries and vice versa.

2. If the birth had been registered and correctly coded as either home or elsewhere delivery, but the information supplied by midwives suggested that the medical records differed with regards to the place of delivery.

In all, 74 births were coded as "disputes", of which 27 fell into the first category. In the analysis, a home or elsewhere birth was included in the category to which it had been previously assigned, unless it was clear that the initial coding by the OPCS was incorrect. These 27 births were reclassified into the correct categories as is shown in Table 4.6.

TABLE 4.6 CLASSIFICATION OF BIRTHS INCORRECTLY CODED AS HOME OR ELSEWHERE PRIOR TO ANALYSIS.

Birth status as coded by OPCS	Place of birth: Home live birth	Home stillbirth	Elsewhere live birth	Elsewhere stillbirth	All
Home live birth	8746	0	24	0	8770
Home stillbirth	0	107	0	0	107
Elsewhere live birth	2	0	468	0	470
Elsewhere stillbirth	0	1	0	21	22
Total	8748	108	492	21	9369

Gestational Age

One of the curious findings of the consistency checks between registration particulars and information derived during the survey was that five still-births were reported by midwives to have had a gestational age of less than 28 weeks. If this was true then these births should not have been registered because they were late spontaneous abortions. Adhering to the convention that registration details were taken to be correct, unless there was clear evidence from the birth registration draft that there had been a mistake, these stillbirths were not excluded.

Analysis procedure

For each birth included in the survey 48 variables were defined and three new variables were created from the original variables. As a result of the linkage between survey data and registration particulars a further 46 variables were available for use in analyses. Variable lists are appended. (Appendices 6 & 7) Analysis of the survey data was carried out at the London School of Hygiene and Tropical Medicine using a terminal connected to the CDC 7600 computer at the University of London Computer Centre. The Statistical Package for Social Scientists (SPSS) was employed and sub-programs used from this package include:-

a. Frequencies

b. Crosstabs (used to produce contingency tables)

c. Breakdown (which produces means for any value of a defined variable or series of crosstabulated variables)

Presentation of the results

Many of the results from the survey are presented with reference to the

intended place of delivery. The various categories of intended place of delivery used in the survey, do not entirely correspond with those used in the birth registration statistics discussed in chapter II. Outlined below is a brief description of the categories used in the home births survey and a schematisation of how these relate to categories in the birth registration statistics.

Consultant unit*	Mother booked for a hospital delivery under the care of a consultant obstetrician.
GP bed in a consultant unit*	Mother booked for delivery under the care of her general practitioner but in a bed situated in a consultant obstetric unit.
Integrated GP unit*	Mother booked for delivery under the care of her general practitioner in a GP unit situated in a hospital where consultant obstetric facilities are available.
Isolated GP unit+	Mother booked for delivery under the care of her general practitioner in a hospital where there are no consultant obstetric facilities available.
Home	Mothers booked for delivery at her normal home address
Unbooked	No booking arrangements made prior to the onset of labour.
Not known	Intended place of delivery unknown or not recorded by midwives on the questionnaires.

* NHS hospital B

\+ NHS hospital A

Statistical tests and levels of statistical significance

Any differences between rates, to which attention is drawn in the text, are statistically significant at the 5 per cent level unless otherwise specified. Confidence limits of rates (based on the normal distribution) are given where numbers in the numerator are sufficient to make them meaningful.

Statistical tests used in the analyses were:-

a. Parametric
   Differences between sample means and proportion using SNDs
   Fishers Exact

b Non parametric
   Kolmogorov Smirnov

Restrictions on tabulations produced at the OPCS

As only the OPCS personnel are permitted access to the confidential particulars recorded at birth registration any tabulations using variables derived from these particulars were produced by the OPCS using the "Tau" package.

The frequencies in each cell of these tables had to be either zero or above two in order that it was not possible to identify confidential items of data relating to any individual woman in the survey. This restriction did limit the scope of analyses, particularly in groups with small numbers of perinatal deaths.

References

(1) Registrar General **Birth Statistics 1979 Review of the Registrar General on births and patterns of family building in England and Wales in 1979.** London: HMSO, 1981 (Series FMI, No. 6).

(2) Office of Population Censuses and Surveys. **Mortality statistics 1978, 1979. Perinatal and infant : social and biological factors** England and Wales. London: HMSO, 1981. (Series DH3, No. 7).

(3) Black N, Macfarlane A. Methodological kit : Monitoring perinatal statistics in a health district. **Community Medicine** 1982; 4: 25-33.

(4) Office of Population, Censuses and Surveys. **Infant and perinatal mortality by birthweight : 1979 estimates** OPCS Monitor 1982; April 17: 4 (DH3 82/2).

C H A P T E R V

Perinatal Mortality and Cause of Death by Intended Place of Delivery for Births Occurring at Home in 1979

Introduction

The primary aim of the Home Births Survey was to produce perinatal mortality rates for each intended place of delivery for all births occurring at home in 1979. Results relating to this part of the survey are documented in this chapter. It was noted in Chapter I that approximately one quarter of all perinatal deaths in the United Kingdom are the result of lethal malformations. Because it is important to take account of the cause of death when interpreting the risk of perinatal death associated with different places of delivery, cause specific perinatal mortality rates for births at home are reported and discussed.

Intended place of delivery for births occurring at home in 1979

Table 5.1 shows that of those births occurring at home in 1979, for which the intended place of delivery was recorded, 24 per cent were not intended to occur there. Almost 15 per cent of births at home were booked for delivery in a consultant unit, six per cent for some form of general practitioner care and three per cent of mothers giving birth at home had made no formal plans for delivery ie. they were unbooked. It was not possible to obtain information on the intended place of delivery for nine per cent of mothers included in the survey.

Perinatal mortality by intended place of delivery for births occurring at home in 1979

The data presented in Table 5.2 reveal a 50 fold variation in perinatal mortality rates according to the intended place of delivery. The death rate for births intended to occur at home was very low at 4.1 per 1,000. The risk of perinatal death to mothers intending to give birth in hospital

varied according to the type of hospital for which they were booked. The perinatal mortality rate for births intended to occur in consultant units was relatively high at 67.5 per 1 000 birth. Perinatal mortality rates for women intending to give birth in hospital, under the care of their general practitioner, varied from 4.1 per 1 000 births for mothers booked in integrated general practitioner units, to 22.6 per 1 000 births for those intending to give birth in isolated general practitoner units. Differences in perinatal mortality rates for the various GP categories are not statistically significant.

TABLE 5.1 INTENDED PLACE OF DELIVERY FOR BIRTHS OCCURRING AT HOME IN 1979

Intended place of delivery	Number	Percentage
Consultant Unit	1303	14.7
GP bed in consultant unit	170	1.9
Integrated GP unit	243	2.7
Isolated GP unit	133	1.5
Home	5917	66.8
Unbooked	295	3.3
Not known	795	9.0
Total	8856	100.0%

The perinatal mortality rate for babies born to mothers for whom there was no specific intended place of delivery, ie. unbooked, was extremely high at 196.6 per 1 000 births. This high rate is similar to that observed in the routine statistics from the OPCS linked file, for teenage mothers giving

birth to illegitimate babies at home. (1)

The risk of perinatal death for mothers for whom the intended place of delivery was not known was also relatively high at 45.3 per 1 000.

Considering the GP categories as one group, the perinatal mortality for each intended place of delivery is significantly different ($p<0.01$) from the rate for every other group.

TABLE 5.2 PERINATAL MORTALITY RATES BY INTENDED PLACE OF DELIVERY FOR BIRTHS OCCURRING AT HOME IN 1979

Intended place of delivery	Number of stillbirths	Number of first week deaths	Number of live births & stillbirths	Perinatal mortality rate per 1 000 births	95% confidence interval
Consultant unit	46	42	1303	67.5	(53.9 to 81.2)
All GP beds	4	3	546	12.8	(3.4 to 22.2)
GP bed in consultant unit	2	1	170	17.7	
Integrated GP unit	1	0	243	4.1	
Isolated GP unit	1	2	133	22.6	
Home	11	13	5917	4.1	(2.4 to 5.7)
Unbooked	30	28	295	196.6	(151.3 to 242.0)
Not known	17	19	795	45.3	(30.8 to 59.7)
Total	108	105	8856	24.1	

Table 5.3 shows the percentage of perinatal deaths by intended place of delivery as compared with the percentage of births. The largest contributor to the overall perinatal mortality rate for births at home was clearly perinatal deaths to mothers who intended to give birth in consultant units. A high percentage (27.2%) of perinatal deaths also occurred to mothers who were unbooked for delivery. Only 11 per cent of deaths were to mothers who had planned to give birth at home.

TABLE 5.3 PERCENTAGE OF PERINATAL DEATHS BY INTENDED PLACE OF DELIVERY TO BIRTHS OCCURRING AT HOME IN 1979

Intended place of delivery	Percentage of births	Percentage of perinatal deaths
Consultant unit	14.7	41.3
GP units (all)	6.1	3.3
Home	66.8	11.3
Unbooked	3.3	27.2
Not known	9.0	16.9
Total	100.0	100.0

Neonatal mortality by intended place of delivery for births occurring at home in 1979

The pattern of neonatal mortality rates (that is deaths to live born infants in the first month of life per 1 000 live births) as shown in Table 5.4 is very similar to that observed for perinatal mortality. This is because deaths in the first week account for 93 per cent of all neonatal deaths to births at home. When all GP categories are combined the neonatal

mortality rate is significantly different ($p < 0.001$) for every group, when compared with the rate for any other group, except when the rate for GP units is compared with that for births planned to occur at home and when the rate for consultant unit booked deliveries is compared with that for those births where the intended place of delivery was not known.

TABLE 5.4 NEONATAL MORTALITY RATES FOR EACH INTENDED PLACE OF DELIVERY FOR BIRTHS OCCURRING AT HOME IN 1979

Intended place of delivery	Number of neonatal deaths	Number of live births	Neonatal mortality rate	95% confidence interval
Consultant Unit	44	1257	35.0	(24.8 to 45.2)
All GP beds	3	542	5.5	-
Home	16	5906	2.7	(1.4 to 4.0)
Unbooked	31	265	117.0	(78.3 to 155.7)
Not known	19	778	24.4	(13.6 to 35.3)
Total	113	8748	12.9	

Post Neonatal mortality by intended place of delivery for births occurring at home in 1979

The ranking of post neonatal mortality rates (that is deaths to live born infants after the first month but before the end of the first year of life, per thousand births) by intended place of delivery remains the same as that for neonatal and perinatal mortality rates. Differences in post neonatal mortality rates between groups of births at home defined by the

intended place of delivery are only statistically significant when the rate for unbooked births (18.9 per 1,000 births) is compared with the rate for any other group.

TABLE 5.5 POST NEONATAL MORTALITY RATES FOR EACH INTENDED PLACE OF DELIVERY FOR BIRTHS OCCURRING AT HOME IN 1979

Intended place of delivery	Number of infant deaths	Number of live births	Infant mortality rate	95% confidence interval
Consultant unit	8	1257	6.4	(2.0 to 10.8)
All GP units	2	542	3.7	-
Home	26	5906	4.4	(2.7 to 6.1)
Unbooked	5	265	18.9	(2.5 to 35.3)
Not known	4	778	5.1	(0.1 to 10.1)
Total	45	8748	5.1	

The results presented so far indicate that the influence of the intended place of delivery on mortality rates for births occurring at home is strongest around the time of delivery. Significant differences in perinatal and neonatal mortality rates were observed for each intended place of delivery. Excluding the rate for unbooked births, differences between post neonatal mortality rates, for each intended place of delivery, were small and not statistically significant. The post neonatal mortality rate for unbooked births was significantly higher than the rates for births planned to occur at home, in consultant units, in GP units and for those births where the intended place of delivery was unknown. This suggests that the adverse social and biological factors

associated with the high mortality observed in the perinatal period for babies born to these unbooked mothers, continue to operate throughout the first year of life.

Clearly, the intended place of delivery is an important discriminator between different groups of mothers giving birth at home, whose babies have widely differing perinatal mortality experiences. There are, however, perinatal deaths which may be the result of causes unlikely to be related to the actual or intended place of delivery. This is perhaps most important when considering the risk of perinatal death for a mother having a planned home birth.

Cause of death by intended place of delivery for births occurring at home in 1979

Cause of death is classified by the OPCS using the International Classification of Diseases. In 1979 the ninth revision was in use. Cause of death was one of the variables repunched on the death records of infants born at home but dying during the first year of life. These death records were linked with the additional information on the circumstances of the birth derived from the home births survey. Thus, it has been possible to produce tabulations of the cause of death by intended place of delivery for babies born at home in 1979.

The cause specific perinatal mortality rates for each intended place of delivery appear in Table 5.7. (Absolute numbers of still births and first week deaths by intended place of delivery are given in Table 5.6)

The cause specific perinatal mortality rate for deaths attributed to

congenital anomalies for births occurring at home (3.5 per 1,000) is not significantly greater than the rate for all births in England and Wales in 1979 (3.2 per 1,000). The overall rate for births at home, however, masks considerable variations in mortality according to the intended place of delivery. The rate for births occurring at home but booked for delivery in a consultant unit (9.2 per 1,000) is significantly higher than the rate for all births in England and Wales. ($P < 0.001$)

This finding is not unexpected, as mothers who have previously given birth to a congenitally abnormal baby, or those mothers who have been diagnosed antenatally as carrying a congenitally abnormal child, are likely to have been selectively referred to a consultant unit for delivery.

More deaths at home were attributed to hypoxia, birth asphyxia and other respiratory conditions than any other cause. The cause specific perinatal mortality rate for all births at home of 5.9 per 1,000 births is significantly higher than the rate of 3 per 1,000 for all births in 1979. ($P < 0.001$) Most of the perinatal deaths from these conditions, to babies born at home, were those whose deliveries were intended to occur in consultant units or those for whom there was no booking for delivery.

Perinatal deaths attributed to slow fetal growth, fetal malnutrition and immaturity were an important cause of death for births at home. With a cause specific perinatal mortality rate of 3.3 per 1,000 births this compares unfavourably with the rate for all births of 1.0 per 1,000. ($P < 0.001$) The rates for babies born at home, whose deliveries were booked to occur in a consultant unit or whose deliveries had not been

TABLE 5.6 NUMBER OF STILLBIRTHS AND FIRST WEEK DEATHS BY CAUSE OF DEATH AND INTENDED PLACE OF DELIVERY

International classification of diseases*		Intended place of delivery										All
		Stillbirths					First week deaths					
Code	Cause of death	Consultant unit	GP Unit	Home	Unbooked	Not known	Consultant unit	GP Unit	Home	Unbooked	Not known	
000–139	Infectious and parasitic diseases											
460–519	Diseases of respiratory system						1			2		3
480–486	Pneumonia									2		2
740–759	Congenital anomalies	7	1	2	2	5	5	1	7		1	31
740	Anencephalus	2	1	1								4
741	Spina bifida	1										1
742	Other congenital anomalies of the central nervous system					1						1
745–747	Other anomalies of the heart and circulatory system					2	2	1	3			8
760–779	Certain conditions originating in the perinatal period	39	3	9	28	12	36	2	6	19	14	168
760,761	Maternal conditions	2		1	1							4
762	Conditions of the placenta, cord or membranes	15	2	2	6	3						28
763	Other complications of labour and delivery	4		1	4		1	1	1	1		13
764,765	Slow fetal growth, fetal malnutrition and immaturity	3			1	1	13	1	2	5	3	29
767	Birth trauma						3				2	5
768–770	Hypoxia, birth asphixia and other respiratory conditions	3		4	8	4	18	1	2	7	5	52
771	Infections specific to the perinatal period											
773	Haemolytic disease of the newborn											
798	Sudden death cause unknown											
E800–999	External causes of injury and poisoning									7	4	11
000–999	All causes	46	4	11	30	17	42	3	13	28	19	213

TABLE 5.7 PERINATAL MORTALITY RATES BY CAUSE OF DEATH AND INTENDED PLACE OF DELIVERY FOR BIRTHS OCCURRING AT HOME IN 1979

International classification of diseases *		Intended place of delivery						
Code	Cause of death	Consultant unit	GP units	Home	Unbooked	Not Known	All at home	All births in 1979
000-139	Infectious and parasitic diseases							0.0
460-519	Diseases of respiratory system	0.8			6.8		0.3	0.1
480-486	Pnuemonia				6.8		0.2	0.1
740-759	Congenital anomalies	9.2	3.7	1.5	6.8	7.6	3.5	3.2
740	Anencephalus	1.5	1.8	0.2			0.5	0.8
741	Spina bifida	0.8					0.1	0.4
742	Other congenital anomalies of the central nervous system					1.3	0.1	0.3
745-747	Other anomalies of the heart and circulatory system	1.5	1.8	0.5		2.5	0.9	0.5
760-799	Certain conditions originating in the perinatal period	57.6	9.2	2.5	159.3	32.7	19.0	11.1
760,761	Maternal conditions	1.5		0.2	3.4		0.5	1.4
762	Conditions of the placenta, cord or membranes	11.5	3.7	0.3	20.3	3.7	3.2	3.4
763	Other complications of labour and delivery	3.8	1.8	0.3	17.0		1.5	0.3
764-765	Slow fetal growth, fetal malnutrition and immaturity	12.3	1.8	0.3	20.3	5.0	3.3	1.0
767	Birth trauma	2.3				2.5	0.6	0.3
768-770	Hypoxia, birth asphixia and other respiratory conditions	16.1	1.8	1.0	50.9	11.3	5.9	3.0
771	Infections specific to the perinatal period							0.0
773	Haemolytic disease of the newborn							0.2
798	Sudden death cause unknown							0.0
E800-999	External causes of injury and poisoning				23.7	5.0	1.2	0.0
000-999	All causes	67.5	12.8	4.1	196.6	45.3	24.1	14.6

* IXth Revision

booked at all (i.e. unbooked), were significantly higher ($P < 0.001$) than the corresponding rate for all births in England and Wales.

Similarly, perinatal deaths at home resulting from complications of labour and delivery had a cause specific perinatal mortality of 1.5 per 1,000 births, which is significantly higher than the corresponding rate (0.3 per 1,000) for all births. ($P < 0.001$) The majority of these perinatal deaths to babies born at home, were births for which no booking for delivery had been made (i.e. unbooked).

Perinatal deaths resulting from maternal conditions and conditions of the cord, placenta or membranes among births at home, were associated with lower mortality rates than the overall rates for all deliveries. The observed differences between rates for home and all births are only statistically significant in the case of maternal conditions. ($P < 0.05$)

Deaths resulting from pneumonia only occurred amongst babies born to mothers who were unbooked for deliveries or those for whom the intended place of delivery was unknown; likewise deaths from external causes of injury and poisoning.

The ranking of cause specific perinatal mortality rates within intended place of delivery groups remains the same as the overall cause of death specific rates for births at home.

Information on cause of death used in the preceding analysis was derived from death certification. The place on a death certificate reserved for the recording of death is divided into two parts.

FIGURE 5.A RECORDING OF CAUSE OF DEATH ON A DEATH CERTIFICATE

Part I	(a)	Intraventricular haemorrhage
due to	(b)	Respiratory Distress Syndrome
due to	(c)	Prematurity (1.56 kg)
Part II		Toxaemia

(After Adelstein, 1980) (2)

In Part I, the medical practitioner certifying the cause of death is asked to record the causal sequence of conditions (from (a) to (c)) which resulted in death. The condition specified in the last row is taken to be the underlying cause of death. In the example above, this was prematurity. Conditions specified in Part II may have contributed to the underlying cause but are not part of the final sequence of events leading to death. It is the underlying cause of death which is used in most official statistics published by the O.P.C.S. and also in analysis of cause of perinatal death in this chapter.

Unfortunately, doctors sometimes fail to observe the rules for completing death certificates and record the events leading to death in the wrong order or omit some important details. (2)

Although the perinatal mortality rate for births planned to occur at home was relatively low, it is clearly of interest to be able to distinguish between those deaths which resulted from causes unlikely to have been influenced by the place of delivery ie. home, and those deaths which

might have been prevented had the delivery taken place in hospital. Unfortunately, to do so is beyond the scope of this study. The information obtained in the home births survey is not detailed enough, nor is the precision of cause of death recording sufficiently accurate (for reasons explained above) for such a judgement to be made.

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C H A P T E R VI

Characteristics of the Babies Born to Mothers Giving Birth at Home in 1979

Introduction

The results presented in the prece ding chapter revealed significant differences between perinatal mortality rates for each intended place of delivery for births occurring at home in 1979. In this chapter the results of analyses relating to the various characteristics of the babies are presented, to try and establish whether the distributions of these characteristics vary significantly according to the intended place of delivery, and if so, whether this explains the differences in the levels of perinatal mortality associated with each intended place of delivery.

Gestational Age

The mean gestational age reported for all births occurring at home was 39.6 weeks. The highest mean gestational age, 40.0 weeks was recorded for all births intended to occur at home. The means for intended consultant unit and GP unit deliveries were both above 38 weeks at 38.3 and 39.4 respectively. Babies born with gestational ages of less than 38 weeks are normally regarded as premature. Differences between mean gestational ages for each of the four intended place of delivery categories are statistically significant. ($P<0.01$)

TABLE 6.1 : MEAN GESTATIONAL AGE BY INTENDED PLACE OF DELIVERY

Intended place of delivery	Mean gestational age	Standard error of the mean	95% Confidence interval
Consultant Unit	38.3	0.091	(38.1 to 38.5)
GP Units (all)	39.4	0.090	(39.3 to 39.5)
Home	40.0	0.015	(40.0 to 40.0)
Unbooked *	37.4	0.315	(36.8 to 38.0)
All deliveries	39.6	0.022	(39.6 to 39.5)

* Gestational age only reported for 53% of cases (1115 missing values)

The results presented in Table 6.2 show the distribution of gestational age for each intended place of delivery. Overall 93.3% of births occurring at home had a gestational age of 38 weeks and only 1.6% of births had a gestational age of 32 weeks or less. As expected, intended home births had the highest proportion of births of 38 weeks or more gestation. There were no significant differences in the proportion of births in the various GP categories. When the GP categories are combined the differences in the proportion of births of 38 weeks gestational age or more, between each of the four intended place of delivery groups are statistically significant. ($P < 0.001$)

TABLE 6.2 PERCENTAGE OF BIRTHS IN FOUR GESTATIONAL AGE CATEGORIES BY INTENDED PLACE OF DELIVERY

Intended place of delivery	Gestational Age				
	less than 28 weeks	28 to 32 weeks	33 to 37 weeks	38 weeks plus	Total
Consultant unit	1.6 (20)	5.6 (69)	15.9 (194)	76.9 (940)	100%
All GP beds	0.0 (1)	1.3 (7)	9.6 (51)	88.9 (473)	100%
GP bed in a consultant unit	0.0	0.6 (1)	11.3 (19)	88.1 (148)	100%
Integrated GP unit	0.0	2.1 (5)	6.6 (16)	90.1 (219)	100%
Isolated GP unit	0.8 (1)	0.8 (1)	12.9 (16)	85.5 (106)	100%
Home	0.0 (2)	0.1 (6)	1.9 (112)	98.0 (5708)	100%
Unbooked	3.8 (6)	8.9 (14)	22.3 (35)	65.0 (102)	100%
All	0.4 (29)	1.2 (96)	5.1 (392)	93.3 (7223)	100%

(1116 missing observations)

TABLE 6.3 GESTATIONAL AGE SPECIFIC PERINATAL MORTALITY RATES BY INTENDED PLACE OF DELIVERY

Intended place of delivery	Perinatal mortality rates for births less than 38 weeks gestation		Perinatal mortality rates for births of 38 weeks gestation or more	
	Rate	95% confidence interval	Rate	95% confiden interval
Consultant unit	250.88	(200.4 to 301.4)	9.6	(3.4 to 15.8
GP beds (all)	100.00	(24.5 to 178.8)	2.1	
Home	50.00	(11.1 to 89.0)	3.0	(1.6 to 4.4)
Unbooked	400.00	(270.5 to 529.5)	127.5	(62.8 to 192

(1116 missing values)

As expected there was a wide mortality differential between births of less than 38 weeks gestation and those above that age. This can be observed for every intended place of delivery. Differences in perinatal mortality according to the intended place of delivery for those under 38 weeks gestation are statistically significant. ($P < 0.05$) For births of 38 weeks gestation or more the perinatal mortality for each intended place of delivery was significantly different except when births intended to occur in GP beds or at home are compared.

Birthweight

There is considerable variation in the mean birthweight for each intended place of delivery. The ranking of these mean values follows the same pattern as that observed for gestational age, with the highest mean birthweight being recorded for planned births at home (3474 grams) and the lowest for unbooked births at home (2857 grams). Observed differences in mean birthweights for each intended place of delivery are statistically significant. ($P<0.001$)

TABLE 6.4 MEAN BIRTHWEIGHT BY INTENDED PLACE OF DELIVERY

Intended place of delivery	Mean birthweight in grams	Standard error of the mean	95% Confidence Interval
Consultant unit	3058.77	20.4	(3018.8 to 3098.7)
GP units (all)	3269.91	49.3	(3221.0 to 3319.2)
Home	3473.97	6.4	(3461.4 to 3486.5)
Unbooked	2857.37	46.6	(2766.0 to 2948.7)
All	3374.0	6.5	(3361.3 to 3386.7)

(1037 missing values)

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The distribution of birthweights for each category is presented both in tabular and graphical form. (Table 6.5 and Graph 6.A) Turning first to Graph 6.A where the distribution of birthweights for each intended place of delivery is represented as a cumulative relative frequency curve, it can be seen that the distribution of birthweights is quite different for each group. Indeed comparisons between each of the four distributions (using the Kolmogorov Smirnov test) showed that observed differences between each group are statistically significant. $P(<0.01)$ Observed differences between the distributions for the various GP categories (Table 6.6) are not statistically significant.

It is clear from the graph that the unbooked category contains a greater proportion of low birthweight babies (2500 grams or less) whilst the planned home birth group has a far larger concentration of babies in the higher birthweight groups. This can also be seen from Table 6.5 where the proportion of low birthweight babies born to mothers in the unbooked category was 29 per cent. The corresponding proportions for consultant units and all GP units were 18 per cent and 9.4 per cent respectively. The proportion of low birthweight babies born to mothers who planned to give birth at home was very low at 2.5 per cent. This compares favourably with the corresponding percentage of 7.2 for all births in England and Wales in 1979. (1)

GRAPH 6.A

CUMULATIVE RELATIVE FREQUENCY OF BIRTHWEIGHT (IN GRAMS) FOR EACH INTENDED PLACE OF DELIVERY

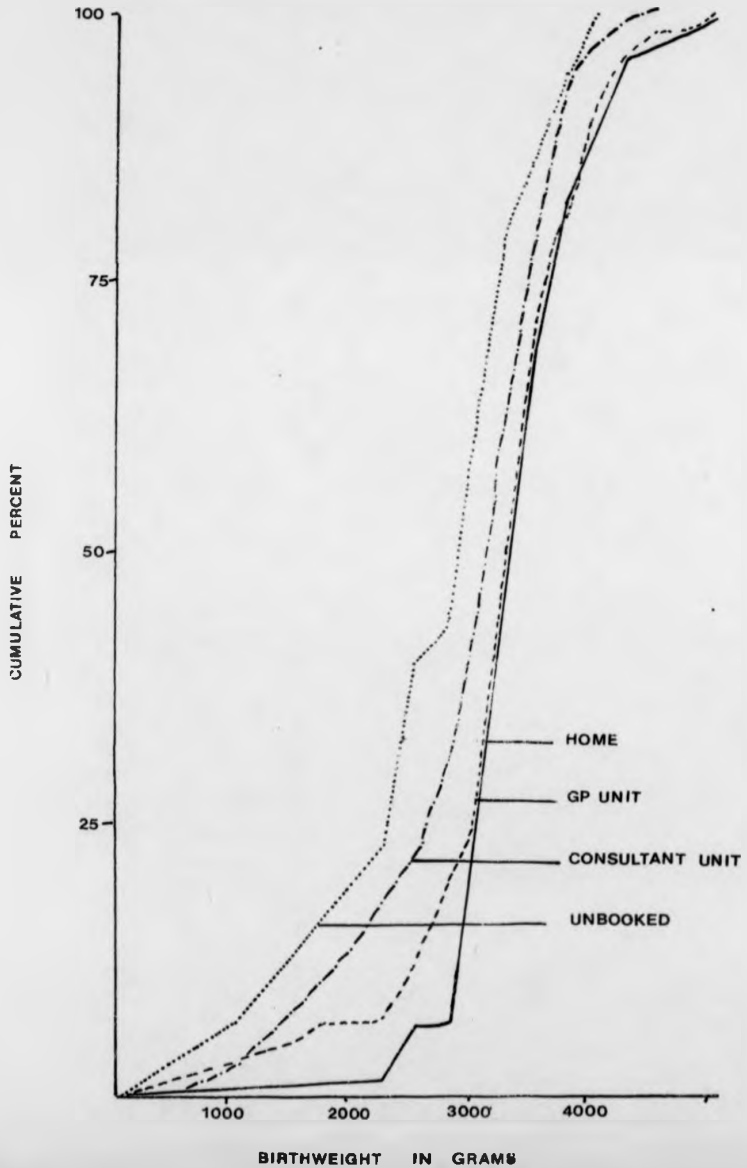


TABLE 6.5 CUMULATIVE RELATIVE FREQUENCY FOR BIRTHWEIGHT GROUPS IN 250 GRAM INTERVALS BY INTENDED PLACE OF DELIVERY.

Birthweight groups	Intended place of delivery: Consultant unit	GP units	Home	Unbooked	All home	All E & W
501-750	0.5	0.0	0.0	1.0	0.1	
751-1000	1.5	0.8	0.0	1.9	0.4	0.36
1001-1250	2.5	0.8	0.1	3.5	0.7	
1251-1500	4.6	1.1	0.1	5.8	1.2	1.01
1501-1750	6.5	1.5	0.1	8.5	1.6	
1751-2000	7.8	2.9	0.3	12.7	2.2	2.4
2001-2250	12.0	5.0	0.6	18.8	3.5	
2251-2500	17.7	9.4	2.5	28.8	6.4	7.2
2501-2750	26.5	13.6	6.7	40.4	11.5	
2751-3000	40.1	27.9	15.8	56.2	21.9	27.5
3001-3250	58.2	46.3	33.0	68.8	39.2	
3251-3500	74.2	66.3	52.9	81.9	58.2	66.5
3501-3750	86.8	83.7	74.8	90.8	77.9	
3751-4000	93.7	91.2	86.5	95.8	88.4	92.5
4001-4250	97.6	96.9	94.2	96.9	95.2	
4251-4500	99.2	99.0	97.5	99.2	98.2	
4501-4750	99.8	99.8	99.4	100.0	99.7	
4751-5000	100.0	100.0	100.0*		100.0	100.0
Total number of births	1223	523	5812	260		

*Includes 4 deliveries which were over 5000 grams

(1038 missing values)

TABLE 6.6 CUMULATIVE RELATIVE FREQUENCY OF BIRTHWEIGHT IN 250 GRAM GROUPS FOR BIRTHS INTENDED TO OCCUR IN THE THREE TYPES OF GENERAL PRACTITIONER UNIT

Birthweight groups(grams)	Intended place of delivery: GP bed in a consultant unit	Integrated GP unit	Isolated GP unit
501-750	0.0	0.0	0.0
751-1000	0.6	0.4	1.5
1001-1250	0.6	0.4	1.5
1251-1500	1.3	0.4	2.3
1501-1750	1.3	1.3	2.3
1751-2000	2.5	2.6	3.8
2001-2250	5.0	4.3	6.2
2251-2500	9.4	8.5	10.8
2501-2750	13.8	12.0	16.2
2751-3000	28.9	26.1	30.0
3001-3250	46.5	45.3	47.7
3251-3500	69.2	62.8	69.2
3501-3750	87.4	80.3	85.4
3751-4000	94.3	89.3	90.8
4001-4250	96.9	97.0	96.9
4251-4500	99.4	98.7	99.2
4501-4750	99.4	100.0	100.0
4751-5000	100.0		
Total number of births	159	234	130

(23 missing values)

Birthweight specific perinatal mortality rates (Table 6.7)

As expected there is a marked difference in perinatal mortality for babies weighing 2500 grams or less with respect to the intended place of delivery of the mother, compared with that observed for babies weighing more than 2500 grams. Within the lower birthweight band the observed differences between the perinatal mortality rates for each intended place of delivery are statistically significant with the exception of comparisons between the rates for consultant units and unbooked deliveries and all GP unit births and planned home deliveries. The perinatal mortality for births where birthweight was unknown was high but many of these babies probably weighed less than 1500 grams.(2)

For deliveries in the higher birthweight band the only statistically significant differences are between the perinatal mortality rate for unbooked births when compared with the rates for all other intended delivery locations. Thus, the higher perinatal mortality for babies weighing less than 2501 grams, born at home to mothers booked for hospital delivery, appears to explain the differences observed between the perinatal mortality rates between planned and unplanned births at home. Put another way, with the exception of unbooked births, mothers giving birth at home intentionally or unintentionally, whose baby weighed more than 2500 grams, experienced a uniformly low perinatal mortality rate.

TABLE 6.7 BIRTHWEIGHT SPECIFIC PERINATAL MORTALITY RATES FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Perinatal mortality rates for births of 2500 grams or less		Perinatal mortality rates for births greater than 2501 grams		Perinatal mortality rates for those where birthweight was unknown	
	Rate	95% Confidence interval	Rate	95% Confidence interval	Rate	95% Confidence interval
Consultant unit	236.1	(179.5 to 292.7)	4.0	(0.11 to 7.9)	412.5	(304.6 to 502.4)
GP beds (all)	81.6	(4.9 to 158.3)	2.1		87.0	
Home	48.3	(13.4 to 83.2)	2.3	(1.1 to 3.6)	38.1	(1.5 to 74.7)
Unbooked	306.7	(202.3 to 411.1)	97.3	(54.6 to 140.0)	485.7	(320.1 to 651.3)
All	175.3	(141.5 to 209.1)	4.9	(3.3 to 6.5)	230.5	(177.6 to 283.5)

(1038 missing values)

Birthweight and gestational age

Table 6.8 illustrates the relationship between birthweight and gestational age for babies categorised by the intended place of delivery of the mother. As expected the overall association between these variables is positive, that is to say birthweight increases with increasing gestational age.

Looking at differences between mean birthweights for babies of 32 weeks plus by the intended place of delivery of the mother, the most notable trend is that the mean birthweights for babies born to mother intending to give birth at home are significantly greater than the corresponding mean values for all other intended place of delivery categories.

When considering births of 33 weeks or more, it can be seen that the ranking of mean birthweight values within gestational age groups, with respect to the intended place of delivery, follows the same pattern as that observed for gestational age and birthweight seperately. That is to say the highest mean birthweight values are obtained for births intended to occur at home, GP units have slightly lower mean values, followed by the mean values for births where the intended place of birth of the mother was unknown and consultant units. Births to mothers who were unbooked for delivery have the lowest mean values.

TABLES 6.8 MEAN BIRTHWEIGHT (TO THE NEAREST GRAM) BY GESTATIONAL AGE FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Gestational Age: Less than 28 weeks	(standard error)	28 to 32 weeks	(standard error)	33 to 37 weeks	(standard error)	38 weeks plus	(standard error)
Consultant unit	1014	(114)	1600	(83)	2505	(43)	3292	(16)
GP Units (all)	992	(0)	1491	(243)	2535	(85)	3378	(21)
Home	801	(221)	2214	(476)	2936	(55)	3488	(6)
Unbooked	955	(55)	1627	(182)	2323	(79)	3261	(48)
All	977	(71)	1626	(74)	2616	(31)	3452	(6)

(1223 missing values)

Abnormalities present at birth

As part of the Home Births Survey, midwives completing the questionnaires were asked to report whether there was any abnormality present in the baby at birth. Responses to this question are summarised in Table 6.9.

No abnormalities were reported for births where the intended place of delivery was unknown. If the intended place of delivery was unknown this usually meant that the midwifery records for this delivery were unavailable and hence no details about the baby, its mother, or the circumstances of the delivery were recorded on the questionnaire.

Midwives reporting abnormalities did not use standard criteria. For example some reported minor abnormalities while others did not. Table 6.9 shows that the reporting of the various categories of abnormalities is considerably lower for births to mothers who plan to deliver at home. The exceptions are the rates for cleft palate and lips, and hand and foot abnormalities where the rates for these abnormalities were similar for all intended delivery locations.

Since the definitions of these abnormalities were not standardized, it is difficult to draw firm conclusions about the rates in this population.

TABLE 6.9 RATES OF REPORTED ABNORMALITIES PER 1 000 BIRTHS BY INTENDED PLACE OF DELIVERY

Type of abnormality	I.C.D.	Intended place of delivery: Consultant	GP Unit	Home	Unbooked	All
Anencephalus & Spina bifida	740, 741	1.53 (2)	3.66 (2)	0.85 (5)	-	1.02 (9)
Hydrocephalus & Microcephalus	742	2.30 (3)	1.83 (1)	-	3.39	0.57 (5)
Congenital heart anomalies	744-	3.84 (5)	5.49 (3)	0.68 (4)	3.39 (1)	1.48 (13
Anomalies of the circulatory system	747	-	-	0.51 (3)	-	0.57 (5)
Cleft lip & cleft palate	749	1.53 (2)	-	1.35 (8)	-	1.13 (10
Anomalies of the alimentary tract	750-	3.07 (4)	1.83 (1)	1.01 (6)	3.39 (1)	1.35 (12
Genital anomalies	752,778	2.30 (3)	-	1.69 (10)	-	1.47 (13
Congenital dislocation of the hips	754.30, 754.32	5.37 (7)	5.49 (3)	2.87 (17)	-	3.05 (27
Talipes and club foot	754.50-754.73	3.07 (4)	10.99 (6)	1.52 (9)	-	2.15 (19
Other hand and foot anomalies	755	1.53 (2)	1.83 (1)	1.52 (9)	3.39 (1)	1.46 (13
Anomalies of the integument	757	3.07 (4)	-	1.01 (6)	6.78 (2)	1.35 (1
Downs syndrome	758	2.30 (3)	-	1.01 (6)	3.39 (1)	1.13 (1
Multiple congenital anomalies	759	0.87 (1)	-	0.34 (2)	3.39 (1)	0.45 (4
Anomalies due to birth truama	767, 768	-		0.34 (2)	6.78 (2)	0.45 (4
Other major anomalies not elsewhere classified		6.14 (8)	3.66 (2)	1.52 (9)	3.39 (1)	2.26 (2
Other minor anomalies not elsewhere classified		4.60 (6)	-	1.52 (9)	-	1.69 (1
Total		(54)	(19)	(105)	(11)	(189

Abnormalities were classified according to the 1979 British Paediatric Association of Diseases.

Conclusion

Clearly, the higher proportion of low birthweight babies born to mothers having unplanned deliveries at home accounts for most of the differences observed in perinatal mortality between births intended to occur in hospital and planned home births. Although, the perinatal mortality rate for babies born to mothers who were not booked anywhere for delivery is lower for babies weighing 2501 grams or more (97.3 per 1 000 births) it is still significantly higher than the corresponding rates for all other intended places of delivery. The explanation for this high level of mortality may lie in the realms of the characteristics of the mothers rather than those of their babies.

References

1. Macfarlane A. Unpublished analysis of data from the Department of Health and Social Services.

2. Office of Population, Censuses and Surveys. Infant and perinatal mortality by birthweight : 1979 estimates. OPCS Monitor 1982; April 27 : 4 (DH3 82/2).

C H A P T E R VII

Characteristics of the Mothers

Introduction

In this chapter results relating to the characteristics of mothers giving birth at home in 1979 are considered. Of particular interest is the extent of variations in maternal characteristics between different intended place of delivery groups, and the effect of these on perinatal mortality. In this chapter, as elsewhere, gravidity refers to the number of previous pregnancies and parity refers to number of previous live births and stillbirths.

Previous gravidity and parity (Tables 7.1 and 7.2)

Midwives were asked to state the number of previous pregnancies, live births, stillbirths and abortions for each mother. At birth registration only information on legitimate parity is collected. Thus, data on parity obtained during the survey is more complete and was used in all the following analyses. A comparison between survey parity and parity recorded at birth registration can be found in chapter IV.

The highest mean previous parity recorded was to mothers who intended to give birth in consultant units. The mean previous parity for mothers who had planned home births is significantly lower at 1.7 ($P < 0.001$). Observed differences between mean values for the various GP categories are not statistically significant. However, when all deliveries booked for a GP bed are considered as one group, differences in mean parity between all intended place of delivery categories are statistically significant ($P < 0.001$).

TABLE 7.1 MEAN GRAVIDITY FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Mean gravidity	95% confidence interval
Consultant unit	2.1	(2.0 - 2.2)
All GP beds	1.6	(1.6 - 1.7)
GP bed in consultant unit	1.6	(1.5 - 1.7)
Integrated GP unit	1.7	(1.5 - 1.9)
Isolated GP unit	1.5	(1.4 - 1.7)
Home	1.8	(1.8 - 1.8)
Unbooked	1.2	(1.0 - 1.4)
All	1.8	(1.8 - 1.8)

(888 missing values)

TABLE 7.2 MEAN PREVIOUS PARITY FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Mean parity	95% confidence interval
Consultant unit	1.8	(1.8 - 1.9)
All GP beds	1.5	(1.4 - 1.6)
GP bed in consultant unit	1.4	(1.3 - 1.5)
Integrated GP unit	1.6	(1.4 - 1.7)
Isolated GP unit	1.4	(1.3 - 1.6)
Home	1.7	(1.6 - 1.7)
Unbooked	1.1	(0.9 - 1.3)
All	1.7	(1.7 - 1.7)

(1106 missing values)

The disparity between mean previous parity and mean previous gravidity is greatest for those intending to give birth in consultant units. The higher rate of pregnancy loss amongst these women may partly explain why they were booked for consultant obstetric care, as previous fetal loss is an important predictor of subsequent loss.

A prerequisite of a comparison between sample means is that the observations from which the means are calculated are normally distributed. The data presented in Table 7.3 show that the previous parity distribution for births at home is skewed to the right. The application of a non-parametric test (Kolmogorov-Smirnov) to compare the parity distributions for the various intended place of delivery groups produces similar results. That is to say, there is no significant difference between the previous parity distributions for the various GP categories, but when these are considered as one group the previous parity distributions for each intended place of delivery is significantly different from that for any other group ($P < 0.05$).

The majority of women (76.1 per cent) giving birth at home had already had one or two previous births. This pattern is maintained for births in each intended place of delivery category, with the exception of unbooked births. Indeed, the previous parity distributions for unbooked mothers is quite unlike that observed for any of the other groups.

More than half (55.3 per cent) of unbooked mothers were nulliparous ($P < 0.001$) and as a group they had a higher percentage of high parity (4 plus previous births) than intended GP or planned home births. Mothers intending to deliver in consultant units also tended to be of a higher parity with 12.9 per cent having previously given birth to four or more children.

TABLE 7.3 MOTHERS' PREVIOUS PARITY FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Previous parity 0	1	2	3	4	5+	All
Consultant unit	14.8(180)	37.5(457)	23.0(280)	11.9(145)	6.2(76)	6.7(82)	100%(1220)
GP Units	6.8(36)	52.4(279)	30.1(160)	7.9(42)	1.9(10)	0.9(5)	100%(532)
GP bed in consultant unit	7.2(12)	53.0 (88)	31.3(52)	7.8(13)	- 0	0.6(1)	100%(166)
Integrated GP unit	3.8(9)	55.3(131)	29.5(70)	6.3(15)	3.4(8)	1.7(4)	100%(237)
Isolated GP unit	11.6(15)	46.5(60)	29.5(38)	10.9(14)	1.6 2	- -	100%(129)
Home	5.1(290)	44.2(2530)	36.9(2113)	11.1(635)	2.2(127)	0.5(30)	100%(5725)
Unbooked	55.3(151)	16.5(45)	12.5(34)	7.0(19)	3.7(10)	5.1(14)	100%(273)
All	8.5(657)	42.7(3311)	33.4(2587)	10.9(841)	2.9(223)	1.7(131)	100%(7750)

(missing 1106 observations)

TABLE 7.4 NULLIGRAVID MOTHERS AS A PROPORTION OF NULLIPAROUS MOTHERS FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Percentage of nulligravid mothers	Percentage of gravid mothers	All nulliparous mothers
Consultant unit	91.7 (165)	8.3 (15)	100% (180)
All GP beds	83.3 (30)	16.7 (6)	100% (36)
GP bed in consultant unit	58.3 (7)	41.7 (5)	100% (12)
Integrated GP unit	100.0 (9)	- -	100% (9)
Isolated GP unit	93.3 (14)	6.7 (1)	100% (15)
Home	82.4 (239)	17.6 (51)	100% (290)
Unbooked	96.1 (146)	3.9 (6)	100% (151)
All	88.3 (580)	11.7 (77)	100% (657)

Table 7.4 reveals that between intended delivery locations there exists quite a wide variation in the percentage of mothers who have had one or more pregnancies which terminated before achieving a gestational age of 28 weeks. The proportion of gravid but nulliparous mothers is significantly higher for both mothers booked to deliver in GP beds in consultant units and at home when compared with those not booked for delivery in these locations.

Perinatal mortality by mothers' previous parity for each intended place of delivery

The data in Table 7.5, and summarised in Graph 7.A, demonstrate that the relationship between mothers' previous parity and perinatal mortality for each intended place of delivery was broadly similar; that is to say the risk of perinatal mortality was highest for first births, considerably lower for second and third births and rose again for women who had had three or more previous births.

TABLE 7.5 PERINATAL MORTALITY RATES BY MOTHERS' PREVIOUS PARITY FOR EACH INTENDED PLACE OF DELIVERY

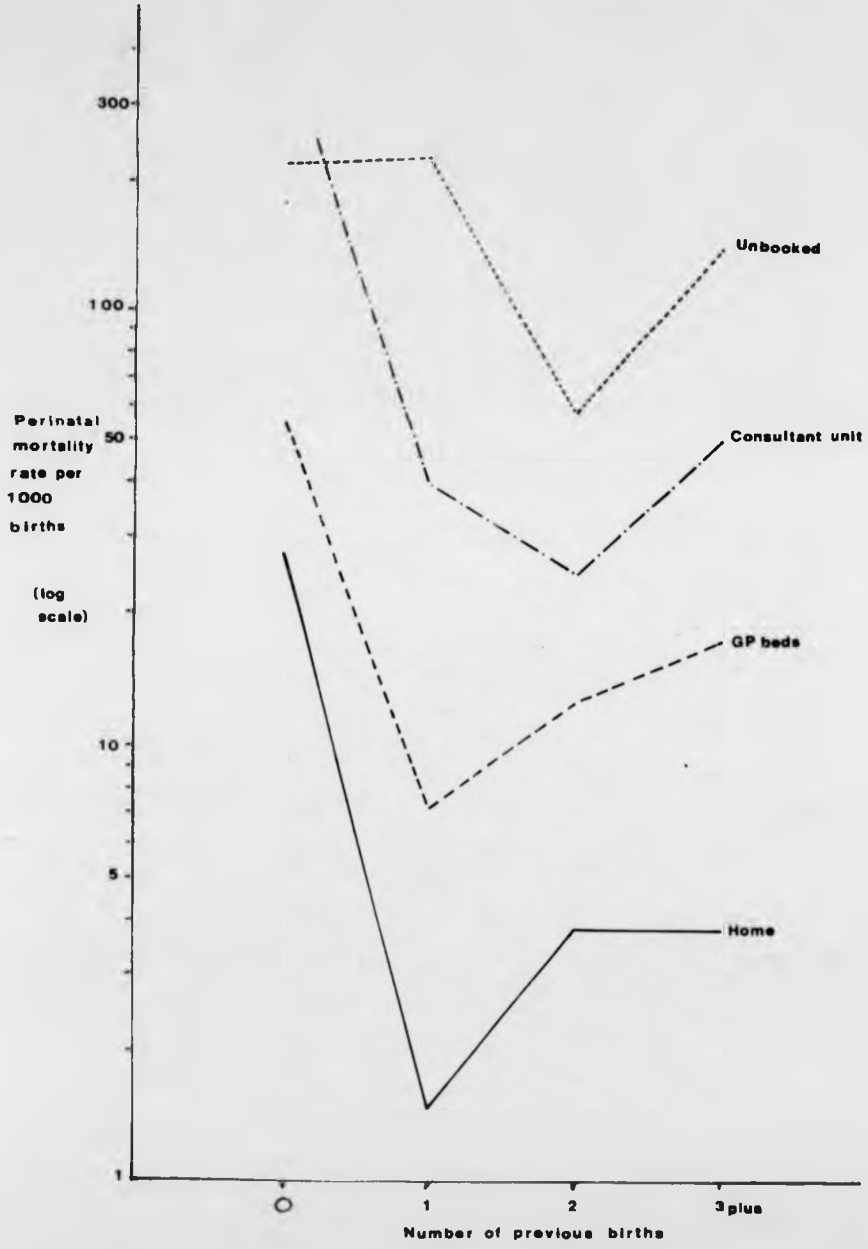
Intended Place	Number of previous births					
	0		1	2	3+	Not known
	Nulligravid	Gravid				
Consultant unit	230.0	266.7	39.4	25.0	49.5	72.3
GP beds (all)	66.7	-	7.2	12.5	17.5	-
Home	33.6	-	1.6	3.8	3.7	6.1
Unbooked	217.7	250.0	222.2	58.8	139.5	318.2
All*	140.7	64.9	10.2	7.7	20.3	46.7

*Including births where the intended place of delivery was not known.

(It is not possible to include comparable figures for England and Wales as part of this table as only mothers' legitimate parity is recorded at birth registration.)

Unbooked births however, do not fit into this general pattern as the perinatal mortality rate was consistently high for those mothers having a

GRAPH 7.A PERINATAL MORTALITY RATES BY MOTHERS PREVIOUS PARITY FOR EACH INTENDED PLACE OF DELIVERY



first or second birth. For unbooked mothers as well as those who intended to give birth in consultant units, the perinatal mortality rate for the current birth was lowest for mothers who had had two previous births. For planned home and intended GP bed births the perinatal mortality rate was lowest for mothers who had had only one previous birth. Gravidity amongst nulliparous women would not appear to have influenced the outcome of the current birth. Excluding planned home births, the perinatal mortality rate for the current birth rose for women of parity three and above.

Maternal Age

Data on the distribution of maternal ages for each intended place of delivery in Table 7.6, shows that the majority of hospital booked mothers were in their twenties. Within this broad group, however, a higher percentage of consultant unit and isolated GP unit intended births were to teenage mothers. In contrast, only a very low percentage of planned home births were to teenage mothers (1.3 per cent), the majority being aged between 25 and 34. A very high percentage of unbooked mothers were teenagers (40.3 per cent). This group also had the highest percentage of mothers aged 35 and over (10.5 per cent).

Comparing the overall age distributions, the first rather unexpected finding is that the distribution for isolated general practitioner units is significantly different ($P < 0.05$) from that for GP beds in consultant units. The main difference being that women who intended to give birth in isolated GP units were younger. There is no significant variation between the distributions for GP beds in consultant unit and integrated GP unit intended births. The maternal age distribution for isolated GP units is similar to that for consultant units and indeed there is no statistically significant difference between the two distributions.

Considering the maternal age distribution for all GP beds as one, the distribution of mothers' ages for each intended delivery location is significantly different ($P < 0.05$) from that for every other location, with the exception of the distributions for the combined GP category when compared with that for mothers whose intended place of delivery was unknown.

TABLE 7.6 MATERNAL AGE FOR EACH INTENDED PLACE OF DELIVERY

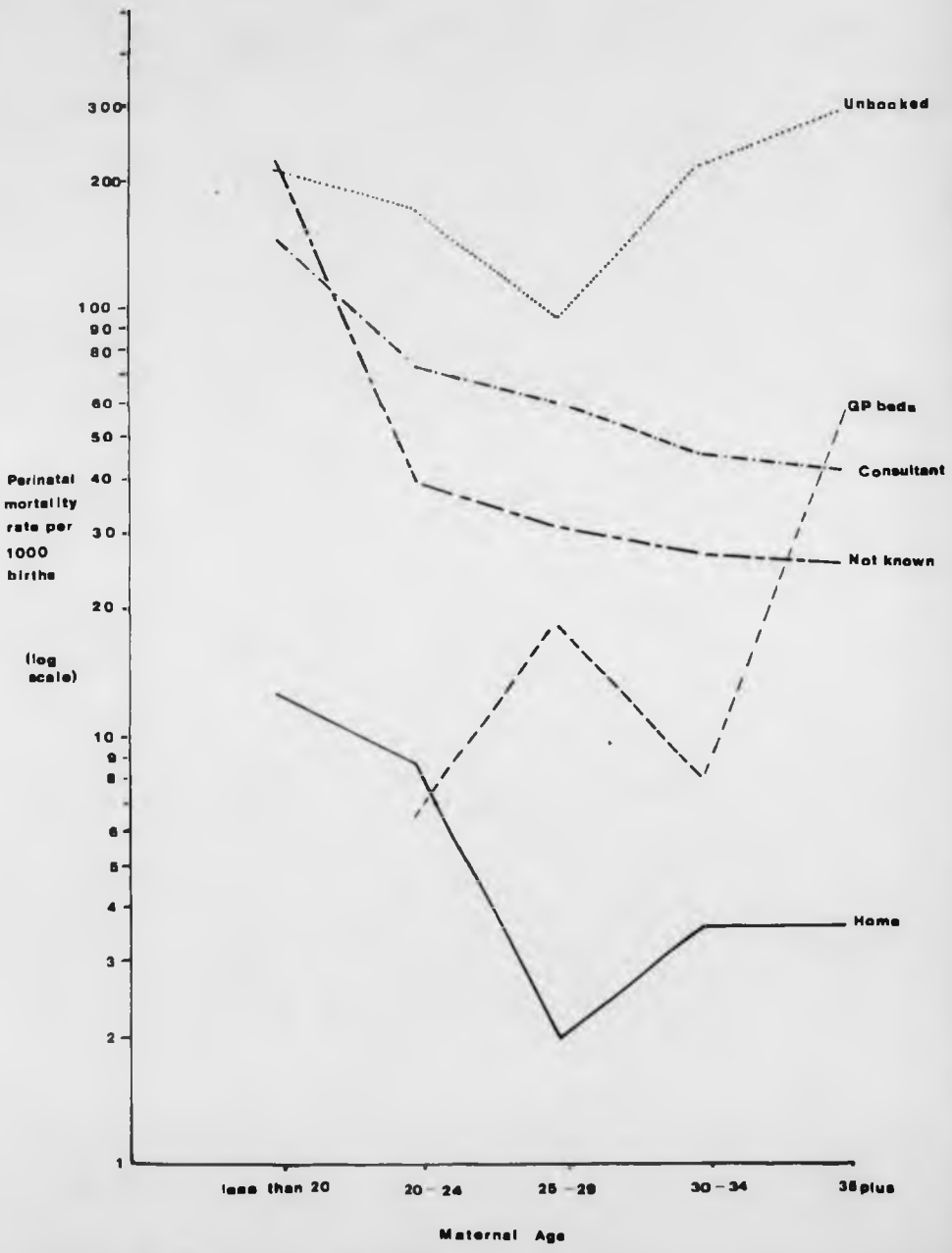
Intended place of delivery	Maternal Age 0-19	20-24	25-29	30-34	35 +	All
Consultant unit	8.8(115)	31.2 (406)	30.7 (400)	22.0 (286)	7.4 (96)	100%(1303)
All GP beds	4.8 (26)	28.2 (154)	40.5 (221)	23.4 (128)	3.1 (17)	100% (546)
GP bed in consultant unit	2.4 (4)	25.3 (43)	44.1 (75)	25.3 (43)	2.9 (5)	100% (170)
Integrated GP unit	3.7 (9)	26.8 (65)	42.4 (103)	24.7 (60)	2.5 (6)	100% (243)
Isolated GP unit	9.8 (13)	34.6 (46)	32.3 (43)	18.8 (25)	4.5 (6)	100% (133)
Home	1.3 (79)	19.6(1157)	41.9(2479)	32.5(1921)	4.8(281)	100%(5917)
Unbooked	40.3(119)	25.4 (75)	14.2 (42)	9.5 (28)	10.5 (31)	100% (295)
Not known	7.2 (57)	22.4 (178)	36.8 (293)	28.5 (227)	5.0 (40)	100% (795)
Total	4.5(396)	22.2(1970)	38.8(3435)	29.2(2590)	5.3(465)	100%(8856)
All England & Wales	9.3	30.3	34.8	19.7	6.0	100%

TABLE 7.7 INTENDED PLACE OF DELIVERY BY MATERNAL AGE AND LEGITIMACY

Intended place of delivery	0-19		20-24		25-29		30-34		35 +		All	
	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit
Consultant unit	5.4	3.5	25.9	5.3	26.8	3.9	19.4	2.5	6.8	6.1	84.2	15.8
	(70)	(45)	(337)	(69)	(349)	(51)	(253)	(33)	(88)	(8)	(1097)	(206)
All GP beds	3.1	0.2	25.1	3.1	38.3	2.2	22.3	1.1	2.8	0.4	91.8	8.2
	(18)	(8)	(137)	(17)	(209)	(12)	(122)	(6)	(15)	(2)	(501)	(45)
GP bed in consultant unit	0.2	0.1	21.8	3.5	41.2	2.9	24.1	0.2	2.4	0.1	91.2	8.8
	(3)	(1)	(37)	(6)	(70)	(5)	(41)	(2)	(4)	(1)	(155)	(15)
Integrated GP unit	2.5	1.2	25.1	1.7	39.9	2.5	23.5	1.2	2.1	0.1	93.0	7.0
	(6)	(3)	(61)	(4)	(97)	(6)	(57)	(3)	(5)	(1)	(226)	(17)
Isolated GP unit	6.8	3.0	29.3	5.3	31.6	0.1	18.1	0.1	4.5	-	90.2	9.8
	(9)	(4)	(39)	(7)	(42)	(1)	(24)	(1)	(6)	(0)	(120)	(13)
Home	1.1	0.2	17.7	1.9	39.5	2.4	30.6	1.9	4.3	0.4	93.2	6.8
	(66)	(13)	(1045)	(112)	(2336)	(143)	(1810)	(111)	(255)	(26)	(5512)	(405)
Unbooked	2.4	38.0	9.2	1.6	7.8	6.4	5.4	4.1	8.8	1.7	33.6	66.4
	(7)	(112)	(27)	(48)	(23)	(19)	(16)	(12)	(26)	(5)	(99)	(196)
Not known	2.1	5.0	18.7	3.6	32.8	4.0	24.5	4.0	4.2	0.9	83.6	16.4
	(17)	(40)	(149)	(29)	(261)	(32)	(195)	(32)	(33)	(7)	(655)	(110)
All	2.0	5.0	19.1	3.1	35 .4	2.9	27.1	2.2	4.7	0.5	88.8	11.2
	(178)	(218)	(1695)	(275)	(3178)	(257)	(2396)	(194)	(417)	(48)	(7864)	(992)
England and Wales*	5.5	3.8	26.7	3.6	32.8	1.9	18.6	1.1	5.4	0.5	89.1	10.9

*Source: Registrar General (1981) Birth Statistics 1979. Review of the Registrar General on births and patterns of family building in England and Wales: HMSO, (Series FM1, No.9)

GRAPH 7.8 PERINATAL MORTALITY RATES BY MATERNAL AGE FOR EACH INTENDED PLACE OF DELIVERY



Maternal age specific perinatal mortality rates

The data summarised in Graph 7.B demonstrate that the nature of the association between maternal age and perinatal mortality varied considerably according to the intended place of delivery. For consultant unit booked births and deliveries to mothers for whom the intended place of delivery was not known, the perinatal mortality rate was highest for mothers aged under 20 whereafter the risk of perinatal death declined with increasing maternal age. The risk of perinatal death for unbooked births was high for women aged less than 20 and declined for women aged 20-29, but it increased thereafter and for those aged 35 and over, the risk was greater than that for teenage mothers.

For planned home births the perinatal mortality rate was highest for teenage mothers but delined little for mothers aged 20 to 24. The perinatal mortality rate for mothers aged 25 to 29 was extremely low (2 per 1 000 births). The pattern for births booked for GP beds is erratic due to the small numbers of deaths involved.

Illegitimacy

Data on the proportions of illegitimate births can be seen in the two final columns of Table 7.7. If the percentage of illegitimate births in each group are ranked, planned home births have the lowest percentage of illegimate births followed by intended GP and consultant booked births. Unbooked births have the greatest percentage (66.4 per cent) of illegimate births.

The various GP categories do not differ significantly with respect to the percentage of illegimate births nor do they differ from the percentage observed for planned home births. Observed differences between other intended place of delivery categories are significant ($P < 0.001$) with the exception of the difference between consultant booked births when compared with those mothers whose intended place of delivery was unknown.

Maternal age and legitimacy

The relationship between maternal age and legitimacy for each intended place of delivery is shown in Table 7.7. With the exception of unbooked births to teenage mothers the percentage of illegitimate births within 5 year age groups, for each intended place of delivery, was fairly low ranging from 0.1% to 6.4%. For all births in England and Wales in 1979 the percentage of illegimate births was highest for mothers aged under 20 and declined with increasing maternal age. This was also true for all births at home but when broken down into intended place of delivery groups some interesting differences emerge.

The highest proportion of illegimate births to women booked for delivery in hospital occurs in the 20 - 24 year age group, while for planned home births, the highest proportion of illegitimate births was to women aged 25 - 29.

TABLE 7.8 PERINATAL MORTALITY FOR LEGITIMATE AND ILLEGITIMATE BIRTHS FOR EACH INTENDED PLACE OF DELIVERY, ENGLAND & WALES 1979

Intended place of delivery	Perinatal mortality rate	
	Legitimate	Illegitimate
Consultant unit	62.9	92.2
GP beds	12.0	22.2
Home	3.3	14.8
Unbooked	181.8	204.1
Not known	22.9	150.0
All Home	16.0	87.7
England & Wales	14.0	19.5

Perinatal mortality by intended place of delivery for legitimate and illegitimate births

The relationship between illegitimacy and perinatal mortality varied little according to the intended place of delivery: perinatal mortality was consistently higher for illegitimate births. These differences are not statistically significant in the case of consultant unit intended and unbooked births.

The risk of perinatal death in relation to maternal age and parity

Maternal age and previous parity specific perinatal mortality rates are presented in Table 7.9. As a consequence of the small numbers of deaths in the peripheral age groups (less than 20 and 35 plus) maternal age has been classified into three broad bands.

Nulliparity was a major factor associated with high perinatal mortality rates and mortality tended to rise for women who had already had three or more children. This is true irrespective of the intended place of delivery. Clearly the effect of previous parity on the risk of perinatal death for the current birth acts independently from the effect of maternal age.

TABLE 7.9 MATERNAL AGE AND PREVIOUS PARITY SPECIFIC PERINATAL MORTALITY RATES FOR EACH INTENDED PLACE OF DELIVERY

Maternal age and number of previous births	Intended place of delivery			
	Hospital	Home	Unbooked	All Known
0-24				
0	197.3 (29)	37.4 (4)	198.5 (26)	153.2 (59)
1	28.8 (9)	4.0 (3)	250.0 (7)	17.3 (19)
2	7.1 (1)	10.8 (3)	62.5 (1)	11.5 (5)
3+	86.2 (5)	-	-	44.2 (5)
All aged < 25*	68.5 (48)	8.9 (11)	201.0 (39)	46.0 (98)
25-29				
0	204.1 (10)	15.6 (2)	100.0 (1)	69.5 (13)
1	35.9 (9)	0.9 (1)	200.0 (2)	8.6 (12)
2	16.7 (3)	1.1 (1)	-	3.7 (4)
3+	53.1 (6)	3.9 (1)	100.0 (1)	21.2 (8)
All aged 25-29*	47.2 (28)	2.0 (5)	95.2 (4)	12.1 (37)
30 +				
0	250.0 (5)	36.4 (2)	600.0 (6)	152.9 (13)
1	11.6 (2)	.	142.9 (1)	3.7 (3)
2	42.0 (5)	4.3 (4)	166.7 (1)	9.4 (10)
3+	26.5 (5)	3.9 (2)	185.2 (5)	163.9 (12)
All aged 30 plus*	36.1 (19)	3.6 (8)	254.2 (15)	15.1 (42)
All ages				
0	203.7 (44)	27.6 (8)	218.5 (33)	129.4 (85)
1	27.2 (20)	1.6 (4)	222.2 (10)	10.3 (34)
2	20.5 (9)	3.8 (8)	58.8 (2)	7.3 (19)
3+	44.4 (16)	3.7 (3)	139.5 (6)	20.4 (25)
All births at home*	51.4	4.1	196.6	22.0

* All including those for whom parity was not known

Social Class

The occupation of the father of a legitimate live birth is recorded when the birth is registered; likewise an illegitimate birth if it is registered by both parents. If an illegitimate birth is registered by the mother only, then her occupation is recorded. In 1979 a 10 percent random sample of live births were coded for fathers occupation according to the 1970 Classification of Occupations (1). All stillbirths were coded for social class. Occupation codes were allocated according to the Registrar General's social classes as used in the 1971 Census Reports, a procedure which is less accurate in the case of birth registration as the questions relating to occupations are less detailed than those on the census schedule.

There are two main obstacles when considering the social class of the parents of babies born at home in 1979. Firstly, only 10 percent of these births were coded for social class and secondly the information on illegitimate births, from which the social class code is derived, is unreliable. This is a particularly thorny problem with unbooked births because they included a high proportion of illegitimate births.

Table 7.10 gives the social class distribution for the intended place of delivery for legitimate births for which a social class code was available. It is clear from this table that a greater proportion of mothers having planned home births were from social classes I and II, than mothers who were booked for hospital deliveries. Correspondingly, social classes IV and V were under represented amongst mothers having planned home births when compared with those who intended to give birth in hospital. The same is true if the social class distribution of mothers having planned home

births is contrasted with that for all legitimate births in England and Wales. Social class I and II mothers are over represented in the planned home births group. Curiously, the percentages of mothers in social classes I and II and classes IV and V in the planned home birth group and those mothers for whom the intended place of delivery was unknown are very similar.

Mothers' country of birth

The country of birth of the baby's mother is noted at birth registration. This is, of course, not the same as ethnic origin. Table 7.11 gives a broad banding of mother's country of birth for each intended place of delivery.

A significantly higher proportion of mothers who had planned home births were born in the United Kingdom compared with mothers who intended to give birth in hospital ($P < 0.001$). Surprisingly, the percentages of United Kingdom born mothers having planned and unbooked births at home are similar.

TABLE 7.10 SOCIAL CLASS OF FATHER FOR ALL LEGITIMATE BIRTHS AT HOME FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Social class I	II	IIINM	IIIM	IV	V	Other	All
Hospital	3.8 (6)	16.5 (26)	7.6 (12)	37.3 (59)	24.7 (39)	9.5 (15)	0.6 (1)	100%(158)
Home	9.3 (53)	27.2(155)	10.1 (57)	37.1(211)	11.1 (63)	3.7 (21)	1.6 (9)	100%(569)
Unbooked	.	7.1 (1)	.	50.0 (7)	28.6 (4)	14.3 (2)	-	100% (14)
Not known	9.1 (7)	19.5 (15)	7.8 (6)	37.7 (29)	18.2 (14)	3.9 (3)	3.9 (3)	100% (77)
All Home	8.1 (66)	24.1(197)	9.2 (75)	37.4(306)	14.7(120)	5.0 (41)	1.6 (13)	100%(818)
*England and Wales		27.6	10.0	38.2		21.1	3.3	

* Based on estimates of total legitimate livebirths OPCS Series FM1 No 6 Births Statistics 1981
and stillbirths OPCS Series DH3 No 7 Mortality Statitics 1981

TABLE 7.11 MOTHERS COUNTRY OF BIRTH FOR EACH INTENDED PLACE OF DELIVERY

Mothers country of birth	Intended place of delivery											
	Consultant Unit		All GP beds		Home		Unbooked		Not known		All home		All E&W*
	%		%		%		%		%		%		%
United Kingdom	82.0	(1069)	91.4	(499)	95.1	(5627)	94.6	(279)	88.2	(701)	92.4	(8175)	86.8
Ireland	1.6	(21)	0.6	(3)	0.8	(49)	0.7	(2)	0.9	(7)	0.9	(82)	1.5
Australia, Canada and New Zealand	0.2	(3)	0.7	(4)	0.6	(35)	0.3	(1)	1.0	(8)	0.6	(51)	0.4
New Commonwealth and Pakistan	12.1	(158)	5.9	(32)	0.7	(41)	3.1	(9)	4.8	(38)	3.1	(278)	8.2
Europe	1.0	(13)	0.7	(4)	1.3	(79)	0.3	(1)	1.6	(13)	1.2	(110)	1.5
Other	2.9	(38)	0.7	(4)	1.4	(84)	1.0	(3)	3.3	(26)	1.8	(155)	1.5
Not stated	0.1	(1)	.	.	0.0	(2)	.	.	0.3	(2)	0.1	(5)	0.1
Total	100	(1303)	100	(546)	100	(5917)	100	(295)	100	(795)	100	(8856)	100

*Livebirths OPCS Series FM1 no.6. Birth Statistics 1981

Stillbirths OPCS Series DH3 no.7 Mortality Statistics 1981

Conclusion

The results presented in the preceding pages clearly demonstrate that there are considerable differences in the distribution of certain maternal characteristics according to the mother's intended place of delivery.

Previous parity, maternal age and illegitimacy all effect the risk of perinatal death and operate both independently of each other and of the intended place of delivery. The variations in the distribution of one, or any combination of these three variables is insufficient to account for the differences in the risk of perinatal death for each intended place of delivery, ie. even when broken down into components of these variables, differences between intended place of delivery categories remain. In this respect birthweight still remains the most powerful explanatory variable (see Chapter VI).

Previous fetal loss is a powerful predictor of subsequent loss and any mother who had experienced such a loss would almost certainly be booked for a hospital delivery. Obviously these high risk women are more easily identifiable if they are multiparous. Further evidence that multiparous women delivering at home are a select group carrying a low risk of perinatal mortality is that the association between perinatal mortality was different from the 'J' shaped curve usually found in cross sectional analyses. (2) (Graph 7.1) Longitudinal analyses have suggested that the high perinatal mortality rates associated with high parity is accounted for by a small group of women who try to compensate for their high rates of fetal loss by having repeated pregnancies. (3)

Previous studies of home births revealed that the social class distribution

of mothers giving birth at home differed little from that for hospital births (4 and 5). This is also true for 1979; differences in the social class distribution only emerge when the intended place of delivery is taken into account.

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C H A P T E R VIII

Circumstances of the Delivery

Introduction

The aim of this chapter is to present results from the survey which help to build up a picture of the circumstances in which the deliveries took place. These results also give some indication as to why nearly 30 per cent of births at home were not intended to occur there.

Birth attendants by intended place of delivery

Table 8.1 shows the responses to the question:

"Who actually delivered the baby?"

Prece ding questions enquired as to whether a midwife or doctor were present at the delivery. In the rare instance where two people were said to have conducted the delivery, if one of them was either a doctor or a midwife, then the birth was coded as having been conducted by that professional attendant, but if both a doctor and midwife were said to have delivered the baby, then information on the birth attendant was coded as missing.

The results show that the majority of mothers giving birth at home were delivered by a midwife (83.4 per cent). Only a small percentage (2.2) of babies were delivered by a doctor. Six and a half per cent of all deliveries took place without anyone in attendance.

Although the majority of births at home were reported to have been attended by a midwife, there was considerable variation in the percentages of deliveries attended by qualified practitioners according to whether the birth had been planned to occur at home or not. Over 98 per cent of

planned home births were attended by a doctor or a midwife. This is significantly higher ($p<0.001$) than the corresponding percentages for all other intended places of delivery.

TABLE 8.1 BIRTH ATTENDANT FOR EACH INTENDED PLACE OF DELIVERY

Intended place of delivery	Birth attendant						
	Midwife	Doctor	Ambulance Staff	Husband/ Partner	Mother alone	Other	All
Consultant unit	34.8 (380)	5.3 (58)	17.6 (192)	10.6 (116)	24.4 (266)	7.3 (80)	100% (1092)
All GP beds	60.8 (306)	3.8 (19)	8.1 (41)	8.3 (42)	14.9 (75)	4.0 (20)	100% (503)
GP bed in Consutant unit	62.2 (92)	4.1 (6)	8.8 (13)	8.1 (12)	14.9 (22)	2.0 (3)	100% (148)
Integrated GP unit	70.9 (166)	2.1 (5)	5.6 (13)	6.4 (15)	10.3 (24)	4.7 (11)	100% (234)
Isolated GP unit	39.7 (48)	6.6 (8)	12.4 (15)	12.4 (15)	24.0 (29)	5.0 (6)	100% (121)
Home	97.2 (5695)	1.2 (68)	0.1 (4)	0.7 (39)	0.7 (39)	0.2 (12)	100% (5857)
Unbooked	16.5 (40)	9.5 (23)	8.2 (20)	7.4 (18)	48.1 (117)	10.3 (25)	100% (243)
All	83.4 (6421)	2.2 (168)	3.3 (257)	2.8 (215)	6.5 (497)	1.8 (137)	100% (7695)

(1161 missing values)

Doctor Most of the deliveries were conducted by general practitioners however six deliveries were conducted by an obstetric registrar and four by a consultant obstetrician.

Other Included in this category are neighbours, grandparents, sisters and policemen

With the exception of planned home births, a relatively high proportion of deliveries were reported as unattended, ie. the mother gave birth alone. Nearly half the mothers who were "unbooked" delivered alone, and a quarter of the deliveries, intended to occur in consultant or isolated GP units, were unattended. Only in a very small percentage (0.7) of planned home births, did the mother deliver alone.

In table 8.2 details are given of the percentages of deliveries where a doctor, midwife or both were present at the delivery. In addition, for deliveries at which both were present, details of who conducted the delivery are given. Clearly, for hospital intended, or planned home births it was three or four times more likely that a midwife was in attendance. From the final column of the table it is also evident that for those few deliveries for whom it was known that both a doctor and midwife were present the delivery was nearly always conducted by the midwife.

TABLE 8.2 PRESENCE OF DOCTORS AND MIDWIVES AT THE DELIVERY BY INTENDED PLACE OF DELIVERY

Intended place of delivery	Percentage of deliveries where:-			
	Doctor present	Midwife present	Both present	Midwife conducted delivery when both present
Consultant unit	9.1 (116)	31.9 (406)	5.6 (70)	79.1 (53)
All GP beds	11.1 (60)	57.1 (310)	7.6 (42)	75.7 (39)
GP bed in Consultant unit	10.1 (17)	55.3 (94)	7.7 (13)	84.6 (11)
Integrated GP unit	11.7 (28)	69.7 (168)	10.0 (24)	95.8 (23)
Isolated GP unit	11.4 (15)	36.4 (48)	3.8 (5)	100.0 (5)
Home	19.7 (1136)	97.8 (5759)	19.5 (1123)	94.4 (1062)
Unbooked	12.3 (36)	15.1 (44)	5.2 (15)	73.3 (11)

Missing values

Numbers in the cells in this table are not expressed as a percentage of the total number in each intended place of delivery group, but as a percentage of the total number in each intended place of delivery group where information for this particular variable was recorded.

Perinatal mortality by birth attendant for each intended place of delivery

Some caution is required when interpreting the data in table 8.3, not only because of the large standard errors associated with some of the rates, but also because of the relatively high perinatal mortality amongst those

deliveries where the intended place of delivery was known, but the person who delivered the baby was not recorded. The perinatal mortality rates for deliveries conducted by midwives were substantially lower than those associated with any other delivery attendant. Conversely, deliveries conducted by doctors were associated with a considerably higher perinatal mortality.

TABLE 8.3 PERINATAL MORTALITY BY BIRTH ATTENDANT FOR EACH INTENDED PLACE OF DELIVERY

Birth attendant	Intended Place of delvery							
	Consultant unit		GP beds (all)		Home		Unbooked	
	PMR	(SE)	PMR	(SE)	PMR	(SE)	PMR	(SE)
Midwife	26.3	(8.2)	3.3	(3.3)	3.2	(0.7)	100.0	(47.4)
Doctor	120.7	(42.8)	105.3	(70.4)	29.4	(20.5)	217.4	(86.0)
Ambulance Staff	57.3	(16.8)	24.4	(24.1)	250.0	(216.5)	150.0	(79.8)
Husband/partner	86.2	(26.1)	23.8	(23.5)	-		-	
Mother alone	101.5	(18.5)	26.7	(18.6)	25.6	(25.3)	282.1	(41.6)
Other	37.5	(21.2)	-		83.3	(79.8)	80.0	(54.3)
Not known	94.8	(20.2)	-		16.7	(16.5)	211.5	(56.6)

Key

PMR Perinatal mortality rate
SE Standard error

The differences between perinatal mortality rates for deliveries conducted by midwives and doctors are statistically significant in the case of consultant unit intended births. ($P<.01$) One possible explanation for the high perinatal mortality rate for deliveries conducted by a doctor is

that the doctor may have been summoned because of some problem during labour, which resulted in a poor delivery outcome eg. if an instrumental delivery was required, then a doctor would have to perform it. Although not all differences between perinatal mortality rates for doctor and midwife conducted deliveries are statistically significant, the trend is consistent for all intended place of delivery groups. In order to further investigate these differences, a distinction must be made between perinatal mortality rates for deliveries conducted by doctors and midwives at which only one or the other was present from those deliveries at which both were in attendance. The results of such analyses can be found in Table 8.4.

Babies born to mother delivering at home unaided also experienced a high perinatal mortality rate. One in three of the babies born to mothers unaided during delivery and with no specific intended place of delivery died during the perinatal period.

Detailed comparison between perinatal mortality rates between doctor and midwife conducted deliveries for each intended place of delivery

When both a doctor and midwife were present at a delivery, the perinatal mortality rates for deliveries conducted by a doctor were higher than for those babies delivered by midwives. The differences between the rates for each intended place of delivery, however, are not statistically significant.

TABLE 8.4 COMPARISONS BETWEEN PERINATAL MORTALITY RATES BETWEEN DELIVERIES CONDUCTED BY DOCTORS AND MIDWIVES ACCORDING TO WHETHER ONE OR BOTH WERE IN ATTENDANCE AT THE DELIVERY FOR EACH INTENDED PLACE OF DELIVERY

Intended place delivery	Midwife only present		Doctor only present		Significance of difference between rates	Midwife and doctor present at the birth				Significance of of difference between rates
						Midwife delivered		Doctor delivered		
	PMR	SE	PMR	SE		PMR	SE	PMR	SE	
Consultant unit	27.6	(9.1)	133.3	(50.7)	***	18.9	(18.7)	76.9	(73.9)	N/S
GP beds (all)	-	-	125.0	(82.7)	**	25.6	(25.3)	-	-	N/S
Home	2.2	(0.7)	-	-	N/S	7.7	(2.7)	34.5	(24.0)	N/S
Unbooked	34.5	(33.9)	200.0	(89.4)	N/S	272.7	(134.3)	333.3	(272.2)	N/S

Key

PMR Perinatal mortality rate

SE Standard error

*** P< 0.001

** P< 0.01

N/S Not statistically significant

Comparisons between perinatal mortality rates for deliveries where only a doctor or midwife was present are open to a number of interpretations. For all unplanned births no difference between rates would be expected, as it is reasonable to assume that whether a doctor or midwife was present, was a matter of chance rather than a reflection of the perceived risk of perinatal death. It is therefore surprising to observe that when the mother was booked for a hospital delivery, perinatal mortality rates for midwife conducted deliveries are significantly lower than for those babies delivered by doctor.

If births are further sub-divided by birthweight (Table 8.5) then it becomes clear that the discrepancy between the perinatal mortality rates for deliveries attended by either a doctor or a midwife is largely explained by the proportion of low birthweight babies attended. All of the babies which died during the perinatal period, where only a doctor was present at the delivery, weighed 2500 grams or less.

TABLE 8.5 BIRTHWEIGHT SPECIFIC PERINATAL MORTALITY RATES FOR BABIES WHERE EITHER A DOCTOR OR MIDWIFE WAS PRESENT AT THE DELIVERY

Intended place of delivery	Under 2501 grams		2501 grams and over	
	Midwife	Doctor	Midwife	Doctor
Consultant unit	166.7	307.7	3.6	-
GP beds (all)	-	500.0	-	-
Home	28.9	-	1.3	-
Unbooked	-	375.0	-	-
All	58.4	360.0	1.4	-

Within the low birthweight band however there is a suggestion that the perinatal mortality for deliveries attended by a doctor only was higher than those attended by a midwife. These differences are only significant in the case of births booked for delivery in hospital. ($P < 0.05$).

Reasons given for the intended place of delivery differing from the actual place of delivery

Midwives were asked to explain why, if a mother had been booked for delivery in hospital, she gave birth at home. In Table 8.6 responses to this question are presented for the two main categories of intended hospital deliveries.

A significantly higher proportion of deliveries intended to occur in consultant units were said to have taken place at home because of a rapid, premature or precipitate labour, or because an ambulance had not been called early enough. In addition, substantially more mothers intending to give birth in a GP bed were said by midwives to have been too far advanced in labour to be transferred to hospital. The explanations as to why mothers booked for delivery in hospital gave birth at home, were given long after the event, and as such may not be very reliable. Nevertheless, it is interesting to note that 93 per cent of mothers said to be too far advanced in labour were delivered by a midwife. It may be that these were deliveries to mothers who would have liked a home delivery, and, with the consent of the midwife eventually gave birth at home despite being booked for delivery in hospital.

TABLE 8.6 REASONS FOR THE BIRTH OCCURRING AT HOME ACCIDENTALLY FOR MOTHERS WHO WERE BOOKED FOR A HOSPITAL DELIVERY

Intended place of delivery	Reasons for the birth occuring accidentally at home						
	Premature, rapid or precipitate labour	Unrecognised labour	Late contacting services	Bad weather conditions	Labour too far advanced to move mother	Mother refused to go to hospital	Other
Consultant unit	634 (53.6)	32 (2.7)	318 (26.9)	20 (1.7)	100 (8.4)	58 (4.9)	22 (1.9)
GP beds (all)	242 (47.1)	15 (2.9)	87 (16.9)	9 (1.8)	125 (24.3)	27 (5.3)	9 (1.7)
All	876 (51.6)	47 (2.8)	405 (23.9)	29 (1.7)	225 (13.2)	85 (5.0)	31 (1.8)

(151 missing values)

Seasonal Variation

Table 8.8 shows the distribution of births by months for the various intended place of delivery groups. In order to be able to make meaningful comparisons of the number of births in any one month, with the number in another month, when calendar months are of various lengths, the number of births in each cell are expressed as a percentage of all births in that month.

This table has two interesting features. Firstly, the percentage of births where the mother's intended place of delivery is not known, is higher in January than at any other time of year. The most plausible explanation for this is that midwifery records relating to births in the first month of the year are more likely to have been lost. Secondly, the percentages of hospital planned deliveries are greatest in February and March. There was heavy snow cover in some areas of England and Wales during this period which may have caused more women than usual to deliver at home unintentionally. (1) If this was the case, however, one would have expected more than 2 per cent of births occurring accidentally at home to have been reported as the result of bad weather conditions.

TABLE 8.8 MONTH OF BIRTH FOR EACH INTENDED PLACE OF DELIVERY FOR BIRTHS OCCURRING AT HOME

Intended place of delivery	Month of Birth											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Hospital	20.8 (174)	24.9 (192)	23.0 (191)	19.2 (149)	18.8 (151)	21.4 (161)	21.4 (145)	19.5 (130)	21.3 (147)	19.0 (140)	19.8 (128)	21.0 (141)
Home	64.2 (536)	62.7 (483)	66.0 (547)	67.9 (527)	70.3 (564)	66.1 (498)	66.7 (453)	67.2 (448)	66.2 (457)	70.1 (516)	69.2 (447)	65.5 (441)
Unbooked	2.8 (23)	3.4 (26)	2.8 (23)	4.0 (31)	3.1 (25)	2.8 (21)	3.5 (24)	3.7 (25)	3.8 (26)	3.8 (28)	3.1 (20)	3.4 (23)
Not known	12.2 (102)	9.0 (69)	8.2 (68)	8.9 (69)	7.7 (62)	9.7 (73)	8.4 (57)	9.6 (64)	8.7 (60)	7.1 (52)	7.9 (51)	10.1 (68)
Total	100.0% (835)	100.0% (770)	100.0% (829)	100.0% (776)	100.0% (802)	100.0% (753)	100.0% (679)	100.0% (667)	100.0% (690)	100.0% (736)	100.0% (646)	100.0% (673)

Transfer of mothers and babies to hospital after delivery at home

In total 1,364 mothers and 1,436 babies were reported as having been transferred into hospital after the birth. Those transferred during labour would not, of course, be included in this sample. Table 8.9 below shows the percentage of transfers within each intended place of delivery group.

TABLE 8.9 PERCENTAGE OF TRANSFERS WITHIN EACH INTENDED PLACE OF DELIVERY GROU

Intended place of delivery	Percentage of mothers transferred	Percentage of babies transferred
Consultant unit	61.9 (807)	63.7 (830)
GP Beds (all)	31.9 (174)	33.3 (182)
Home	2.8 (172)	3.5 (204)
Unbooked	67.1 (198)	69.5 (205)
Total	15.4 (1364)*	16.2 (1436)+

* including 13 where the intended place of delivery was unknown

+ including 15 where the intended place of delivery was unknown

Midwives were asked to record the reasons why the transfers were made. In the case of mothers booked for hospital delivery it was routine to transfer mother and baby into hospital. Thus, responses to the question asking about the reasons for the transfer into hospital did not give any real indication of morbidity consequently data presented in tables 8.10 & 8.11 refer only to transfers after planned home deliveries.

The main reason given as to why babies, born to mothers having planned home births, were transferred into hospital, was to be with their mothers. This was the reason given for over half of the babies transferred. Only one fifth of mothers were transferred to hospital to be with their babies.

TABLE 8.10 REASONS GIVEN BY MIDWIVES AS TO WHY BABIES BORN TO MOTHERS FOR BOOKED DELIVERY AT HOME WERE TRANSFERRED INTO HOSPITAL

Reason	Number	Percentage of all planned home births
To be with mother	105	1.8
Observation	11	0.2
Prematurity	13	0.2
Cold	3	0.1
Requiring treatment	14	0.2
Post mortem/mortuary	4	0.1
Respiratory difficulties	14	0.2
Low birthweight	6	0.1
Admission to SCBU	9	0.2
Noenatal jaundice	8	0.1
Because of abnormality	12	0.2
Other	5	0.1
Total	204	3.5

Key

SCBU Special care baby unit.

TABLE 8.11 REASONS GIVEN BY MIDWIVES AS TO WHY MOTHERS BOOKED FOR HOME DELIVERY WERE TRANSFERRED INTO HOSPITAL AFTER THE DELIVERY

Reason	Number	Percentage of all planned home births
Perineal suturing	17	0.3
Retained placenta	79	1.3
Post partum haemorrhage	26	0.4
Second twin in utero	6	0.1
To be with baby	31	0.5
Other	13	0.2
Total	172	2.8

Conclusion

The majority of planned home deliveries were attended by a doctor, a midwife or both. A small percentage (2.8 per cent) were not and the outcome for these births was less good. It was clear from additional notes made on the questionnaires that although these births were intended to occur at home they nevertheless occurred at an unexpected time.

The percentage of mothers had babies transferred into hospital after a planned home delivery , 3.5 and 2.8 per cent respectively, was low, indicating that planned home delivery in 1979 was associated with little serious morbidity.

The circumstances in which unplanned births at home occurred were far from ideal and contrast sharply with those for planned home births. Only 40 per

cent of births intended to occur in a consultant unit were attended by either a doctor or a midwife. Even fewer unbooked (27 per cent) births were attended by a professional. Almost 50 per cent of unbooked mothers delivered alone with the consequence that one in three of their babies died. Surprisingly, nearly two thirds of babies booked for delivery in a GP bed were attended by a doctor or midwife.

Although the perinatal mortality rates associated with the various delivery attendants are difficult to interpret it can be concluded that deliveries which occurred at home, planned or otherwise, without a professional in attendance had a much poorer outcome than those attended by a doctor or a midwife.

The results with respect to why mothers who were booked for a hospital delivery gave birth at home, suggest that more of the births intended to occur in a consultant unit were genuinely unplanned births compared with those planned to occur in a GP bed. This theme is explored in greater detail in chapter nine.

References

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C H A P T E R IX

Mothers who Booked for Hospital Delivery but Intended to Give Birth at Home

Introduction

Anecdotal evidence, available during the planning stage of the survey, suggested that a proportion of mothers having unplanned deliveries at home were booking for a hospital delivery although intending to give birth at home. It was further suggested that midwives were often aware of this and supported mothers' actions. Clearly, mothers who take such steps must be unable to book for delivery at home, possibly because they possess certain characteristics associated with poor pregnancy outcome.

In order to try and identify these women in the Home Births Survey the main question on the questionnaire, asking where the mother was booked for delivery, was followed by a supplementary question asking:

> "If the intended place of delivery differs from the actual place of delivery (ie.home) please give reasons why this happened?"

If, in reply to this question, midwives gave any indication that the mother had booked for a hospital delivery but intended to give birth at home, then this information was coded separately. Five percent of all mothers (97) included in the survey as booked for a hosptal delivery were categorised in this way. The place of booking for these mothers is displayed in Table 9.1. This shows that the majority of these women were booked for delivery in consultant units.

TABLE 9.1 PLACE OF BOOKING FOR MOTHERS WHO BOOKED FOR A HOSPITAL DELIVERY BUT WHO, ACCORDING TO MIDWIVES, INTENDED TO GIVE BIRTH AT HOME

Place of booking	Number	Percentage	As a Percentage of all deliveries in that group
Consultant unit	70	72.2	5.4
GP bed in consultant unit	11	11.3	
Integrated GP unit	8	8.2	5.0
Isolated GP unit	8	8.2	
Total	97	100.0	

Another way of trying to identify these women in the survey might have been to include a more direct question about whether mothers intended to adhere to their booking arrangements. From an epidemiological point of view, the absence of a direct question makes the presentation of results by intended place of delivery, including this group as a separate category, unsatisfactory, as women who should have been categorised in this way will have been omitted. This omission could arise in one of two ways. Firstly, there may have been mothers who fell into this category but without the prompting of a direct question, midwives failed to record this information. Secondly, there will also have been mothers whose intentions will have gone unrecorded because midwives completing the questionnaires were unaware of the mother's plans.

For these reasons, most of the presentation of results from the survey has been confined to the place of booking (ie. the intended place of delivery immediately before the onset of labour) as recorded by midwives in answer to question one. In this chapter, however, some results separating mothers identified as booking for hospital delivery but intending to give birth at home, are included.

Gestational Age

The data presented in Table 9.2 show that a greater percentage of babies born to mothers who booked for hospital but intended to give birth at home had a gestational age of 38 weeks or more when compared with those booked for consultant unit or GP unit intended deliveries. The difference is only statistically significant when the percentage of deliveries after 38 weeks in consultant units is compared with the "hospital booked intended home" birth group.

TABLE 9.2 GESTATIONAL AGE BY INTENDED PLACE OF DELIVERY INCLUDING AS A SEPERATE CATEGORY MOTHERS WHO BOOKED FOR A HOSPITAL DELIVERY BUT INTENDED TO GIVE BIRTH AT HOME.

Intended place of delivery	Gestational Age: Less than 28 weeks	28 to 32 weeks	33 to 37 weeks	38 weeks	All
Consultant unit	1.7 (20)	5.9 (69)	16.3 (189)	76.1 (883)	100% (1161)
GP bed in consultant unit	- (0)	0.6 (1)	12.1 (19)	87.3 (137)	100% (157)
Integrated GP unit	- (0)	2.2 (5)	6.9 (16)	91.0 (211)	100% (232)
Isolated GP unit	0.9 (1)	0.9 (1)	13.8 (16)	84.5 (98)	100% (116)
Hospital booked intended home	- (0)	- (0)	5.6 (5)	94.4 (84)	100% (89)
Home	0 (2)	0.1 (6)	1.9 (112)	97.9 (5708)	100% (5828)
Unbooked	3.8 (6)	8.9 (14)	22.3 (35)	65.0 (102)	100% (157)
All	0.4 (29)	1.2 (96)	50.7 (92)	93.3 (7223)	100% (7740)

(1116 missing observations)

TABLE 9.3 MEAN GESTATIONAL AGE BY INTENDED PLACE OF DELIVERY INCLUDING AS A SEPARATE CATEGORY MOTHERS WHO WERE BOOKED FOR A HOSPITAL DELIVERY BUT INTENDED TO GIVE BIRTH AT HOME.

Intended place of delivery	Mean gestational age	95% confidence interval
Consultant unit	38.2	(38.1 to 38.3)
All GP beds	39.3	(39.1 to 39.5)
GP bed in a consultant unit	39.3	(39.1 to 39.5)
Integrated GP unit	39.4	(39.3 to 39.5)
Isolated GP unit	39.1	(38.9 to 39.4)
Hospital booked intended home	39.6	(39.5 to 39.7)
Home	40.0	(40.0 to 40.0)
Unbooked	37.4	(36.8 to 38.0)
All	39.6	(39.6 to 39.6)

(1116 missing observations)

Observed differences between the mean gestational age for babies born to mothers booked for a hospital delivery but intending to give birth at home, and those for babies born to mothers booked for consultant unit or home are statistically significant. ($p<0.01$)

Birthweight

Comparing the distribution of birthweights (as shown in table 9.4) of the "hospital booked intended home" group with that for all other groups it appears that the distribution for this group is more like that observed for the intended home category than any other group.

TABLE 9.4 BIRTHWEIGHT OF BABY BY INTENDED PLACE OF DELIVERY OF MOTHERS INCLUDING AS A SEPARATE CATEGORY THOSE MOTHERS WHO BOOKED FOR A HOSPITAL DELIVERY BUT INTENDED TO GIVE BIRTH AT HOME.

Intended place of delivery	Less than 1501 grams	1501 to 2500 grams	2501 to 3500 grams	3501 to 4500 grams	4501 grams and above	
Consultant unit	4.8 (56)	13.6 (158)	56.1 (652)	24.7 (287)	0.7 (8)	100% (1161)
GP units (all)	1.2 (6)	8.7 (43)	56.1 (279)	33.0 (164)	1.0 (5)	100% (497)
Hospital booked intended home	- (0)	2.3 (2)	67.0 (59)	28.4 (25)	2.3 (2)	100% (88)
Home	1.0 (6)	2.4 (139)	50.4 (2929)	44.6 (2595)	2.5 (143)	100% (5812)
Unbooked	5.8 (15)	23.1 (60)	53.1 (138)	17.3 (45)	0.8 (2)	100% (260)
All	1.1 (83)	5.1 (402)	51.9 (4057)	39.9 (3116)	2.1 (160)	100% (7818)

(1038 missing observations)

The percentage of low birthweight babies in the "hospital booked intended home" category is significantly lower than that for all other groups, with the exception of the intended home category. ($p<0.05$) Although the percentage of low birthweight babies in the booked home category is less than the corr esponding percentage in the "booked hospital intended home" group the difference is not statistically significant.

TABLE 9.5 MEAN BIRTHWEIGHT BY INTENDED PLACE OF DELIVERY INCLUDING AS A SEPARATE CATEGORY MOTHERS BOOKED FOR A HOSPITAL DELIVERY BUT WHO INTENDED TO GIVE BIRTH AT HOME

Intended place of delivery	Mean birthweight in grams	95% confidence interval in grams
Consultant unit	3044	(3003 to 3085)
GP units (all)	3264	(3213 to 3316)
Hosptital booked intended home	3351	(3284 to 3453)
Home	3474	(3461 to 3487)
Unbooked	2857	(2766 to 2949)
All	3374	(3361 to 3387)

(1036 missing values)

Observed differences between mean birthweight for babies born to mothers in the "hospital booked intended home category" and mean values for all other categories were statistically significant with the exception of the mean value for GP units. ($p<0.05$)

TABLE 9.6 BIRTH ATTENDANT BY INTENDED PLACE OF DELIVERY INCLUDING AS A SEPARATE CATEGORY MOTHERS WHO BOOKED FOR HOSPITAL DELIVERY BUT INTENDED TO GIVE BIRTH AT HOME.

Intended place of delivery	Birth Attendant: Midwife	Doctor	Ambulance staff	Husband/ partner	Mother alone*	Other	Total
Consultant unit	33.0 (338)	5.3 (54)	18.3 (188)	10.8 (111)	25.5 (258)	7.4 (76)	100% (1025)
GP bed in a consultant unit	61.3 (85)	3.7 (5)	9.5 (13)	7.3 (10)	15.3 (21)	2.9 (3)	100% (137)
Isolated GP unit	70.4 (159)	2.2 (5)	5.8 (13)	6.6 (15)	10.2 (23)	4.9 (11)	100% (226)
Integrated GP unit	37.2 (42)	7.1 (8)	12.4 (14)	13.3 (15)	25.7 (29)	4.4 (5)	100% (113)
Hospital booked intended home	66.0 (62)	5.3 (5)	5.3 (5)	7.4 (7)	10.6 (10)	5.3 (5)	100% (94)
Home	97.2(5695)	1.2 (68)	0.1 (4)	0.7 (39)	0.7 (39)	0.2 (12)	100% (5857)
Unbooked	16.5 (40)	9.5 (23)	8.2 (20)	7.4 (18)	48.1 (117)	10.3 (25)	100% (243)
All	83.4(6418)	21.8(168)	3.3 (257)	27.9 (215)	64.6 (497)	18.2 (137)	100% (7695)

(1161 missing values)

*Mother gave birth without anyone else being in attendance.

Birth attendant

Professional attendants delivered 71.3 per cent of babies born to mothers who booked for delivery at home but intended to give birth in hospital. This is considerably lower than the percentage of deliveries attended by either a doctor or midwife in the intended home category. Given that medical staff may not have been aware of these mothers' intentions not to adhere to their hospital booking arrangements, it is not surprising that there was a lower level of professional attendance at these deliveries compared with that for the planned home birth group.

Mothers' previous parity, age and marital status

Analyses presented so far in this chapter suggest that the characteristics of the babies born to mothers who booked for a hospital delivery but intended to give birth at home, are similar to those observed for babies born to mothers who had planned home births. There are notable differences however between these two groups with respect to mothers' previous parity, age and marital status.

The data shown in Table 9.7 show that there were more nulliparous and high parity mothers (four or more births) in the "booked hospital intended home" category than in the group of mothers booked for birth at home. ($p<0.001$) The data on mean previous parity shown in Table 9.8 confirm this. The mean value for the "hospital booked intended home category" is higher than mean for births booked for delivery at home or in a GP bed. ($p<0.01$)

TABLE 9.7 PREVIOUS PARITY BY INTENDED PLACE OF DELIVERY INCLUDING AS A SEPARATE CATEGORY MOTHERS WHO BOOKED FOR A HOSPITAL DELIVERY BUT INTENDED TO GIVE BIRTH AT HOME.

Intended place of delivery	Number of previous births: Nulliparous	1	2	3	4 plus	All
Consultant unit	15.2 (174)	38.0 (439)	22.8 (263)	11.6 (134)	12.4 (143)	100% (1153)
GP bed in Consultant Unit	5.8 (9)	53.6 (83)	32.9 (51)	7.1 (11)	0.7 (1)	100% (155)
Integrated GP unit	3.9 (9)	56.3 (129)	28.8 (66)	6.6 (15)	4.4 (10)	100% (229)
Isolated GP unit	12.4 (15)	47.1 (57)	28.9 (35)	9.9 (12)	1.7 (2)	100% (121)
Hospital booked intended home	9.6 (9)	29.8 (28)	26.6 (25)	16.0 (15)	18.1 (17)	100% (94)
Home	5.0 (290)	44.0 (2530)	36.7 (2113)	11.0 (635)	3.2 (187)	100% (5753)
Unbooked	55.3 (151)	16.5 (45)	12.5 (34)	7.0 (19)	8.8 (24)	100% (273)
All	8.4 (657)	42.6 (3311)	33.3 (2587)	10.8 (841)	4.9 (382)	100% (7778)

(1078 missing observations)

TABLE 9.8 PREVIOUS MEAN PARITY BY INTENDED PLACE OF DELIVERY WITH MOTHERS WHO BOOKED FOR A HOSPITAL DELIVERY BUT INTENDED TO GIVE BIRTH AT HOME INCLUDED AS A SEPARATE CATEGORY.

Intended place of delivery	Previous mean parity	95% confidence interval
Consultant unit	1.8	(1.8 to 1.8)
GP units (all)	1.5	(1.4 to 1.5)
Hospital booked intended home	2.1	(2.0 to 2.3)
Home	1.7	(1.6 to 1.7)
Unbooked	1.1	(0.9 to 1.2)
All	1.7	(1.7 to 1.7)

(1078 missing values)

Data on maternal age and marital status are presented in Table 9.9. The most striking aspect of these data is the high percentage of illegitimate births (28.9 per cent) in the "hospital booked intended home" category compared with both hospital and home booked births. ($p<0.001$)

The "hospital booked intended home" category also has a higher percentage of mothers at both ends of the age spectrum compared with the distribution for mothers who booked for a home birth. The differences observed in the percentages of women aged 0-19 and 35 or more in the "hospital booked intended home group" when compared with the planned home delivery group, are statistically significant. ($p<0.05$)

TABLE 9.9 INTENDED PLACE OF DELIVERY BY MATERNAL AGE AND MARITAL STATUS INCLUDING AS A SEPARATE CATEGORY MOTHERS WHO BOOKED FOR A HOSPITAL DELIVERY BUT INTENDED TO GIVE BIRTH AT HOME

Intended place of delivery	Maternal Age: Under 20		20 - 24		25 - 29		30 - 34		35 plus		All	
	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit
Consultant unit	5.5 (68)	3.6 (44)	26.6 (328)	4.9 (61)	27.3 (336)	3.7 (46)	19.2 (237)	2.0 (25)	6.7 (82)	0.5 (6)	85.2 (1051)	14.8 (182)
GP bed in constant unit	1.3 (2)	0.6 (1)	22.0 (35)	3.1 (5)	42.8 (68)	2.5 (4)	23.3 (37)	1.3 (2)	2.5 (4)	0.6 (1)	91.8 (146)	8.2 (13)
Integrated GP unit	2.6 (6)	1.3 (3)	25.1 (59)	1.7 (4)	40.4 (95)	2.6 (6)	23.0 (54)	1.3 (3)	2.1 (5)	-	93.2 (219)	6.8 (16)
Isolated GP unit	7.2 (9)	3.2 (4)	29.6 (37)	5.6 (7)	32.0 (40)	- -	16.8 (21)	0.8 (1)	4.8 (6)	- -	90.4 (113)	9.6 (12)
Hospital booked intended home	3.1 (3)	1.0 (1)	15.5 (15)	9.3 (9)	19.6 (19)	7.2 (7)	26.8 (26)	8.2 (8)	6.2 (6)	3.1 (3)	71.1 (69)	28.9 (28)
Home	1.1 (66)	0.2 (13)	17.7 (1045)	1.9 (112)	39.5 (2336)	2.4 (143)	30.6 (1810)	1.9 (111)	4.3 (255)	0.4 (26)	93.2 (5512)	6.8 (405)
Unbooked	2.4 (7)	38.0 (112)	9.2 (27)	1.6 (48)	7.8 (23)	6.4 (19)	5.4 (16)	4.1 (12)	8.8 (26)	1.7 (5)	33.6 (99)	66.4 (196)
Not known	2.1 (17)	5.0 (40)	18.7 (149)	3.6 (29)	32.8 (261)	4.0 (32)	24.5 (195)	4.0 (32)	4.2 (33)	0.9 (7)	83.6 (655)	16.4 (140)
All	2.0 (178)	2.5 (218)	19.0 (1695)	3.1 (275)	35.9 (3178)	2.9 (257)	27.1 (2396)	2.1 (194)	4.7 (417)	0.5 (48)	88.8 (7864)	11.2 (992)

Conclusion

Only one of the babies belonging to these 97 mothers classified as booking for hospital but intending to give birth at home, was stillborn. The midwife reported that this mother was booked for a consultant unit but

> "admitted into hospital with pre-eclamptic toxemia. Patient took her own discharge and went into labour immediately after reaching home. She did not want to tell her boyfriend who was staying with her that she was having pains"

It is not altogether clear from his account whether this mother really wanted a home delivery and her inclusion in the "hospital booked intended home" category is questionable.

Overall, the outcomes of these 97 births, in terms of birthweight, gestationa age, and perinatal mortality were similar for mothers having planned births a home. Conversely, these 97 women are quite distinct from those having planne home births with respect to their age, marital status and previous parity.

Mothers in the "booked hospital intended home" group had a significantly high mean parity, and a greater percentage were nulliparous or high parity mothers In addition, a greater percentage of these births were illegitimate and to teenage mothers or those 35 and over.

It is likely then that these women were unable to book for a home birth because they possessed one or more characteristics, considered by medical sta to increase the risk of maternal and perinatal problems.

C H A P T E R X

Mothers who were not Booked anywhere for Delivery

Introduction

The results of the home births survey discussed so far have shown that mothers who gave birth at home, but were unbooked for delivery at any location, to be an unusual group. The perinatal mortality for this group was 196.6 per 1000 births. This was more than double the rate for any of the other intended place of delivery and 50 times the rate for planned home births. Although only three per cent of mothers giving birth at home were unbooked for delivery, perinatal deaths to these mothers accounted for 27.2 per cent of all perinatal deaths at home in 1979. That one in five of the babies born to these mothers died during the perinatal period is disquieting but details of the cause of death are more disturbing (see Table 5, Chapter V). The mortality rate from external causes of injury and poisoning (which means injury and violence not connected with the delivery) of 23.7 per 1000 births is extremely high. Indeed the 295 unbooked mothers contributed one third of all the perinatal deaths attributed to this ICD* chapter in the whole of England and Wales. A further four perinatal deaths at home were also the result of external causes of injury or poisoning and these were all mothers for whom the intended place of delivery was not known.

Births to mothers in this unbooked category were characterised by having a significantly lower mean birthweight (2857 grams) than all other intended home was 3374 grams). In only 26.0 per cent of deliveries was a doctor or midwife present compared with 85.4 per cent of the total survey population.

*ICD International Classification of Diseases

In 48.1 per cent of cases mothers delivered entirely alone. The corresponding percentage for the total survey population was 6.5 per cent. The consequences of unbooked mothers giving birth at home alone was that one in three of their babies died during the perinatal period.

Results from linkage between survey and registration data revealed that a significantly greater percentage of mothers having no specific intended place of delivery (40 per cent) were teenagers, compared with four and a half per cent of the survey population as a whole ($P < 0.001$). There was also a significantly larger perentage of mothers aged over 35 (10 per cent) in this unbooked group compared with the corresponding percentage (5.2 per cent) for all mothers giving birth at home ($P < 0.001$).

Only 33.6 per cent of unbooked births which occurred at home were legitimate compared with 88.5 per cent of all births at home. Among the teenage group only six per cent of unbooked births were legitimate compared with 81.7 per cent of all births occurring at home.

In previous chapters I have shown that the high perinatal mortality amongst babies born to mothers in this group could not be explained by a high proportion of low birthweight babies or as a consequence of patterns in maternal characteristics such as age, marital status and parity associated with poor pregnancy outcome.

One maternal characteristic which is available for only ten per cent of the survey population is social class. This combined with the fact that the information from which social class is derived for illegitimate births is

unreliable, means that analyses by social class for unbooked births are not possible. However, with respect to mothers who conceal their pregnancies anecdotal evidence reported in the literature suggests that these mothers come from a wide social background (1,2).

On the questionnaire midwives were asked to report the reason why no booking had been made. In the next section responses to this question are used to examine within group differences in maternal characteristics and the delivery outcome.

Reasons given for the absence of a booking for delivery

As Table 10.1 below shows, 62 per cent of these unbooked mothers were reported by midwives to have concealed their pregnancies. This includes a subgroup of 12 per cent of unbooked mothers who told midwives that they were unaware of their pregnancy. A further 25 per cent received no antenatal care. A small proportion of these mothers (5 per cent of the total) had refused care. It is likely then that 82 per cent of these mothers had no contact with the health services, with respect to their pregnancies, before the onset of labour.

TABLE 10.1 REASONS FOR THE ABSENCE OF A PLACE OF BOOKING FOR DELIVERY

Reasons for the absence of booking	Number	Percentage
Concealed pregnancy	182	61.7
No antenatal care	74	25.1
Other/not known	39	13.2
Total	295	100

On the face of it there would seem to be little difference between a mother wh concealed her pregnancy and one who received no antenatal care. The former would seem to be a subset of the latter. In distinguishing between mothers in this way however midwives do seem to have differentiated between at least two groups of mothers with different characteristics.

Mothers who were said to have concealed their pregnancies or who told medical staff that they had been unaware of their pregnancy were typically nulliparous young and unmarried. Approximately half were less than 20 years of age, 76 per cent were unmarried and 65 per cent were nulliparous (Tables 10.2 and 10.3).

The following comments by midwives illustrate the trends observed in the data

1. "Concealed pregnancy - mother very young (aged 15 years) would not accept that she was pregnant"

2. "The patient was unmarried and living at home. The patient said she didn't know she was pregnant"

Mothers whom midwives reported as having received no antenatal care were characteristically older (77 per cent were over 19 years of age) and multipar (over one quarter had already had three or more livebirths) as the following remark shows:

> "Patient had failed to seek antenatal care and hidden her pregnancy from other family members, doctors and midwives, fearing a hospital confinement due to age and parity"

"All other children had been born at home. Patient afraid of hospitals"

TABLE 10.2 REASON FOR THE ABSENCE OF A BOOKING FOR DELIVERY BY MOTHER'S PREVIOUS PARITY (IE EXCLUDING THE CURRENT BIRTH)

Reason for the absence of a booking	Nulliparous	1	2	3	4	5+	Not known	Total
Concealed pregnancy	64.8(118)	12.6 (23)	8.2 (15)	6.7 (12)	2.2 (4)	0.6 (1)	4.1 (9)	100%(182)
No antenatal care	27.0 (20)	20.3 (15)	21.6 (16)	5.4 (4)	6.8 (5)	12.2 (9)	6.8 (5)	100% (74)
Other/Not known	33.3 (13)	18.0 (7)	7.7 (3)	7.7 (3)	2.6 (1)	10.3 (4)	20.5 (8)	100% (39)
Total	51.2(151)	15.3 (45)	11.5 (34)	6.4 (19)	3.4 (10)	4.8 (14)	7.5 (22)	100%(295)

TABLE 10.3 MATERNAL AGE AND LEGITIMACY ACCORDING TO THE REASON FOR THERE BEING NO BOOKING FOR DELIVERY

Reason for no booking for delivery	Maternal Age and Legitimacy											
	Under 19		20–24		25–29		30–34		35+		All	
	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit
Concealed pregnancy	1.7	46.7	6.6	20.3	4.4	5.5	2.2	3.3	7.7	1.7	22.5	77.5
	(3)	(85)	(12)	(37)	(8)	(10)	(4)	(6)	(14)	(3)	(41)	(141)
No antenatal care	4.1	18.9	16.2	9.5	13.5	9.5	10.8	5.4	10.8	1.4	55.4	44.6
	(3)	(14)	(12)	(7)	(10)	(7)	(8)	(4)	(8)	(1)	(41)	(33)
Other/Not known	2.6	33.3	7.7	10.3	12.8	5.1	10.3	5.1	10.3	2.6	43.6	56.4
	(1)	(13)	(3)	(4)	(5)	(2)	(4)	(2)	(4)	(1)	(17)	(22)
Total	2.1	38.0	9.2	1.6	7.8	6.4	5.4	4.1	8.8	1.7	33.6	66.4

Perintal Mortality Acording to the Reason for the Absence of Booking

(Table 10.4)

The difference in perinatal mortality between mothers who concealed their pregnancies and those who were reported as having not received antenatal care is statistically significant ($P < 0.05$).

Despite there being no significant differences in mean birthweight between the two groups (Table 10.5) there are interesting differences in birthweight specific perinatal mortality rates. The excess in mortality amongst those mothers who concealed their pregnancies is confined to babies weighing 2501 grams or more (Table 10.6).

TABLE 10.4 PERINTAL MORTALITY BY REASONS FOR THE ABSENCE OF A BOOKING FOR DELIVERY

Reason for the absence of a booking for delivery	Number of stillbirths	Number of perinatal deaths	Number in subgroup	Perintal mortality rate per 1000 births	(95% confidence interval)
Concealed pregnancy	21	21	182	230.8	(169.9-292.
No antenatal care	4	4	74	108.1	(37.4-178.
Other/Not known	5	3	39	250.1	(123.4-376.
Total	30	28	295	196.6	(151.3-242.

TABLE 10.5 MEAN BIRTHWEIGHT BY REASON FOR THE ABSENCE OF A BOOKING FOR DELIVERY

Reason for the absence of a	Mean birthweight	No.of Cases	95% Confidence Interval
Concealed pregnancy	2851.5	158	(2732.7-2970.4)
No antenatal care	2847.9	66	(2655.0-3040.8)
Other	3399.0	4	(2822.1-3975.9)
Total	2860	228	(2760.0-2960.2)

(67 missing values)

TABLE 10.6 PERINATAL MORTALITY ACCORDING TO BIRTHWEIGHT BY REASON FOR THE ABSENCE OF A BOOKING (Number of deaths in parenthesis)

Reason for the absence of a booking	Birthweight	
	2500 grams or less	2501 grams or more
Concealed pregnancy	260.9 (12)	133.9 (15)
No antenatal care	388.9 (7)	- (0)
All	306.7 (23)	97.3 (18)

(67 missing values)

Concealed pregnancies

Some of the additional information supplied by midwives about mothers who had concealed their pregnancies, highlights the tragic circumstances of the births and deaths of the babies born to these mothers.

1. Mother
"came with her sister to casualty - admitted to maternity unit - retained placenta, tissue laceration"

Baby
"brought in by sister in plastic carrier bag. Fresh stillborn infant delivered in toilet"

2. Mother
"Started haemorrhaging at school about four days after delivery. Admitted to A & E Department. Transferred to Gynaecological Ward because it was realised that she had recently delivered"

"Would not admit to the birth"

Baby
"Baby had been strangled by mother shortly after birth"

3. Mother
"Admitted as an emergency via casualty department because of heavy vaginal bleeding, at this stage it was not known that she had recently delivered a baby"

Baby
"After admitting delivering a baby a nurse went to retrieve the baby from the wardrobe"

4. "Concealed pregnancy because of parental father's probable reaction"

Denial of pregnancy

Some of the mothers who were unbooked for delivery at home, appear from midwives'comments, to have managed not only to deny their pregnancies to their relatives and friends but also seem to have engaged

in a psychological process of self-denial. The two following extracts from responses on the questionnaires demonstrate this.

> "single girl who denied knowledge of pregnancy and labour. Sent to hospital by GP after tenants in other bed sitters called him in"

> "single girl. Pregnancy not acknowledged by mother and not noticed by the rest of the family"

Discussion

That such a high proportion of perinatal deaths were to babies born at home to mothers who had made no formal plans for delivery, was one of the unexpected findings of this survey. Clearly, this result begs a number of questions.

Firstly, are these mothers just "the tip of the iceberg"? That is to say are there many other mothers who conceal their pregnancies until they go into labour, when they call for help or are discovered and are admitted to hospital before the baby is born?

It is impossible to answer this question directly, because from the way in which statistics on maternity admission (3) are currently collected it is not possible to distinguish between mothers admitted to hospital as the result of an emergency transfer from another hospital where they were booked for delivery, from those mothers who were admitted to hospital having made no booking for delivery. What is certain is that the mothers who conceal their pregnancies and give birth at home are the successful concealers and as such are likely to be at the extreme end of a spectrum.

The second question one might wish to ask is have other studies yielded similar findings? Certainly other cross sectional studies of perinatal mortality have identified groups of mothers with characteristics not dissimilar to those of unbooked mothers in the home births survey but researchers have tended to attach different labels to them, for example "late bookers for antenatal care". Concealed pregnancies may also have been included under the meaningless title BBA (birth before arrival).

One cross sectional study of interest was that carried out by Robertson and Carr in the late 1960s (4). They conducted a survey in 11 health authorities to look at the characteristics of late bookers for antenatal care. Details of 10,250 pregnancies were obtained. Late booking was defined as failure to seek antenatal care before the end of the 32nd week of pregnancy. One hundred and sixty four women were deemed to fall into this category. The authors did not report a significantly higher perinatal mortality for this group but they were only able to obtain details on the outcome of pregnancy for 91 per cent of the married mothers.

The late bookers differed from the sa mple as a whole in that more of them were unmarried (30 per cent compared with 6 per cent in the sample as a whole) and a higher percentage (37 per cent compared with 9.5 per cent in the sample as a whole) were of a higher parity (4 plus).

The authors report that "desire to conceal an illegitimate pregnancy was the most important cause of late booking in the unmarried, most of whom were nulliparous. Unwanted pregnancy was also an important feature among the group of late bookers who were married". The authors also noted that of the 67 late bookers who were living in "irregular marital

situations", a very high percentage (82 per cent) were admitted for confinement in specialist hospitals or as emergency transfers.

Another study of interest is an analysis of births which occurred at home in Cardiff between 1970 and 1979 (5). The researchers found that seven per cent of births at home were unbooked; 50 per cent of these mothers were under 20; 57 per cent were nulliparous; 57 per cent were from social classes IV and V; and 73.3 per cent of the mothers were single, separated or divorced. Of the 30 unbooked births six died during the perinatal period: a mortality rate of 200 per 1000 births.

A much earlier study, which nevertheless provides important comparative data, is the 1958 Perinatal Mortality Survey. This survey was conducted in two parts. Information was collected for all births in England and Wales occurring in one week and all the perinatal deaths in the three subsequent months. The rates given in Table 10.7 were therefore arrived at by extrapolation (6).

These data show that in 1958 there were at least twice as many unbooked deliveries in hospital as there were at home. It is also noteworthy that the perinatal mortality rates for these two groups are about the same (168.0 and 175.8 per 1000).

TABLE 10.7 COMPARISON BETWEEN DATA ON UNBOOKED BIRTHS FROM THE 1958 PERINATAL MORTALITY SURVEY AND THE HOME BIRTHS SURVEY

	Perinatal mortality rate	Percentage of all home/ hospital births	Estimated number of births in one year	Percentage of all births in one year
1958 Survey				
Unbooked delivered at home	168.0	1.0%	3172	0.41%
Unbooked delivered in hospital	174.8	1.6%	6916	0.91%
1979 Home Births Survey	196.6	3.3%	295	0.05%

Two important points emerge from a comparison of the 1958 and 1979 figures. Firstly, unbooked mothers delivering at home, as a proportion of all deliveries, have declined from 0.41 in 1958 to 0.05 in 1979. Because of the decrease in the absolute number of births at home however, unbooked births have increased as a proportion of all home births. Secondly, the outcome of these deliveries in terms of perinatal mortality, does not seem to have improved in the 21 years that separate these two surveys. The overall perinatal mortality rate has halved during this time.

The final, and most important question that must be asked is what can be done to ensure a reduction in both the high perinatal mortality rate and the suffering amongst these mothers who do not book for delivery? There are no easy answers but there are at least three ways in which we can begin to move forward.

Firstly, it would seem reasonable to conclude that the majority of these unbooked deliveries at home were the result of unwanted and often unacknowledged pregnancies. Primary prevention in the form of sex education, together with comprehensive and accessible family planning and counselling services would seem to be paramount.

Secondly, there is a need for more information. The recommendations of the Steering Group on Health Services Information go some way towards making this possible. The intended place of delivery is to be recorded but under the proposed classification there is no slot for unbooked births. (7)

It is also to be regretted that the detailed classification on the circumstances surrounding admissions to hospital recommended in Paragraph 5.13 of the Steering Group's first report (which would have permitted the identification of mothers admitted to hospitals as emergency cases where no booking had been made for delivery) has been said, in a later report, "not to be worthwhile" in the case of maternity admissions. (8)

Finally, health professionals, youth workers, social workers and teachers need to be made more alert to the possibility of concealed pregnancy and to be encouraged to discuss strategies for dealing with the problem. In this context it may also be that the attitudes of professionals to these mothers need to be examined. A number of comments made by midwives on the survey questionnaire suggest that these mothers may be alienated from the maternity services by the attitudes of the professionals involved. In response to the question "If there was no booking for delivery please give reasons why a booking was not made?" one midwife wrote of a Bangladeshi woman who had given birth at home to a stillborn child, "indifference", "language problems". A different midwife referring to another mother recorded "Patient did not bother. No preparations made for confinement".

An extensive literature search for this chapter yielded only two academic articles which consisted of case studies of concealed pregnancy. Apart from this the only people who appear to have written on the subject are journalists on tabloid newspapers. The sensationalist and censorous headlines which accompany these articles, for example "Gymslip Shocker Holiday Surprise for Mum, 15" which headed a story about a schoolgirl who gave birth while on a school visit to France, betray social attitudes which are unlikely to encourage these reluctant mothers to seek help. (9)

Throughout this chapter only unbooked births which occurred at home have been considered. There were 33 unbooked deliveries which occurred outside hospital and at an address other than the mother's normal home address. Six of these babies died during the perinatal period giving a perinatal mortality of 181.8 per 1000 births. This, however, may be an underestimate as nine stillbirths were excluded from this part of the study because the name and address of the mother was unknown (see Chapter IV). Thus, the perinatal mortality rate for unbooked births to mothers delivering away from home and outside hospital may have been as high as 357.1 per 1000 births.

If it is assumed that there were twice as many unbooked births in hospital as there were at home in 1979 (as was the case in 1958) and that these births experienced the same mortality rate as for unbooked births at home (as was the case in 1958) this would have meant that 189 of the 9402 deaths in 1979 were to mothers unbooked for delivery. (This includes the 9 stillbirths excluded from the survey because no maternal details had been recorded at birth registration). Without these deaths the perinatal mortality rate for England and Wales in 1979 would only have been reduced by two per cent. These calculations are based on the assumptions that the

ratio of unbooked births occurring at home and in hospital was the same in 1979 as it was in 1958 and that the perinatal mortality experienced by these two groups was the same. Because of the enormous changes in maternity care between 1958 and 1979, it may be that these assumptions are invalid.

Although in population terms an unbooked birth is a rare event the medical sequalae, as this chapter demonstrates, are not insignificant. Clearly there is need for a comprehensive preventive strategy and further research.

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C H A P T E R X I

Births Occurring Outside Hospital and at a Location Other Than the Mother's Normal Place of Residence (Elsewhere deliveries)

Introduction

Little is known about deliveries which occur outside hospital and at a location other than the mothers normal place of residence. 513 such "elsewhere" deliveries occurred in England and Wales in 1979. Questionnaires were dispatched for these births at the same time as the main home births survey was being conducted.

Elsewhere deliveries are by definition a heterogeneous group comprising at least two distinctive types of delivery; those which occur in transit while the mother is in labour and on her way to hospital and those which occur at an address other than the mother's normal place of residence. Both categories will contain births intended to occur in hospital as well as those planned to occur at an address outside hospital. It would seem reasonable to expect that when elsewhere deliveries are sub-divided according to the intended place of delivery, the resultant sub-groups would display perinatal mortality rates and possess maternal characteristics similar to those observed for the corresponding groups amongst births occurring at home. The aims of analyses presented in this chapter are firstly to shed some light on the characteristics associated with "elsewhere" deliveries and secondly to compare the characterstics of the various groups of "elsewhere" deliveries with their counterparts giving birth at home.

The intended place of delivery and actual delivery location of elsewhere birth in 1979.

The health district code attributed to each birth in England and Wales is based on the mothers' usual home address. This, of course, is not necessarily the same as the district in which the birth took place. This inconsistency created problems with the "elsewhere" deliveries. Divisional Nursing Officers, Midwifery, were sometimes unaware of the birth if it had taken place in another health district and were therefore unable to complete the questionnaire. If questionnaires pertaining to "elsewhere" deliveries were returned for this reason, they were then forwarded to the health district in which the delivery took place. This procedure did not always prove successful and is reflected in the higher percentage of "elsewhere" deliveries for which the intended place of delivery was not known (17.5 percent) as compared with 9 percent for births at home.

TABLE 11.1 INTENDED PLACE OF DELIVERY FOR "ELSEWHERE" BIRTHS, ENGLAND & WALES, 1979

Intended place of delivery	Number	Percentage
Consultant unit	255	49.9
GP bed in consultant unit	17	3.3
Integrated GP unit	19	3.7
Isolated GP unit	25	4.9
Home	75	14.6
Unbooked	33	6.4
Not known	89	17.4
All	513	100

It was clear from the address of the place of delivery that "elsewhere" births could be classified by the precise location of delivery: births either occurred while the mother was on route to hospital (often in an ambulance) at a private address or at a non-private address eg. public toilet.

TABLE 11.2 INTENDED PLACE OF DELIVERY BY LOCATION OF DELIVERY FOR ELSWHERE BIRTHS, ENGLAND & WALES 1979

Intended place of delivery	Location of delivery: En route	Private address	Non-private address	All
Consultant unit	61.6 (149)	35.1 (85)	3.3 (8)	100% (242
GP beds (all)	55.5 (33)	40.0 (24)	5.0 (3)	100% (60
Private address +	3.1 (2)	96.9 (64)	- (0)	100% (66
No booking	34.4 (11)	53.1 (17)	12.5 (4)	100% (32
Not known	31.1 (28)	62.2 (55)	6.6 (6)	100% (89
All	45.6 (223)	50.1 (245)	4.3 (21)	100% (489

* 24 elsewhere deliveries have not been included in this table because these were deliveries which were incorrectly coded by the OPCS as home births.

\+ This private address is not necessarily the same as the private address whe the birth occurred.

Table 11.2 gives details of the intended place of delivery cross classified with the actual place of delivery. This table shows that half of the elsewhere births in 1979 occurred at a private address, 46 percent occurred whilst the mother was being transported to hospital and the remaining four percent occurred at a non-private address. Within certain

intended place of delivery groups however, the pattern is somewhat different. Only two births intended to occur at a private address happened while the mother was "in transit". These two births may have been to mothers who were booked for a home delivery but were transferred into hospital after the onset of labour. A slightly higher percentage of births (12.5) where the mother was unbooked for delivery occurred at a non-private address, compared with the corresponding percentages for all other intended place of delivery groups.

Perinatal mortality for each intended place of delivery (Table 11.3)

As was observed for all births at home, there is considerable variation in perinatal mortality rates according to the intended place of delivery for elsewhere births. None of the births intended to occur at a private address resulted in a perinatal death. In contrast the perinatal mortality rate for births intended to occur in consultant units was relatively high at 74.5 per 1 000 births and was similar to that for women booked for delivery under the care of a general practitioner (65.6 per 1 000). The perinatal mortality rates both for unbooked births at 181.1 per 1 000 births and for births where the intended place of delivery was not known (179.8 per 1 000) were both high.

Comparison between perinatal mortality rates for each intended place of delivery for elsewhere births and those occurring at home.

There is no significant difference between perinatal mortality rates for any intended place of delivery, with the exception of births planned to occur in isolated GP units. The rate for "elsewhere" births is significantly

greater than the corresponding rate for all births at home (see Table 5.2) ($p<0.05$). Births intended to occur in an isolated GP unit which happened while the mother was on her way to hospital, may include those who were being transferred from an isolated GP unit to a consultant unit because of some problem arising during labour. Fourteen mothers who intended to deliver in an isolated GP unit delivered in transit and two of these deliveries resulted in stillbirths. It is not possible to tell from the birth registration particulars or from the questionnaire whether these women were on route to the isolated GP unit or were being transferred to a consultant unit. Clearly, if the two stillbirths were to mothers in the latter category then this might explain the significantly higher perinatal mortality rate for those who intended to deliver in isolated GP units but were "elsewhere" deliveries instead.

Perinatal mortality rates by delivery location for "elsewhere" births

Data presented in Table 11.4 show that there was little difference in the risk of perinatal death for babies born on route to hospital and those born at a private address. The perinatal mortality rate for births at a non-private address was however significantly higher ($p<0.05$) that the rate for the other two delivery locations.

From these analyses it would appear that for elsewhere births the intended place of delivery may be a more powerful discriminator in terms of perinatal mortality than the actual place of delivery. The delivery location does exert some influence within intended place of delivery groups; that is to say the risk of a perinatal death for a mother giving birth at a non-private address is greater than other delivery locations irrespective of the intended place of delivery.

TABLE 11.3 PERINATAL MORTALITY BY INTENDED PLACE OF DELIVERY FOR ALL BIRTHS ELSEWHERE, ENGLAND & WALES 1979

Intended place of delivery	Number of stillbirths	Number of perinatal deaths	Total number of births	Perinatal mortality rate	95% confidence interval
Consultant unit	10	9	255	74.5	(42.3 - 106.7)
All GP beds	4	0	61	65.6	(3.5 - 127.7)
GP bed in a consultant unit	0	0	17	-	
Integrated GP unit	0	0	19	-	
Isolated GP unit	4	0	25	160.0	(16.3 - 303.7)
Private address	0	0	74	-	
Unbooked	2	4	33	181.8	(50.2 - 313.4)
Not known	5	11	89	179.8	(100.0 - 259.6)
All	21	24	513	87.7	(63.2 - 112.2)

TABLE 11.4 PERINATAL MORTALITY RATES BY INTENDED PLACE OF DELIVERY FOR EACH DELIVERY LOCATION FOR "ELSE WHERE" BIRTHS, ENGLAND & WALES 1979

Delivery location	Intended place of delivery					
	Consultant unit	GP bed	Private address	Not booked	Not known	All
In transit	73.8	60.6	-	181.8	71.4	76.2
Private address+	70.6	41.7	-	235.3	200.0	89.8
Non private	125.0	333.3	-	-	500.0	238.1
All*	74.4	66.6	-	187.5	177.7	90.0

* This table only refers to 489 births correctly coded by OPCS as elsewhere deliveries. Thus, 24 births (including 1 stillbirth) are excluded. This means that perinatal mortality rates in this table differ slightly from those in Table 11.2.

+ This is not necessarily the same private address at which the delivery was intended to occurr.

Birthweight

The cumulative relative frequencies for birthweight according to the intended place of delivery are shown in Table 11.6 and Graph 11.A. Here, as was observed for births at home, there is a significant difference between each distribution when compared with that for any other group. ($p < 0.05$) The distribution for unbooked births contains a high proportion of low birthweight babies whilst that for births intended to occur at a private address contains a very high proportion of babies weighing more than 2500 grams.

Perinatal mortality rates for low birthweight babies and those of normal weight are given in Table 11.5. Most of the deaths were to babies weighing 2500 grams or less. The small number of deaths to babies weighing more than 2500 grams make the results of analyses of these data inconclusive. There is a suggestion however, that the differences in perinatal mortality observed for the various intended place of delivery groups may, to some extent, be explained by the differences in the proportion of low birthweight babies within the different intended place of delivery groups.

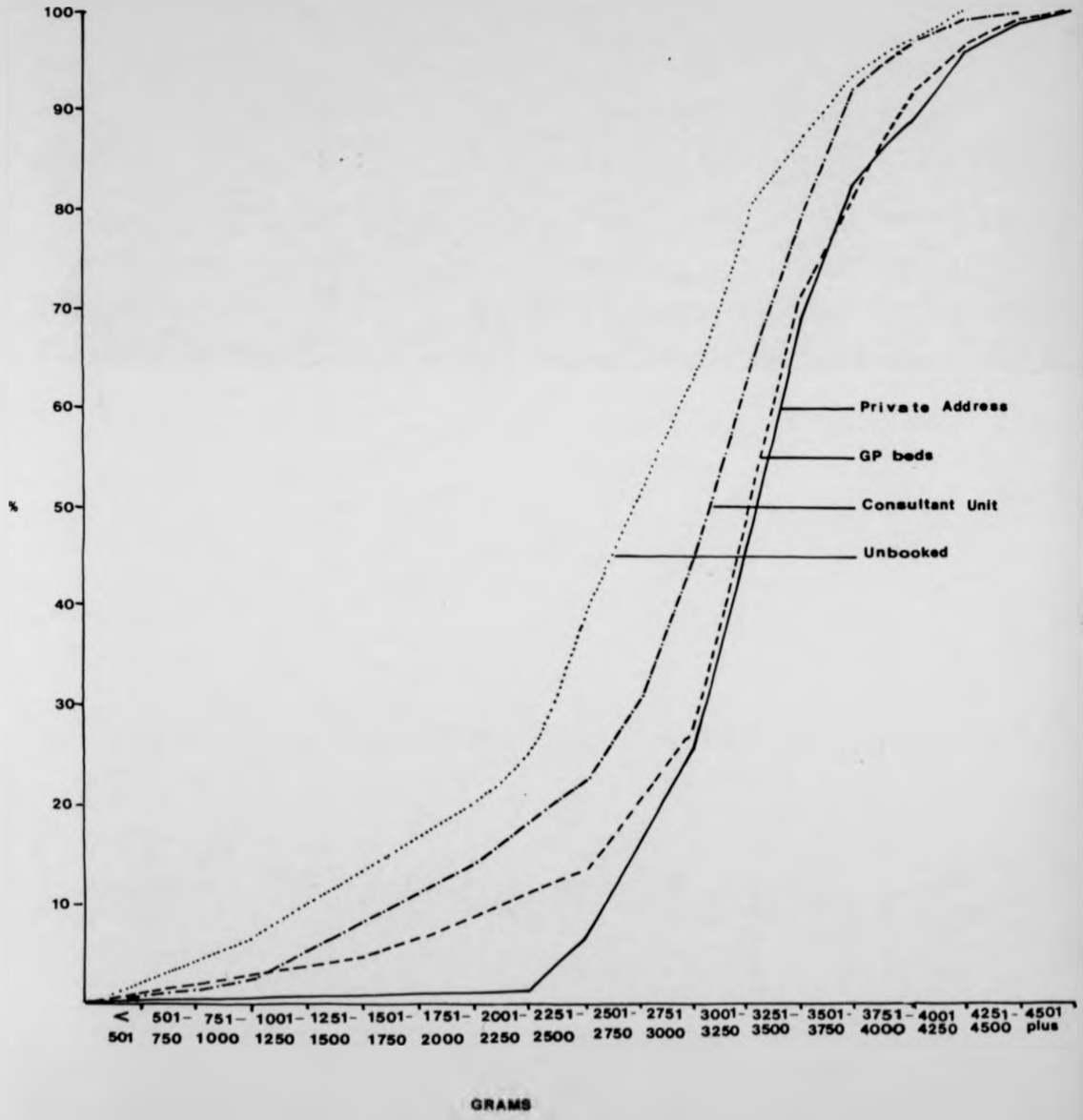
TABLE 11.5 BIRTHWEIGHT SPECIFIC PERINATAL MORTALITY RATES FOR EACH INTENDED PLACE OF DELIVERY (NUMBER OF PERINATAL DEATHS ARE GIVEN IN PARENTHESES)

Intended place of delivery	Birthweight					
	2500 grams or less			2501 grams and over		
	PMR		SE	PMR		SE
Hospital	290.3	(18)	(57.7)	4.29	(1)	(4.28)
Private address	-			-		
Unbooked	250.0	(3)	(125.0)	55.6	(1)	(54.0)
All	265.8	(21)	(125.0)	9.4	(2)	(5.4)

TABLE 11.6 CUMULATIVE RELATIVE FREQUENCY FOR BIRTHWEIGHT GROUPS IN 250 GRAM INTERVALS BY INTENDED PLACE OF DELIVERY FOR "ELSEWHERE" BIRTHS

	Intended place of delivery				
Birhtweight groups	Consultant	GP beds	Private	Not booked	All
<501	0.8				
501-750	1.6				
751-1000	2.9			6.7	
1001-1250	5.9			13.4	
1251-1500	8.4	5.1		13.4	
1501-1750	11.4	6.8		16.7	
1751-2000	14.4	6.8		20.0	
2001-2250	19.1	6.8	1.4	23.3	
2251-2500	22.9	13.6	6.8	40.0	
2501-2750	31.0	20.4	6.8	43.3	
2751-3000	45.0	27.2	25.7	63.3	
3001-3250	63.6	49.0	46.0	80.0	
3251-3500	79.3	71.2	69.0	86.7	
3501-3750	94.1	81.4	82.5	93.4	
3751-4000	97.1	91.6	89.3	96.7	
4001-4250	99.2	96.6	96.1	100.0	
4251-4500	100.0	98.4	98.8		
4501-4750		98.4	98.8		
4751-5000		100.0	100.0		

GRAPH 11. A CUMULATIVE RELATIVE FREQUENCY OF BIRTHWEIGHT (IN GRAMS) FOR EACH INTENDED PLACE OF BIRTH FOR ELSEWHERE DELIVERIES



Maternal Age and Parity

The ages of mothers wishing to give birth in a consultant unit are distributed as expected throughout the childbearing age range. This contrasts with mothers intending to give birth at a private house (eg. other than the mother's normal home address) whose ages were mainly within the 20 to 29 year age range. (Table 11.7)

There are a number of interesting differences between the age distribution of mothers delivering at home and elsewhere deliveries. (See Tables 7.6 and 11.7). The distribution of births intended to occur in consultant units is very similar for home and elsewhere deliveries. The percentage of mothers aged less than 20 is however greater amongst elsewhere deliveries for both mothers intending to give birth in a GP bed ($p < 0.05$) and for those having a planned birth at a private address.

For all intended place of delivery groups apart from unbooked births, the modal previous parity was one birth. A considerably higher percentage of unbooked mothers were nulliparous (37.5 percent) compared with those in other groups. (Table 11.9)

The previous parity distribution within intended place of delivery groups for elsewhere births are broadly similar to those observed for the corresponding groups amongst home births but there are certain interesting and significant differences. (Table 7.3) The percentage of nulliparous mothers intending to give birth in hospital under the care of a general practitioner and those planning to give birth at a private address are significantly higher than the corresponding percentages for births at home. ($p < 0.05$).

TABLE 11.7 MATERNAL AGE IN FIVE YEAR AGE GROUPS FOR EACH INTENDED PLACE OF DELIVERY FOR "ELSEWHERE" BIRTHS, ENGLAND & WALES 1979

Intended place of delivery	Maternal Age Under 20	20-24	25-29	30-34	35 plus	All
Consultant Unit	11.0 (28)	37.6 (96)	28.6 (73)	17.3 (44)	5.5 (14)	100% (255)
All GP beds	11.5 (7)	39.3 (24)	36.0 (22)	13.1 (8)	0 (0)	100% (61)
Private house	6.7 (5)	46.7 (35)	33.3 (25)	12.0 (9)	1.3 (1)	100% (75)
Unbooked	39.4 (13)	36.4 (12)	12.1 (4)	9.1 (3)	3.0 (1)	100% (33)
Not known	14.6 (13)	48.3 (43)	15.7 (14)	18.0 (16)	3.4 (3)	100% (89)
All	12.9 (66)	40.9(210)	26.9(138)	15.6 (80)	3.7 (19)	100% (513)

TABLE 11.8 MATERNAL AGE AND LEGITIMACY FOR EACH INTENDED PLACE OF DELIVERY FOR "ELSEWHERE" BIRTHS,

ENGLAND & WALES 1979

Intended place of delivery	Maternal Age: Under 20		20 - 24		25 - 29		30 - 34		35 plus		All	
	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit	Legit	Illegit
Consultant unit	7.5 (19)	3.5 (9)	31.0 (79)	6.7 (17)	25.1 (64)	3.5 (9)	15.7 (40)	1.6 (4)	5.1 (13)	0.4 (1)	84.3 (215)	15.7 (40)
GP beds (all)	9.8 (6)	1.6 (1)	37.7 (23)	1.6 (1)	31.1 (19)	4.9 (3)	9.8 (6)	3.3 (2)	- (0)	- (0)	88.5 (54)	11.5 (7)
Private address	4.0 (3)	2.7 (2)	40.0 (30)	6.7 (5)	26.7 (20)	6.7 (5)	9.3 (7)	2.7 (2)	- (0)	1.3 (1)	80.0 (60)	20.0 (15)
Unbooked	3.0 (1)	36.4 (12)	12.1 (4)	24.2 (8)	6.1 (2)	6.1 (2)	- (0)	9.1 (3)	- (0)	3.0 (1)	21.2 (7)	78.8 (26)
Not known	3.4 (3)	11.2 (10)	12.4 (11)	48.3 (43)	10.1 (9)	5.6 (5)	14.6 (13)	3.4 (3)	1.1 (1)	2.2 (2)	65.2 (58)	34.8 (31)
All	6.2 (32)	6.6 (34)	32.8 (168)	8.2 (42)	22.2 (114)	4.7 (24)	12.9 (66)	2.7 (14)	2.7 (14)	1.0 (5)	76.8 (394)	23.2 (119)

TABLE 11.9 NUMBER OF PREVIOUS LIVE BIRTHS AND STILLBIRTHS BY MOTHERS' PREVIOUS PARITY FOR EACH INTENDED PLACE OF DELIVERY FOR ELSEWHERE DELIVERIES, ENGLAND & WALES 1979

Intended place of delivery	Previous Parity: Nulliparous	1	2	3	4 plus	All
Consultant unit	14.5 (34)	43.4 (102)	22.1 (52)	11.5 (27)	8.5 (20)	100% (235)
GP beds (all)	14.8 (9)	50.8 (31)	31.1 (19)	1.6 (1)	1.6 (1)	100% (61)
Private address	21.7 (15)	52.2 (36)	18.8 (13)	5.8 (4)	1.4 (1)	100% (69)
Unbooked	37.5 (12)	34.4 (11)	12.5 (4)	9.4 (3)	6.2 (2)	100% (32)
All	17.6 (70)	45.3 (180)	22.2 (88)	8.8 (35)	6.0 (24)	100% (397)

(Missing values 116)

It would seem then, that with respect to maternal age and parity, mothers who intended to give birth in a consultant unit or who were unbooked for delivery and gave birth outside hospital, were very similar to the corresponding groups of mothers who gave birth at home. Mothers intending to give birth in a GP bed or at a private address other than their own were younger and on average of lower parity than their counterparts giving birth at home.

Illegitimacy

With respect to illegitimacy a larger proportion of mothers having elsewhere births were unmarried compared with both women having births at home and the childbearing population as a whole. A significantly greater proportion of elsewhere deliveries which were intended to occur at a private address or where the intended place of delivery was unknown, were illegitimate compared with the same group giving birth at home. ($p < 0.001$). (Tables 11.8 and 7.7).

Seasonal variation in "elsewhere" deliveries

Table 11.10 shows the distribution of births by month for the various intended place of delivery groups. (The format of the table is identical to that of Table 8.7). Unlike the distribution for hospital planned deliveries occurring at home in 1979 there is no excess of "elsewhere" deliveries in February and March. There is, however, an excess of births in January and February (possibly women at home for Christmas) and unexpectedly a higher proportion of deliveries in the summer months from May to August.

TABLE 11.10 : MONTH OF BIRTH FOR EACH INTENDED PLACE OF DELIVERY FOR "ELSEWHERE" BIRTHS.

Intended place of delivery	Month of Birth											
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Hospital	73.4% (47)	52.2% (24)	54.0% (27)	51.9% (27)	62.9% (22)	68.4% (26)	60.9% (28)	69.5% (30)	50.0% (12)	59.5% (22)	51.6% (16)	72.9% (35)
Home	10.9% (7)	21.7% (10)	18.0% (9)	32.7% (17)	11.4% (4)	8.1% (3)	17.4% (8)	4.7% (2)	4.2% (1)	13.5% (5)	22.6% (7)	4.2% (2)
Unbooked	1.6% (1)	6.5% (3)	8.0% (4)	5.8% (3)	11.4% (4)	- (0)	6.5% (3)	9.3% (4)	20.8% (5)	2.7% (1)	6.5% (2)	6.3% (3)
Not known	14.1% (10)	19.6% (9)	2.0% (10)	9.9% (5)	14.3% (5)	21.1% (8)	15.2% (7)	16.3% (7)	25.0% (6)	24.3% (9)	19.4% (6)	16.7% (8)
Total	100.0% (65)	100.0% (46)	100.0% (50)	100.0% (52)	100.0% (35)	100.0% (37)	100.0% (46)	100.0% (43)	100.0% (24)	100.0% (37)	100.0% (31)	100.0% (48)

Conclusion

As was stated in the introduction to this chapter little research has been conducted into "elsewhere" deliveries. A study of all births occurring outside Norway, however, does provide some interesting comparative data. (1)

Deliveries which take place while the mother is in transit to hospital occur at an annual rate of approximately 1.7 per 1,000 births in Norway. This is considerably higher than the rate of 0.35 per 1,000 derived from the results of the Home Births Survey. The characteristics of the Norwegian and English/Welsh groups are nevertheless remarkably similar. The Norwegian authors found that a higher proportion of in transit deliveries occurred in the summertime; one of the unexpected findings with regard to "elsewhere" deliveries. They also observed that only 10 per cent of in transit deliveries were to primaparous women (the corresponding percentage from the survey results was 14 per cent) and that one third of mothers did not have qualified assistance during delivery. In England and Wales only one third of these mothers did have qualified assistance.

Comparing and contrasting intended place of delivery sub-groups for "elsewhere" deliveries with those of births occurring at home revealed that the characteristics of both were broadly similar. The exceptions were that with regard to "elsewhere" deliveries the risk of perinatal death was higher for isolated general practitioner unit intended deliveries and that mothers intending to give birth in a GP bed or at a private address were on average younger and of lower parity than their counterparts giving birth at home.

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C H A P T E R XII

Transfers to Hospital, After the Onset of Labour, of Women Booked for Delivery at Home

Introduction

In trying to assess the effect of the place of birth on delivery outcome it has been suggested that analyses should be based on the intended place of delivery thereby minimising the selective effect of the biological, medical and social mechanisms which confound analyses by actual place of delivery. The results of the Home Births Survey, which show a 50 fold variation in perinatal mortality according to the intended place of delivery, adequately demonstrate the critical importance of knowing about the intended place of delivery when trying to assess the risk of mortality associated with home delivery.

The perinatal mortality rate of 4.1 per 1000 of planned home births in 1979 does not represent the true risk of perinatal death for mothers planning to give birth at home as it does not include those who, although intending to give birth at home, were transferred into hospital.

The planned place of delivery can either be defined as the place initially booked for delivery, or, allowing for changes during pregnancy, the intended place of delivery immediately before the onset of labour. It has been argued that

> "If similar antenatal care is provided for all women cases should probably be categorised on the basis of the plans for delivery that existed immediately before the onset of labour. In these circumstances deaths that occur before labour (as well as those due to malformations) should be excluded. If, however, substantial differences exist in antenatal care between groups defined by planned place of delivery, and if these differences are likely to affect perinatal outcome, the groups should be defined by plans stated earlier in pregnancy." (1)

The use of registration particulars in the Home Births Survey procedure did not permit the identification of mothers planning to give births at

TABLE 12.1 REVIEW OF PREVIOUS STUDIES INVESTIGATING PERINATAL MORTALITY ASSOCIATED WITH TRANSFERS INTO HOSPITAL FOR WOMEN INITIALLY WISHING TO GIVE BIRTH AT HOME

Authors and period of study	Number of women initially booked for home delivery	Antenatal transfers			Labour transfers			Home births			PMR for home births and labour transfers		PMR for all women initially intending to give birth at home	
	%	%	PMR	SE	%	PMR	SE	%	PMR	SE	PMR	SE	PMR	SE
Rutter 1961-1962	1165 (100)	61 (5)	49.2	(27.7)	44 (4)	68.1	(38.0)	1060 (91)	2.8	(1.6)	5.4	(2.2)	7.7	(2.7)
Hudson 1960-1966	667*(100)	85 (12)	23.8	(16.4)	32 (5)	31.3	(30.8)	554 (83)	5.4	(3.1)	6.8	(3.4)	8.9	(3.8)
Woodall 1950-1969	1058 (100)	50 (5)	140.0	(49.1)	41 (4)	195.0	(61.9)	967 (91)	9.3	(3.1)	16.9	(4.1)	22.7	(4.6)
Rees 1948-1958	380 (100)	6 (2)	166.6	(152.2)	2 (1)	500.0	(354)	372 (98)	21.5	(7.5)	24.1	(7.9)	26.3	(8.2)
Kloosterman Holland	4804+(100)	778(16.1)	41.1	(7.2)	316 (7)	19.0	(7.7)	3741 (77)	1.6	(0.7)	3.0	(0.9)	9.1	(1.4)

*These women between them had 4 sets of twins

+Includes 31 women who had twins

TABLE 12.2 NUMBERS OF WOMEN BOOKED FOR HOME DELIVERY SOME OF WHOM TRANSFERRED TO DELIVER IN HOSPITAL AND THOSE WHO DELIVERED AT HOME ALTHOUGH BOOKED ELSEWHERE, OXFORD 1976-1983 (Chloe Fisher, Personnal Communication)

Year	Booked home delivered home	Booked home delivered hospital		Booked hospital delivered home	Unbooked delivered home	Total delivered home
		Antenatal transfer	Labour transfer			
1976	23	N/A	N/A	14		37
1977	25	5	0	8	1	34
1978	37	3	0	18		55
1979	37	10	1	11	4*	52
1980	42	4	2	9		51
1981	24	1	1	13		37
1982	21	5	0	12	1	34
198	21	4	4	17	2	40

* 1 stillbirth
N/A Not available

home but delivering in hospital, as registration particulars are based solely on the actual place of birth. During the survey midwives were asked if they could provide accurate information on the number and outcomes of births to mothers intending to give birth at home in 1979 who actually delivered in hospital. Only two districts were able to do so. (Tables 12.2 and 12.3)

Evidence from other studies

Reports of a number of studies which give details of perinatal mortality by place of booking and actual place of delivery were considered in Chapter I (pages 27 to 31). This section is concerned only with studies which distinguish between plans for home births which were changed before the onset of labour and those mothers transferring into hospital after the onset of labour.

Evidence from these studies suggests that between five and fifteen percent of mothers planning to give birth at home will change their plans during the antenatal period and delivery in hospital; a further four to seven percent will transfer to hospital after the onset of labour (1-4). The data in Table 12.1 show that the perinatal mortality rate associated with those transferring to hospital is likely to be significantly higher than that for those remaining at home. When the perinatal mortality rate for mothers transferred in labour is combined with that for those having planned home births the overall rate is increased by between 11 and 48 per cent and if antenatal transfers are included the overall rate is increased by between 18 and 82 percent.

Data from Oxford community midwifery service voering an eight year period

(Table 12.2) show that three per cent of those booked for home delivery were transferred in labour. Nearly three per cent of all those delivering at home were "unbooked" for delivery and 30 per cent had been booked for delivery in hospital; percentages very similar to those found in the Home Births Survey. The only perinatal death recorded during the eight year period was to a mother who was unbooked for delivery.

One district was able to provide details of mothers who in 1979 were booked for delivery but who were transferred into hospital after the onset of labour. These data are shown in Table 12.3 below.

TABLE 12.3 TRANSFERS TO HOSPITAL OF MOTHERS BOOKED FOR DELIVERY AT HOME IN ONE HEALTH DISTRICT IN ENGLAND AND WALES 1979

Number of women initially booked for home		Antenatal transfers			Labour transfers			Delivered at home			PMR includi all transfe
No.	%	No.	%	PMR	No.	%	PMR	No.	%	PMR	PMR
269	(100)	15	(5.5)	0	24	(9)	41.6	230	(85.5)	4.4	7.4

Fifteen per cent of mothers intending to give birth at home eventually delivered in hospital. There was only one perinatal death amongst those transferred and this was due to cord prolapse associated with a second undiagnosed twin.

Although data obtained during the Home Births Survey, and estimates of the risk of perinatal death for those transferring in labour from other studies are based on small numbers, the findings are broadly consistent and suggest

that the overall perinatal mortality rate for planned home births could be as much as doubled when transfers after the onset of labour are taken into account. Had this been done for the 1979 data the overall perinatal mortality rate may have been 8 per 1000 still well below the national rate of 14.6 per 1000.

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C H A P T E R XIII

Perinatal Mortality for Planned Home Births 1975-1979

Introduction

The object of this study was to test the hypothesis that the apparent increase in the perinatal mortality rate for births at home in England and Wales was a consequence of a change in the ratio of planned and unplanned births at home. That is to say, unplanned births associated with a high perinatal mortality, were forming an increasing proportion of the births occurring at home. As routine birth registration statistics do not distinguish between planned and unplanned births at home it was necessary to mount a special survey to obtain this information. Thus, the primary aim of the home births survey was to collect details of the intended place of delivery for all births registered as occurring at home in 1979, in order that perinatal mortality rates for each intended place of delivery could be calculated for that year.

The results presented and discussed in Chapter V do indeed show that in 1979 there was a statistically significant difference between the perinatal mortality rates for planned and unplanned births occurring at home. The results from the survey only provide a 'snapshot' of information in time. To consider the original hypothesis the results from the survey have to applied over time. This can be done using a form of indirect standardisation.

Before proceding with the standardisation two assumptions have to be made. It is assumed:

1. That as a proportion of all deliveries, unplanned deliveries at home do not vary from year to year.

2. That the ratio of planned to unplanned births was the same amongst those births where the intended place of delivery was not known as for those where it was. The 36 deaths to these 795 births were attributed to the planned or unplanned category using the same principle.

The first assumption is supported by work conducted by Murphy et al who have been able to demonstrate that, as a proportion of all births, unplanned births at home in Cardiff remained fairly constant throughout the period 1970 to 1979 (1).

Birth and death registration particulars for the 795 mothers for whom the intended place of delivery was not ascertained were available for analysis. Thus, it is possible to assess whether the distribution of certain characteristics, such as cause of death, maternal age, legitimacy and social class, in the 'not known' group were similar to those observed for any of the other intended place of delivery groups.

With respect to the cause of perinatal death, the group for which the intended place of delivery was not known had a substantially higher death rate attributable to congenital abnormality (7.6 per 1,000) compared with that for planned home or GP unit intended deliveries. It is also the only group, apart from those mothers for whom no booking for delivery was made, which had any deaths resulting from external causes of injury and poisoning. (5.0 per 1,000 births).

The maternal age distribution for mothers whose intended place of delivery was not known, more closely followed the distribution for all births at home than those for any of the other intended place of delivery sub-groups. (Table 7.6) The only notable difference was that a higher percentage of mothers

for whom the intended place of delivery was not known were under 20 years of age (7.2 per cent compared with 1.3 for home booked births). The maternal age specific perinatal mortality rate for these mothers was very high at 228 per 1,000 births, almost the same as that for mothers who were unbooked for delivery (196.6 per 1 000). The percentage of illegitimate births, at 16.4 per cent, was higher than that for all other intended place of delivery sub-groups apart from those where the mother was unbooked for delivery where it was 66.4 per cent.

All these observations tend to suggest that births for which the intended place of delivery was not ascertained were a heterogeneous group which cannot be clearly identified with any one intended place of delivery sub-group. Thus, the assumption that the ratio of planned to unplanned births in this group was the same as that for all births occurring at home would appear to be reasonable.

Standardisation Procedure

This procedure uses the perinatal mortality rates for planned and unplanned births at home in England and Wales in 1979 as standard rates and birth and death registration statistics for previous years as index populations.

The number of unplanned births at home is estimated for each successive year by applying the ratio of unplanned births at home to the total number of births in 1979, to the total number of births in the index population. The number of planned births is then obtained by subtracting the estimated number of unplanned births from the total number of births registered as occurring at home. By applying the perinatal mortality rates for planned and unplanned births obtained in this study to the numbers of births in the two sub-groups (planned and unplanned) an expected number of deaths is

obtained. The ratio of observed to expected deaths can be expressed as a standardised perinatal mortality ratio (SPMR) which, when multiplied by the actual perinatal mortality rate for births at home in 1979 (24.05 per 1,000) is converted into a standardised rate. (Table 13.1)

When the standardised rates for births occurring during the four year period are plotted alongside the actual rate observed for those not occurring at home (Graph 13.A) the rate of decline in both is very similar.

Quantifying the effects of the assumptions on the model

To test the effect of the assumptions on the basic model a number of simulations were carried out using a 'Dynacalc' (2) package on a South Western Technical Products Micro Computer. Simulations were carried out where it was assumed:

(a) that the proportion of unplanned births at home, as a proportion of all births, increased by 2.5% per annum; (Table 13.2)
(b) that the proportion of unplanned births at home, as a proportion of all births, decreased by 2.5% per annum; (Table 13.3)
(c) that the births and deaths to mother for whom the intended place of delivery was not known were planned home births; (Table 13.4)
(d) that the births and deaths to mothers for whom the intended place of delivery was not known were unplanned home births; (Table 13.5)

(Simulations 1 to 4)

In all of these simulations the standardised perinatal mortality rate still declines over time and altering the assumptions only changes the rate at which the decline occurs. (Graph 13.B)

TABLE 13.1 STANDARDISED PERINATAL MORTALITY RATIOS (SPMR) & RATES FOR BIRTHS AT HOME, 1975-78

Year	All births	Proportion of unplanned births	Home births	Estimated number of unplanned births	Estimated number of planned births	PMR to unplanned births	Expected deaths to unplanned births	PMR TO planned home births	Expected deaths planned home	Total expected deaths	Total observed deaths	SPMR	Standardised perinatal mortality rate
	(t)	(Nu/T)	(n)	(nu)	(np)	(Pu)	(nuPu)	(Pb)	(nbPb)	(nuPu)+(nbPb)	(R)	(r/ΣPini)	(rP/ΣPini)
1975	609740	.003744	19540	2283	17257	.077663	177.29	.00406	70.06	247.36	362	1.463	35.19
1976	589979	.003744	14667	2209	12458	.077663	171.55	.00406	50.58	222.13	272	1.225	29.46
1977	574664	.003744	10940	2152	8788	.077663	167.10.	.00406	35.68	202.78	250	1.233	29.65
1978	601526	.003744	9608	2252	7356	.077663	174.91	.00406	29.86	204.77	216	1.055	25.37

T = Number of births at home in 1979, from the OPCS. Nu = Number of unplanned births at home in 1979, estimated as a proportion (0.003744) of T.

Pu = Perinatal mortality rate to unplanned births at home in 1979. Pb = Perinatal mortality rate for planned births at home in 1979.

n = Number of home births, from the OPCS.

GRAPH 13.A STANDARDISED PERINATAL MORTALITY RATES FOR BIRTHS OCCURRING AT HOME COMPARED WITH THE RATES FOR BIRTHS NOT OCCURRING AT HOME

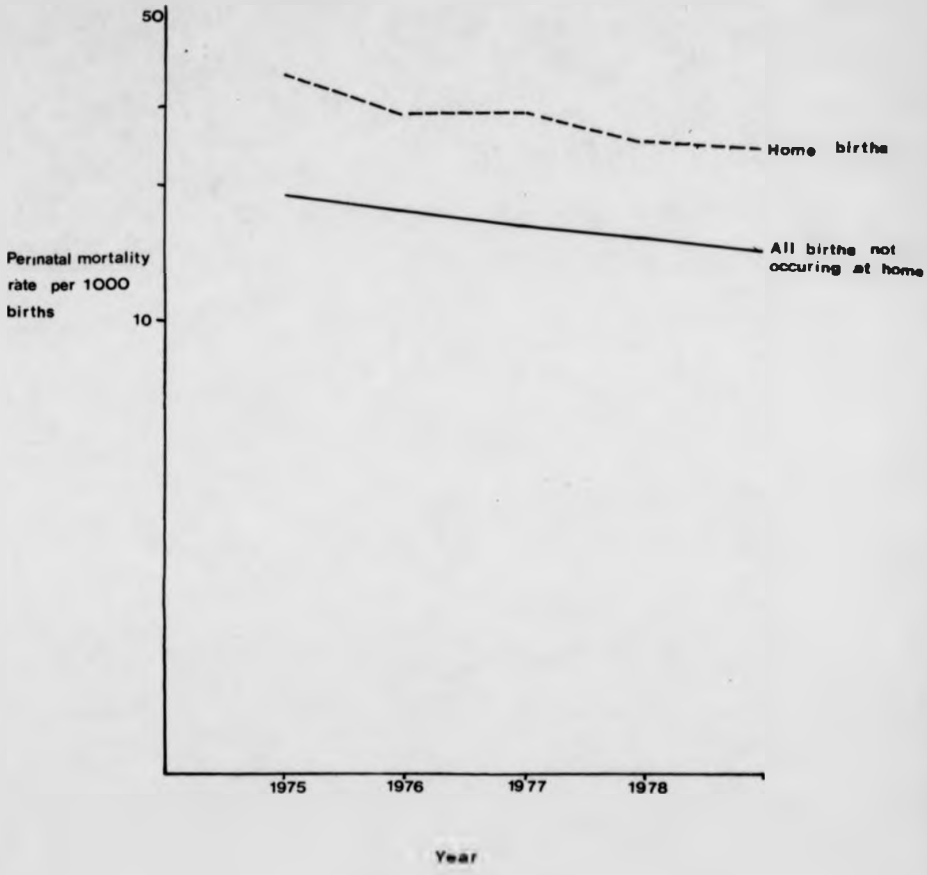


TABLE 13.2 SIMULATION 1 - ASSUMED 2.5% INCREASE IN THE PROPORTION OF UNPLANNED BIRTHS

Year	All births (t)	Proportion of unplanned births (Nu/T)	Home births (n)	Estimated number of unplanned births (nu)	Estimated number of planned births (np)	PMR to unplanned births (Pu)	Expected deaths to unplanned births (nuPu)	PMR to planned home births (Pb)	Expected deaths planned home (nbPb)	Total expected deaths (nuPu)+(nbPb)	Total observed deaths (R)	SPMR (r/£Pini)	Standardised perinatal mortality rate (rP/£Pini)
1975	609740	.003383	19540	2063	17477	.077663	160	.00406	71	231.16	362	1.566	37.66
1976	589979	.0034688	14667	2047	12620	.077663	159	.00406	51	210.18	272	1.2941	31.12
1977	574664	.003559	10940	2045	8895	.077663	159	.00406	36	194.95	250	1.2824	30.84
1978	601526	.0036502	9608	2196	7412	.077663	171	.00406	30	200.62	200	0.99692	12.98

T = Number of births at home in 1979, from the OPCS. Nu = Number of unplanned births at home in 1979, estimated as a proportion (0.003744) of T.

Pu = Perinatal mortality rate to unplanned births at home in 1979. Pb = Perinatal mortality rate for planned births at home in 1979.

n = Number of home births, from the OPCS.

TABLE 13.3 SIMULATION 2 - ASSUMED 2.5% DECLINE IN THE PROPORTION OF UNPLANNED BIRTHS

Year	All births	Proportion of unplanned births	Home births	Estimated number of unplanned births	Estimated number of planned births	PMR to unplanned births	Expected deaths to unplanned births	PMR to planned home births	Expected deaths planned home	Total expected deaths	Total observed deaths	SPMR	Standardised perinatal mortality rate
	(t)	(Nu/T)	(n)	(nu)	(np)	(Pu)	(nuPu)	(Pb)	(nbPb)	(nuPu)+(nbPb)	(R)	(r/£Pini)	(rP/£Pini)
1975	609740	.005132	19540	2519	17021	.077663	196	.00406	69	264.77	362	1.3672	32.88
1976	589979	.004032	14667	2379	12288	.077663	185	.00406	50	234.63	272	1.1592	27.88
1977	574664	.003933	10940	2260	8680	.077663	176	.00406	35	210.77	250	1.1861	28.53
1978	601526	.003837	9608	2308	7300	.077663	179	.00406	30	208.89	200	0.95745	23.03

T = Number of births at home in 1979, from the OPCS. Nu = Number of unplanned births at home in 1979, estimated as a proportion (0.003744) of T.

Pu = Perinatal mortality rate to unplanned births at home in 1979. Pb = Perinatal mortality rate for planned births at home in 1979.

n = Number of home births, from the OPCS.

TABLE 13.4 SIMULATION 3 - ASSUMED THAT ALL BIRTHS & DEATHS TO MOTHERS FOR WHOM THE INTENDED PLACE OF DELIVERY WAS UNKNWON WERE PLANNED

Year	All births	Proportion of unplanned births	Home births	Estimated number of unplanned births	Estimated number of planned births	PMR to unplanned births	Expected deaths to unplanned births	PMR to planned home births	Expected deaths planned home	Total expected deaths	Total observed deaths	SPMR	Standardised perinatal mortality rate
	(t)	(Nu/T)	(n)	(nu)	(np)	(Pu)	(nuPu)	(Pb)	(nbPb)	(nuPu)+(nbPb)	(R)	(r/ΣPini)	(rP/ΣPini)
1975	609740	.00333357	19540	2033	17507	.077663	157.86	.00893921	156.50	314.36	362	1.152	27.71
1976	589979	.00333357	14667	1967	12700	.077663	152.74	.00893921	113.53	266.27	272	1.022	24.58
1977	574664	.00333357	10940	1916	9024	.077663	148.78	.00893921	80.67	229.45	250	1.09	26.21
1978	601526	.00333357	9608	2005	7603	.077663	155.73	.00893921	67.96	223.69	215	0.961	23.11

T = Number of births at home in 1979, from the OPCS. Nu = Number of unplanned births at home in 1979, estimated as a proportion (0.003744) of T.

Pu = Perinatal mortality rate to unplanned births at home in 1979. Pb = Perinatal mortality rate for planned births at home in 1979.

n = Number of home births, from the OPCS.

TABLE 13.5 SIMULATION 4 - ASSUMED THAT ALL BIRTHS & DEATHS TO MOTHERS FOR WHOM THE INTENDED PLACE OF DELIVERY WAS UNKNOWN WERE UNBOOKED

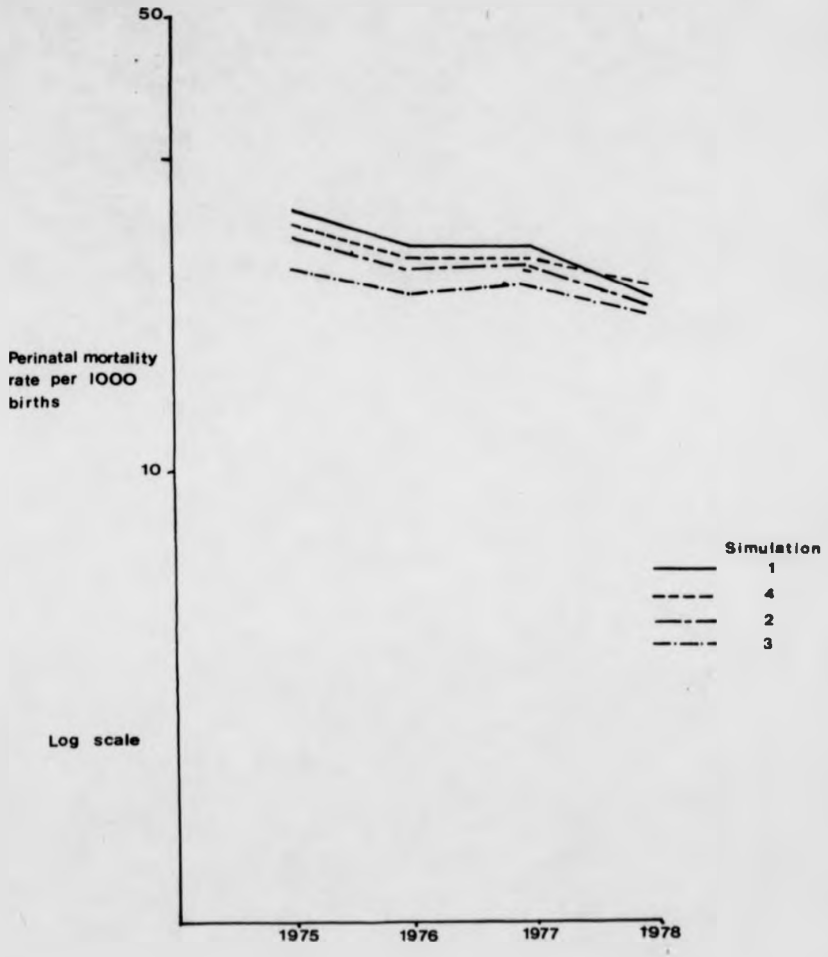
Year	All births	Proportion of unplanned births	Home births	Estimated number of unplanned births	Estimated number of planned births	PMR to unplanned births	Expected deaths to unplanned births	PMR to planned home births	Expected deaths planned home	Total expected deaths	Total observed deaths	SPMR	Standardised perinatal mortality rate
	(t)	(Nu/T)	(n)	(nu)	(np)	(Pu)	(nuPu)	(Pb)	(nbPb)	(nuPu)+(nbPb)	(R)	(r/ΣPini)	(rP/ΣPini)
1975	609740	.00456967	19540	2786	16754	.0643075	179	.00406	68.02	247.20	362	1.464	35.22
1976	589979	.00456967	14667	2696	11971	.0643075	173	.00406	48.60	221.98	272	1.225	29.47
1977	574664	.00456967	10940	2626	8314	.0643075	169	.00406	33.75	202.63	250	1.234	29.67
1978	601526	.00456967	9608	2749	6859	.0643075	177	.00406	27.85	204.62	216	1.056	25.39

T = Number of births at home in 1979, from the OPCS. Nu = Number of unplanned births at home in 1979, estimated as a proportion (0.003744) of T.

Pu = Perinatal mortality rate to unplanned births at home in 1979. Pb = Perinatal mortality rate for planned births at home in 1979.

n = Number of home births, from the OPCS.

GRAPH 13.8 STANDARDISED PERINATAL MORTALITY RATES FOR HOME DELIVERIES : SIMULATIONS 1 to 4



Change in the ratio of unplanned to planned home births

Using the estimates of the numbers of planned and unplanned births at home between 1975 and 1978, Table 13.6 has been constructed to illustrate the change in the ratio of unplanned to planned home births.

TABLE 13.6 : RATIO OF UNPLANNED TO PLANNED HOME BIRTHS 1975 - 1978.

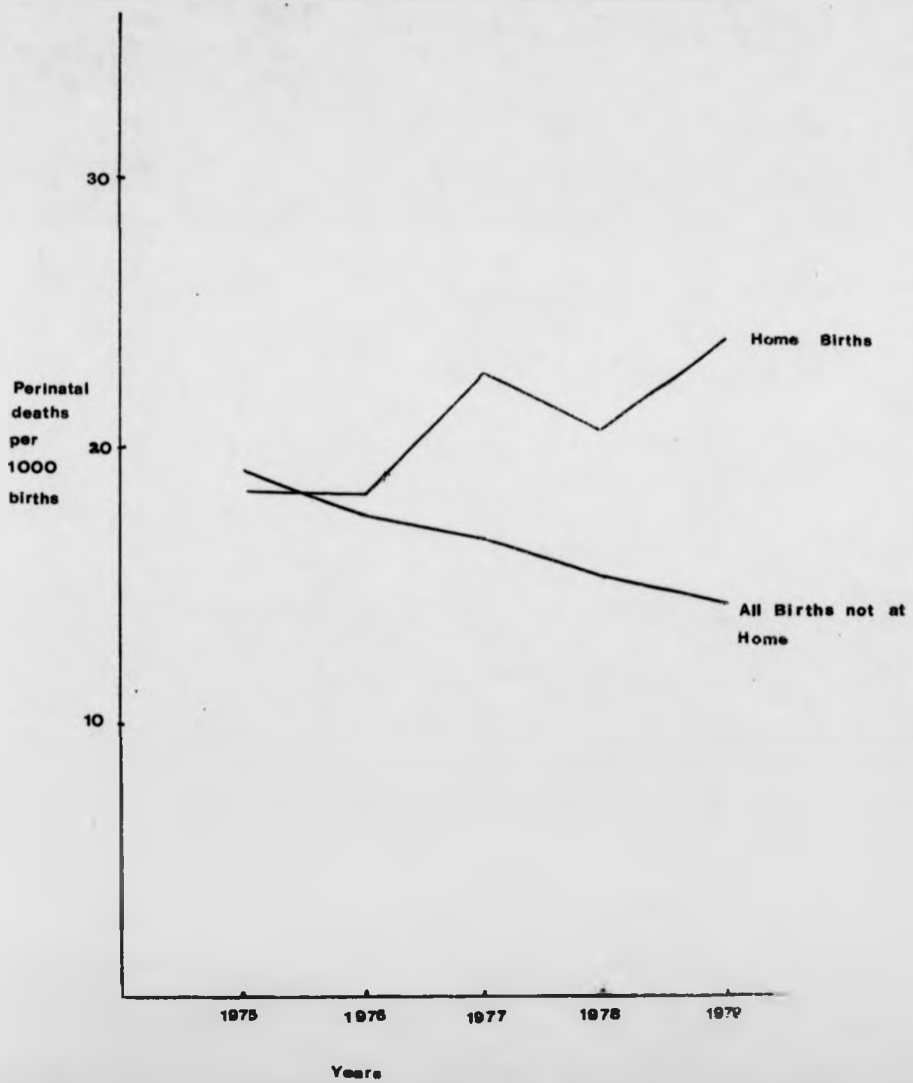
1975	1	to	7.6
1976	1	to	5.6
1977	1	to	4.1
1978	1	to	3.3

In 1975 it is estimated that approximately 1 out of every 8 births occurring at home was unplanned. By 1978 this had changed to approximately 1 in every 3.

Conclusion

In reality the actual perinatal mortality rate for births occurring at home rose from 1977 onwards as is shown in Graph 13.C. The results of this standardisation procedure strongly suggest that this rise was the result of an increase in the number of unplanned births at home relative to those which were planned to occur there.

GRAPH 13.C Perinatal mortality for births occurring at home and all other births, England & Wales, 1975 - 1979.



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C H A P T E R XIV

The Home Births Survey in Retrospect and the Prospects for Further Research

Introduction

The function of this chapter is to provide a critical review of the methodological approach taken in the Home Births Survey, to summarise and comment on the main findings and to assess the potential for further research.

Population Studied

The population studied included 8,856 live births and still births which took place at the mother's normal home address and 513 deliveries which took place outside hospital at an address other than the mother's normal home address ("elsewhere" deliveries) in 1979. In nationally published statistics "elsewhere" deliveries include births occurring in psychiatric institutions, reception centres, remand homes and homes for unmarried mothers as well as births occurring at private home addresses other than the mother's normal home and those occurring while the mother was in transit on her way to hospital. In this survey, however, only births in the latter two categories were included as "elsewhere" deliveries. The perinatal mortality for home and "elsewhere" deliveries, at 24.1 and 87.7 per 1,000 births respectively, was substantially higher than that observed for all births in 1979 (14.6 per 1,000). Mothers in these two groups differed from the national childbearing population in that more of them were young (under 20) and unmarried. The consequence of this convergence of characteristics normally associated with unfavourable delivery outcomes was that approximately 1 in 5 of the babies born to

these young unmarried mothers died. These differences in maternal age and legitimacy were not, however, sufficient to account for the substantially higher perinatal mortality rates observed for home and "elsewhere" deliveries.

It is very unlikely that unmarried teenage mothers would be booked for delivery at home and it was suggested that the rise in the crude perinatal mortality rate for birth at home was artifactual; the consequence of an increase in the proportion of unplanned births at home. As national statistics do not distinguish between planned and unplanned deliveries at home, the information had to be collected in a special survey.

Methodology

Given that for practical reasons it was only feasible to collect data on a cross-sectional basis, the choice was whether to do so for all or part of the population of mothers giving birth at home.

One possible course of action would have been to conduct a case-control study taking all stillbirths and deaths within the first week of life as cases and a sample of those who survived as controls. The main advantage of such an approach would have been the small numbers involved. A study using two controls per case would have required that only 639 deliveries be surveyed. This would have allowed more time to have been devoted to collecting very detailed information about each delivery.

Instead, however, it was decided to collect information for all births at home and use this to enhance existing birth and death registration

information. Because of the confidential nature of certain maternal and paternal characteristics recorded at birth registration, the O.P.C.S. would not have been at liberty to release details such as mother's age and marital status for the small number of births involved in a case-control study. This would have necessitated the collection of duplicate information. Undoubtedly a case-control study would have also shown a huge difference in the risk of perinatal death between planned and unplanned births at home. The advantage of surveying all births occurring at home in 1979 and linking the information obtained to birth and death registration particulars was that the perinatal mortality rates for each intended place of delivery could be calculated. These rates were then used in a standardisation procedure, the results of which demonstrate that when the difference in mortality associated with planned and unplanned births is taken into account, the perinatal mortality rate for births at home declined at about the same rate as that for all births. It would not have been possible to effect the same type of analysis using the relative risk statistics generated in a case-control study.

Biases and Omissions

With the decline in the number of planned home deliveries the role of the community midwife has been reduced to that of providing antenatal and postnatal care. This diminishment in role may not be viewed favourably by community midwives. Community midwives were largely responsible for completing questionnaires and it is arguable that it might be in their interest for home deliveries to appear to have favourable outcomes. It is extremely unlikely, however, that a sufficient number of midwives would have been so dishonest as to make such a bias the explanation for

the substantial differences observed in perinatal mortality and in the distribution of birth weights, maternal age and a parity between planned and unplanned births.

A system of maternity care often referred to as a "Domino" scheme* has been heavily promoted as a substitute for home delivery. As women booked for this type of delivery are likely to be those perceived by medical staff to be at a low pre-delivery risk of perinatal death, it might have been useful to disaggregate them from mothers booked for delivery and postnatal care in a GP or consultant unit.

The perinatal mortality rate for deliveries occurring at home in 1979 where the intended place of delivery was not known (45.3 per 1,000) is double that which would be expected, assuming that the proportion of planned and unplanned births and the attendant mortality rates were the same as those observed for births where the intention was known. The high rate tends to suggest either that the "not known" group actually contained a higher proportion of consultant unit intended and unbooked births, or that the records of the mothers whose babies died were more likely to have been unavailable, than those of babies surviving the first week of life. The system of confidential enquiries into perinatal deaths operated by some Regional Health Authorities may result in records relating to babies who die, being withdrawn from the normal filing system.

One further weakness in the survey methodology was that intended place of delivery as reported by midwives on the questionnaire was not checked

* "Domino" scheme. The mother usually receives her antenatal care in the community from a midwife and a general practitioner. She normally spends the early part of her labour at home and is only admitted to hospital for the delivery itself. If everything is satisfactory, mother and baby are discharged a few hours after delivery.

against reports from mothers as to their perception of their intended place of delivery.

Limitations

The retrospective identification of the intended place of delivery from birth registration particulars meant that it was not possible to trace those mothers who booked to deliver at home but were transferred into hospital after the onset of labour. It was not possible to disaggregate these births from others registered as occurring in hospital.

Midwives are required to keep a register of all the mothers in their care. In the register an event such as a transfer of a mother, booked for delivery at home, into hospital would be recorded. Theoretically it would have been possible to identify mothers using individual community midwives' registers. It would have been impracticable, however, to identify and then ask all community midwives practising in 1979 to go through their registers for that year noting where such transfers had occurred and listing identifing details from which birth registration information could have been traced.

In two Districts, local procedures did permit the identification of mothers transferred from home to hospital. This information, together with evidence from other retrospective studies, suggests that approximately 10% of women are transferred in labour. (Tables 12.1, 12.2 and 12.3). Furthermore, if the perinatal mortality for transfers is taken into account, the overall perinatal mortality rate for births at home may be as much as doubled.

The overall aim of the analyses presented in Chapters VI - XI was to try to identify explanatory variables which accounted for the significant

differences in perinatal mortality observed between different intended places of delivery. A number of variables were identified as being important, but because analyses were restricted to cross-tabulation, it was not possible to identify the relative contributions of each of these factors in explaining the observed differences in mortality. A multivariate analysis could have achieved this. Evidence from the literature, however, suggests that this type of analysis inevitably shows that birthweight is the most important explanatory variable. For example, a multi-factorial model containing 17 biosocial factors explained 46.5% of the total variation in perinatal mortality risk in a series of 42,279 births in Belfast. (1) A model containing only birthweight explained 42.7% of the variation.

The powerful effect of low birthwieght on the risk of perinatal death according to the intended place of delivery was adequately demonstrated in Chapter VI and a multivariate analyses would probably only have been a more complex way of illustrating the same effect.

Major findings of the Home Births Survey

The results relating to various aspects of the survey have been reported and discussed in Chapters V - XIII. Conclusions were drawn at the end of each of these Chapters. This final section is designed to draw the conclusions of the individual Chapters together and to examine the findings of the Home Births Survey in the context of previous work in order to identify areas for further research.

The Survey's most significant finding was the enormous disparity between perinatal mortality rates for births planned to occur at home and

unintended home deliveries. A mother having an unintended delivery at home was seventeen times more likely to lose her baby than a mother who had a planned home birth. Only 66% of births at home were planned to occur there. This finding is consistent with those of other researchers. (2 - 6). (This does not take account of those booked for delivery at home but transferred into hospital after the onset of labour).

The mortality rate of 4.1 per 1,000 births observed for planned home births is remarkably close to that observed for births occurring at home during the period of the British Births Survey which took place in 1970. Direct comparison between these two rates is frustrated by a number of differences in the way they were derived. The 1970 rate is based on only 9 deaths and the small numbers, combined with the fact that the overall perinatal mortality rate for the survey week was considerably lower than that observed for 1970 as a whole, means that the 1970 rate may be subject to considerable error. The 1970 rate may also contain a proportion of unplanned births at home. Notwithstanding these considerations the similarity between the two rates raises some interesting questions:-

> Has the perinatal mortality rate for planned home births remained constant throughout the 1970's at a time when the overall rate fell sharply?
>
> Is the perinatal mortality rate of 4 per 1,000 births the minimum rate that can be achieved for planned home births?

Unfortunately, the data required to answer these questions do not exist. It is interesting to note, however, that the perinatal mortality rate for planned home births in Cardiff during the period 1970 - 1979 was 6.5 per

1,000 births (based on 2 stillbirths). (3) A study of planned and unplanned births in North Carolina carried out by Burnett and colleagues for the period 1974 to 1977 revealed a neonatal mortality rate for planned home births of 6 per 1,000 (5) and a study of out-of-hospital births that occurred in Kentucky during 1981-82 carried out by Hinds et al found a neonatal mortality rate of 5.7 per 1,000 births. (4)

Results of the Home Births Survey also revealed considerable variation in the charactieristics of both mothers and babies according to the intended place of delivery.

A greater proportion of perinatal deaths to babies born at home were the result of congenital abnormality compared with all perinatal deaths in England and Wales. This overall rate, however, masks important differences between intended place of delivery groups. The mortality arising from congenital anomalies among planned home deliveries was significantly lower than that for births intended to occur elsewhere.

Mean birthweight was found to differ significantly according to the intended place of delivery. As might have been expected, the ranking of mean birthweight according to the intended place of delivery was the opposite to that for perinatal mortality, i.e. planned home births had the lowest perinatal mortality and the highest mean birthweight. Conversely, unbooked births had the highest mortality and the lowest mean birthweight. More surprisingly, with the exception of unbooked births, all babies born at home and weighing 2,500 grammes or more experienced a uniformly low perinatal mortality rate whether they were booked for delivery at home or in hospital.

The findings with regard to the incidence of congenital abnormalities and the proportion of low birthweight infants according to the intended place of delivery highlight the importance of these factors in determining the risk of perinatal death.

The data on maternal characteristics contained two interesting features. Firstly, it showed that mothers who had a planned home birth in 1979 were a very select group. Compared with all childbearing women in 1979 they tended to be of higher social class, or more concentrated into the middle of the childbearing age range and fewer were nulliparous or of a very high parity. All this would have predisposed them to a reduced risk of perinatal death.

Nulliparity was identified as being a major factor associated with a less favourable outcome, the perinatal mortality rate being ten times higher for nulliparous women than that for their parous counterparts. The data on parity and perinatal mortality rates for births at home provided further evidence of selection.

The main reasons reported for mothers who were booked for hospital delivery giving birth accidentally at home were rapid, premature or precipitate labour. This was also found to be the case in a Norwegian study (6) of births occurring outside hospital. Unlike the Norwegian findings, however, a large proportion (two thirds) of these births were attended by a doctor or a midwife.

The findings of the survey with regards to unbooked births were significant and disturbing. The high perinatal mortality rate for this group (196.6 per 1,000) in the survey is almost the same as that recorded

for unbooked births more than twenty years before. Furthermore, one third of all perinatal deaths resulting from injury and violence not related to the delivery in England and Wales in 1979 were unbooked home births.

Körner

The implementation of the recommendations of the Steering Group on Health Services Information (Körner) should ensure that in future the type of information collected in the Home Births Survey will be available routinely. All the recommendations on the collection and use of information about the maternity services have been published in the form of a supplement to the Steering Group's First, Fourth and Fifth Reports. (7).

Only those recommendations which have implications for further research on home births and unbooked births will be considered here.

In future, considerably more detailed information about birth will be collected as part of the system of birth notification. (See Appendix 8). Items to be collected include place of delivery; reason for change of intention if different; birthweight; number of previous pregnancies resulting in a registerable birth and status of the person conducting the delivery.

Identifying details about mother and baby are to be collected in such a way as to permit the linking of data for each. In addition, it is recommended that the NHS number of the baby be obtained from the Registrar and included in the data set for each birth.

When data about mother and baby have been merged at District or Regional level, the data sets are to be submitted to the O.P.C.S. The inclusion of the NHS number of baby means that, in theory, the birth notification data can be linked with death registration data, thus making it possible to produce perinatal mortality rates by intended place of delivery as well as by actual place of delivery for all births.

Transfers between intended and actual delivery locations

When the "Körner" recommendations are implemented, it will be possible to identify those mothers who intended to give birth at home but were transferred into hospital. The reasons for the actual and intended place of delivery differing are to be classifed as follows:-

"a. decision made during pregnancy because of change of address,
b. decision made during pregnancy for clinical reasons,
c. decision made during pregnancy for other reasons,
d. decision made during labour for clinical reasons,
e. decision made during labour for other reasons,
f. occurred unintentionally during labour."

Again using the baby's NHS number as the basis for linking birth notification with death registration it should be possible for the O.P.C.S. to produce perinatal mortality rates for women who intended to give birth at home but were transferred into hospital either before or after the onset of labour.

Unbooked Births

According to the new recommendations the actual and intended place of delivery are to be classified as follows:-

"a. at a domestic address
b. in NHS hospital - consultant ward
c. in NHS hospital - GP ward
d. in NHS hospital - consultant/GP ward
e. in private hospital
f. in other hospital or institution
g. none of the above a - f."

An unbooked birth would thus be coded as 'g'. Thus it will be possible to produce perinatal mortality rates by intended place of delivery for all unbooked births wherever the birth takes place.

The routine recording of unbooked births will mean that it should be possible in future to assess the effectiveness of any intervention or initiative to try to encourage these reluctant mothers to come forward and seek help. Unfortunately, the classification of intended place of delivery is not designed to pick-up the reason why a mother was unbooked for delivery, although at local level Districts may wish to enhance their data collection to include this aspect.

Potential for Further Research

Clearly, the potential for further research into and monitoring of home births will be considerably enhanced by the advent of the new Health Services Information System. In future it will be possible to provide accurate and timely information on the risk of perinatal death for a mother having a planned home delivery.

The new information system, however, will not provide the data required to answer questions about the comparative risks associated with institutional and home deliveries. As was noted in chapter one, only a randomised controlled clinical trial could provide unequivocal scientific

evidence as to whether hospital deliveries are safer for all mothers. It is, however, extremely unlikely that such a trial will ever take place. The numbers required to detect significant differences in mortality are prohibitive and the ethical dilemmas involved probably unresolvable.

The problems associated with conducting a randomised controlled trial, however, should not be used as an excuse for inaction. A number of the studies reported on in chapters (8 - 10) and the results of the Home Births Survey demonstrate that for carefully selected mothers giving birth at home favourable outcomes can be achieved. This, together with the continuing demand for home delivery (11) and the evidence that mothers prefer giving birth at home (12, 13), suggests that there is a need for some imaginative scheme to be set up within which a more liberal policy on home births is pursued. The results of such a scheme would, of course, have to be both costed and rigorously evaluated in terms of mortality, morbidity, consumer satisfaction and the view of the professionals involved in providing the care. Such a project would require close co-operation between a number of professional groups including midwives, general practitioners, obstetricians and paediatricians. The "Know Your Midwife" scheme currently under trial at St. George's Hospital, Tooting (14) illustrates well that such collaboration and co-operation is possible.

Thus, although the prospect for future research will be considerably enhanced by the introduction of a new health services information system, only a more active and experimental approach could permit the more fundamental questions about the relative safety of the alternative places of delivery to be addressed.

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CONCLUSIONS

The Home Births Survey was undertaken to test the hypothesis that the rise in the overall perinatal mortality rate for births occurring at home, from 1977 onwards, was the result of an increase in the proportion of unplanned births at home relative to those planned to occur there. The results of the survey confirm this hypothesis. Using indirect standardisation it has been possible to demonstrate that when the proportion of unplanned births is taken into account, the perinatal mortality rate for births at home probably declined at about the same rate as that for all births.

The survey findings suggest that delivery at home is compatible with a low risk of perinatal death. It must be borne in mind, however, that women who had a planned home birth were a select group for both social and medical reasons. The perinatal mortality rate of 4.1 per 1,000 births does not represent a true risk of perinatal death as it does not take into account those mothers who, although booked for delivery at home, were transferred into hospital after the onset of labour. Although evidence from other studies and additional information gathered during the survey suggests that the overall perinatal mortality rate could be as much as doubled when these births are taken into account, there is a need for more timely, national information.

Overall, outcomes for unplanned births at home were poor and the circumstances in which the mothers delivered often unfavourable. That approximately 2,000 mothers deliver at home unexpectedly each year demonstrates that, what ever the fate of planned home deliveries, there will always be a need for obstetric flying squads.

One in five of the unbooked births which occurred at home in 1979 resulted in a perinatal death. This high level of mortality and the tragic circumstances in which many of these births took place requires that a comprehensive preventative strategy be formulated, implemented and evaluated.

The disparate nature of groups of women delivering at home and the attendant variations in perinatal mortality shows the critical importance of knowing about the intended place of delivery when trying to assess the risk of perinatal death associated with home delivery.

Since 1970 national policy on maternity care has advocated the elimination of home delivery, the rationale being that hospital delivery is safer for all mothers. Underpinning this has been a belief that the decline in the overall perinatal mortality rate in England and Wales is partly the result of the decrease in the proportion of home births. This view was recently expressed by Alison Munro in the introduction to the second report of the Maternity Services Advisory Committee.

> "The practice of delivering nearly all babies in hospital has contributed to the dramatic reduction in stillbirths and neonatal deaths and to the avoidance of many child handicaps." (1)

Analyses presented in this thesis have shown that not only are the outcomes for planned home delivery favourable but also that when unplanned births are taken into account perinatal mortality among births at home probably declined at about the same rate as that for all births. These findings challenge the fundamental assumption on which policy is purported to have been based. In the light of the continuing demand for home delivery (2) a review of policy is called for.

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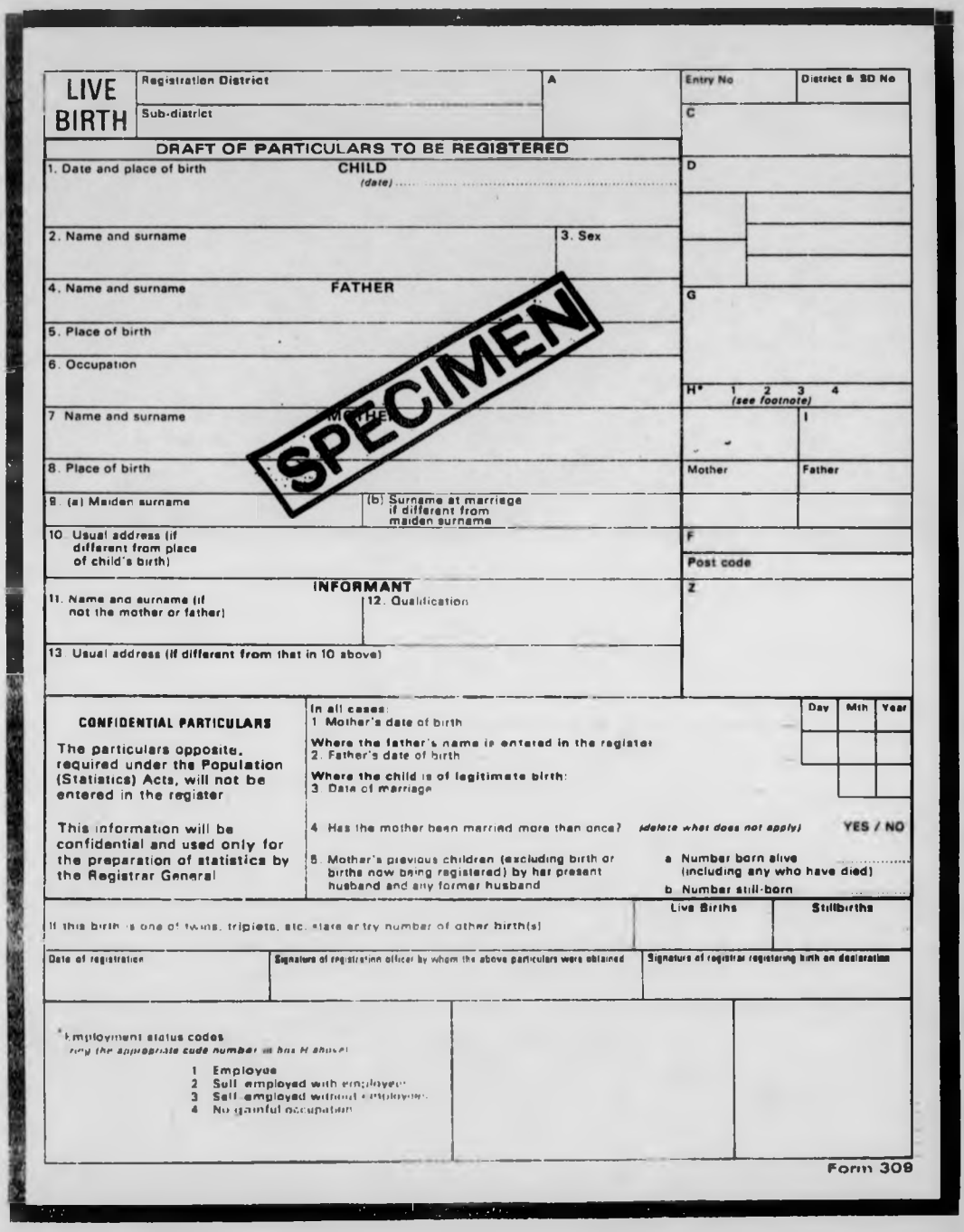
APPENDIX 1



LIVE BIRTH

Registration District | A | Entry No | District & SD No

Sub-district | C

DRAFT OF PARTICULARS TO BE REGISTERED

CHILD

1. Date and place of birth (date) | D

2. Name and surname | 3. Sex

FATHER

4. Name and surname | G

5. Place of birth

6. Occupation | H* 1 2 3 4 (see footnote)

MOTHER

7. Name and surname | I

8. Place of birth | Mother | Father

9. (a) Maiden surname | (b) Surname at marriage if different from maiden surname

10. Usual address (if different from place of child's birth) | F | Post code

INFORMANT

11. Name and surname (if not the mother or father) | 12. Qualification | Z

13. Usual address (if different from that in 10 above)

SPECIMEN

CONFIDENTIAL PARTICULARS

The particulars opposite, required under the Population (Statistics) Acts, will not be entered in the register.

This information will be confidential and used only for the preparation of statistics by the Registrar General.

In all cases:
1. Mother's date of birth — Day | Mth | Year

Where the father's name is entered in the register:
2. Father's date of birth

Where the child is of legitimate birth:
3. Date of marriage

4. Has the mother been married more than once? (delete what does not apply) YES / NO

5. Mother's previous children (excluding birth or births now being registered) by her present husband and any former husband
a. Number born alive (including any who have died)
b. Number still-born

If this birth is one of twins, triplets, etc. state entry number of other birth(s) | Live Births | Stillbirths

Date of registration | Signature of registration officer by whom the above particulars were obtained | Signature of registrar registering birth on declaration

*Employment status codes
(enter the appropriate code number in box H above)
1 Employee
2 Self-employed with employees
3 Self-employed without employees
4 No gainful occupation

Form 309

APPENDIX 2

STILL-BIRTH

Registration district | Entry No | District & SD No | B

Sub-district | C

DRAFT OF PARTICULARS TO BE REGISTERED | D

CHILD

1. Date and place of birth *(date)*

2. Cause of death and nature of evidence that child was still-born | 3. Sex | E wks | L ..... grams or lbs ozs

N | M

FATHER

4. Name and surname | G | H* 1 2 3 4

5. Place of birth

6. Occupation

MOTHER

7. Name and surname | Mother | Father

8. Place of birth

9(a). Maiden surname | (b) Surname at marriage if different from maiden surname | F

10. Usual address (if different from place of child's birth) | Post code

INFORMANT

11. Name and surname (if not the mother or father) | 12. Qualification | Z

13. Usual address (if different from that in 10 above)

CONFIDENTIAL PARTICULARS

The particulars opposite, required under the Population (Statistics) Acts, will not be entered in the register.

This information will be confidential and used only for the preparation of statistics by the Registrar General.

In all cases:	Day	Mth	Year
1. Mother's date of birth			
Where the father's name is entered in the register: 2. Father's date of birth			
Where the child is of legitimate birth: 3. Date of marriage			

4. Has the mother been married more than once? *(delete what does not apply)* YES / NO

5. Mother's previous children (excluding birth or births now being registered) by her present husband and any former husband

a. Number born alive (including any who have died) .....

b. Number still-born .....

If this birth is one of twins, triplets, etc state entry number of other birth(s)

Live births	Stillbirths

Date of registration | Signature of registrar

For OPCS use only

a | b | c | *

*Employment status codes
(ring the appropriate code number in box H above)

1. Employee
2. Self-employed with employees
3. Self-employed without employees
4. No gainful occupation

Form 308

APPENDIX 3

NATIONAL PERINATAL EPIDEMIOLOGY UNIT
HOME BIRTHS SURVEY

CONFIDENTIAL

IDENTITY NUMBER

Please tick appropriate box/es

1. Where was the mother booked to deliver (ie intended place of delivery) immediately before the onset of labour?

a. Consultant Unit ☐

b. G.P. led in Consultant Unit ☐

c. Integrated G.P. Unit ☐

d. Isolated G.P. Unit ☐

e. Home ☐

f. No booking (went unexpectedly) ☐

g. Other (please specify) ☐

h. Not known ☐

2. If the intended place of delivery differs from the actual place of delivery (ie home) please give reasons why this happened

3. If there was no booking for delivery please give reasons why a booking was not made

4. What was the estimated gestational age (from last menstrual period) of the baby at delivery?

_____ weeks

Not known ☐

5. What was the birthweight of the baby?

_____ grammes

Not known ☐

6. Was the baby born with any abnormality?

Yes	No	Not known

If 'Yes' then please give details of the abnormality.

_____

_____

_____

7. Was a doctor present at the birth?

Yes	No	Not known

If 'Yes' then please specify the grade and speciality of each doctor present at the birth.

_____

8. Was a midwife present at the birth?

Yes	No	Not known

9. Who actually delivered the baby?

a. Midwife ☐

b. Student Midwife ☐

c. G.P. ☐

d. Ambulance Staff ☐

e. Husband / Partner ☐

f. Neighbour ☐

g. No one apart from mother ☐

h. Other (please specify) _____

i. Not known ☐

10. Was the mother transferred to hospital after the delivery?

Yes	No	Not known

If 'Yes' please record the reasons for the transfer

11. Was the baby transferred to hospital?

Yes	No	Not known

If 'Yes' please record the reasons for the transfer

12. Please record the following (excluding details of this pregnancy which ended in the delivery under discussion)

Number of previous pregnancies

Number of Live Births

Number of caesarean sections

Number of Stillbirths

Number of living children

Number of neonatal deaths
or within 28 days

Did any previous pregnancies result in multiple births?

If 'Yes' please give details of each pregnancy that ended in a multiple birth including number of live births, number of stillbirths and number of neonatal deaths.

Identification Detail

Name of Mother

Usual Address of Mother

Name of Baby

Baby's Date of Birth

1979

Place of Delivery

Please complete and return to:

Ms Rona Campbell
National Perinatal Epidemiology Unit
FREEPOST
Radcliffe Infirmary
OXFORD OX2 6BR

(No Stamp Required)

HOME BIRTHS SURVEY

APPENDIX 4

Column	Width	Variable Name	Description	Value	Value Label	Description
1-6	6	HSNO	Sequence number	0-9377		
7-10	4	HSNO	Random number			
11-14	4	OCCN	Occupation			
15	1	CLASS	Social Class	0	Social Class I	Professional occupations
				1	Social Class II	Intermediate occupations
				2	Social Class IIINM	Skilled occupations-non manual
				3	Social Class IIIM	Skilled occupations - manual
				4	Social Class IV	Partly skilled occupations
				5	Social Class V	Unskilled occupations
				7	Armed Forces	
				8	Not stated	Inadequately described including housewives
				9	Unoccupied	Full time students, children independent means, no occupation, handicapped
16-18	3	HDS	Health District Code	101-322		OPCS three digit code used to identify the 210 health districts in England & Wales

Column	Width	Variable Name	Description	Value	Value Label	Description
19-21	3	QUNO	Questionnaire Number	001-502		
22-23	2	BDATEDD	Day of Birth	0-31		
24-25	2	BDATEMM	Month of Birth	0-12		
26	1	BSTATUS	Birth Status	1	Home Livebirth	Livebirth at home
				2	Home Stillbirth	Stillbirth at home
				3	EW Livebirth	Livebirth occurring neither at home nor in hospital
				4	EW Stillbirth	Stillbirth occurring neither at home nor in hospital
27	L	SEX		1	Male	
				2	Female	

Column	Width	Variable Name	Description	Value	Value Label	Description
28-29	2	DTYPE	Type of delivery	1	SINGLETON	
				2	TWIN MT LB HOSP	Twin-mate liveborn in hospital
				3	TWIN MT LB HOME	Twin-mate liveborn at home
				4	TWIN MT SB HOSP	Twin-mate stillborn in hospital
				5	TWIN MT SB HOME	Twin-mate stillborn at home
				6	MULTIP MTS LB HOSP	Multiplemate liveborn in hospital
				7	MULTIP MTS LB HOME	Multiple-mates liveborn at home
				8	MULTIP MTS LB & SP HP	Multiple-mates live and stillborn in hospital
				9	MULTIP MTS LB & SB HM	Multiplemates live and stillborn at home
				10	NOT SPECIFIED	
				11	TWIN MT LB ELSW	Twin, mate liveborn elsewhere
30-31	2	IPOD	Intended place of delivery	1	Consultant Unit	
				2	GP Bed in Con Unit	GP Bed in a Consultant Unit
				3	Integrated GP Unit	
				4	Isolate GP Unit	
				5	Home/Private House*	*Elsewhere deliveries only
				6	No Booking	
				7	Other	
				77	Not Known	
				88	Not Recorded	

Column	Width	Variable Name	Description	Value	Value Label	Description
32	1	DOMINOB	Domino Booking	1	Yes	
				2	No	
				9	Not Applicable	
33	1	DOUBLEB	Double booking	1	CON UNIT + HOME	Consultant Unit and Home
				2	GP BED IN CON UNIT + HOME	GP bed in Consultant Unit and Home
				3	INTEG GPU + HOME	Integrated GP Unit and Home
				4	ISOLATED GPU + HOME	Isolated GP Unit and Home
				5	NO	
				9	NOT APPLICABLE	
34	1	MOMINT	Hospital booked but mother's intention to deliver at home	1	Yes	
				2	No	
				9	Not Applicable	

Column	Width	Variable Name	Description	Value	Value Label	Description
35-36	2	RIPOD	Reasons for the intended place of delivery differing from the actual place of delivery	1	Premature Labour	
				2	Rapid Labour	
				3	Precipate Labour	
				4	Unrecognised Labour	
				5	Late contact service	Mother did not contact medical services in time
				6	Bad weather conds	Bad weather conditions prevented mother from reaching hospital in time
				7	Birth before arrival	
				8	Lab too far advanced	Labour too far advanced to permit transfer to hospital
				9	Mother refused hosp	Mother did not wish to be admitted to hospital
				10	Inds action amb pers	Industrial action being taken by ambulance personnel
				11	Amb call after deliv	Ambulance not called until after the delivery
				12	Hospital Unit closed	
				13	No hosp beds avail	No hospital beds available
				20	Other	
				77	Not known	
				88	Not recorded	
				99	Not applicable	

Column	Width	Variable Name	Description	Value	Value Label	Description
37-38	2	RNOBOOK	Reasons for there being no intended place of delivery or booking	1	Concealed pregnancy	
				2	No antenatal care	Mother did not receive any antenatal care
				3	Mother unaware preg	Mother unaware that she was pregnant
				4	Mother refused care	Mother refused any medical care
				20	Other	
				77	Not known	
				88	Not recorded	
				99	Not applicable	
39-40	2	GESTAGE	Gestational Age			Recorded in weeks
41-44	4	BW	Birthweight			Recorded in years
45	1	ABNORM	Presence of abnormality	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	
46-50	5	ABTYPE	Type of abnormality present			Classified according to the British Paediatric Association Classification of Diseases (1979) (Perinatal Supplement)

Column	Width	Variable Name	Description	Value	Value Label	Description
51	1	DRPRES	Doctor present	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	
52	1	DRGRADE	Grade of most senior doctor present	1	GP	
				2	House Officer	
				3	Registrar	
				4	Senior Registrar	
				5	Not obs.qualified	Other not obstetrically qualified
				6	Obstetrician	
53	2	MWPRES	Midwife present at the birth	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	

Column	Width	Variable Name	Description	Value	Value Label	Description
54-55	2	BIRTHAT	Person who actually delivered the baby	1	Midwife	
				2	GP	
				3	Ambulance staff	
				4	Husband/partner	
				5	Neighbour	
				6	Mother alone	
				7	Grandmother	
				8	Policeman	
				9	Grandfather	
				10	Registrar	
				11	Sister	
				12	Consultant	
				77	Not known	
				88	Not recorded	
56	1	MTRANS	Was mother transferred to hospital	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	

Column	Width	Variable Name	Description	Value	Value Label	Description
57-58	2	RMTRANS	Reasons for mother's transfer into hospital	1	Perineal suturing	
				2	Concealed preg	
				3	Origi booked hosp	Originally booked for a hospital delivery
				4	No arrangements home	No preparations for a home confinement
				5	Retained placenta	Retained placenta/membranes
				6	Booked tubal ligation	Mother booked for post delivery sterilization
				7*	En route	
				8	Routine transfer BBA	Routine to transfer a "birth before arrival"to hospital
				9	PPH	Post partum haemorrhage
				10	Second twin in utero	
				11	To be with baby	
				12	Unsuitable home conditions	
				13	Shock	
				14	Mother's request	
				15	Medical exam	Medical examination
				16	Observation	

* only applies to Elsewhere deliveries

Column	Width	Variable Name	Description	Value	Value Label	Description
				17	Deliv placenta	3rd stage management
				20	Other	
				77	Not known	
				88	Not recorded	
59	1	BTRANS	Was the baby transferred into hospital	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	
60-61	2	RBTRANS	Reason why the baby transferred into hospital	1	Routine trans BBA	Routine to transfer a "birth before arrival" to hospital
				2	To be with mother	
				3	Observation	
				4	Prematurity	
				5	Cold	
				6	Unsuitable home conds	
				7	Requiring treatment	In need of medical treatment
				8	Hospital booked	Originally booked for hospital
				9	PM/Mortuary	Post mortem /mortuary

Column	Width	Variable Name	Description	Value	Value Label	Description
				10	En route*	
				11	Respiratory difficulties	
				12	Adoption/Fostering	
				13	Low birthweights	
				14	Admission SCBU	
				15	Previous neonatal death	
				16	Neonatal jaundice	
				18	Because of abnormality	
				20	Other	
				77	Not known	
				88	Not recorded	
62-63	2	GRAV	Gradividty	77	Not known	
				88	Not recorded	
64-65	2	PARITY		77	Not known	
				88	Not recorded	
66	1	EVAB	Ever had an abortion	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	

* only applies to "elsewhere" deliveries

Column	Width	Variable Name	Description	Value	Value Label	Description
67	1	NOAB	Number of abortions	7	Not known	
				8	Not recorded	
				9	Not applicable	
68	1	EVSB	Ever had a stillbirth	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	
69	1	NOSB	Number of stillbirths	As for abortions ----		
70	1	EVND	Ever had a neonatal death	" " "		
71	1	NOND	Number of neonatal deaths	" " "		
72	1	EVMB	Ever had a previous multiple birth	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	
73	1	EVCAES	Ever had a Caeserean section	1	Yes	
				2	No	
				7	Not known	
				8	Not recorded	

Column	Width	Variable Name	Description	Value	Value Label	Description
74	1	DISPUTE	Conflict between birth registration information and medical records	1	Reg home/records hosp	Registered as a home birth but according to medical records was a hospital birth
				2	Reg home/records elsew	Registered as a home birth but according to medical records has an elsewhere delivery
				3	Reg elsw/records hosp	Registered as an elsewhere delivery but according to medical records was a hospital birth
				4	Reg elsw/records home	Registered as an elsewhere delivery but according to medical records occurred at home
				5	OPCS home/ actually elsw	Coded incorrectly as a home was an elsewhere delivery
				6	OPCS elsw/ actually home	Coded incorrectly as an elsewhere was actually a home delivery

APPENDIX 5

```
      PROGRAM HBICHEC(OUTPUT,TAPE6=OUTPUT,TAPE8)
C     ******************************************
C     * THIS PROGRAM CHECKS THAT THE           *
C     * HOME BIRTHS SURVEY DATA ARE            *
C     * CLEAN  I E  THAT ALL CODES ARE         *
C     * VALID AND CONSISTENT WITH EACH         *
C     * OTHER                                  *
C     ******************************************
      IMPLICIT INTEGER (A - Z)
      CHARACTER BLANK*5,C7680*5
      COMMON /FOROUT/ HSNO(3),OCCN,CLASS,HDS,QUNO,BDATEDD,BDATEMM,
     1                BSTATUS,SEX,DTYPE,IPOD,DOMINOB,DOUBLEB,MOMINT,
     2                RIPOD,RNOBOOK,GESTAGE,BW,ABNORM,ABTYPE,DRPRES,
     3                DRGRADE,MWPRES,BIRTHAT,MTRANS,RMTRANS,BTRANS,
     4                RBTRANS,GRAV,PARITY,EVINDAB,NOINDAB,EVSB,NOSB,
     5                EVND,NOND,EVMB,EVCAES,DISPUTE,ELSEWD,
     6                KLOKERR,PRTFLG
      COMMON /FORIN/ C7680
      KLOK = 0
      KLOKERR = 0
      BLANK = '     '
      PRINT 500
C     READ IN A CASE
C
10    READ(8,510,END=20) (HSNO(I),I=1,3),OCCN,CLASS,HDS,QUNO,BDATEDD,
     1                   BDATEMM,BSTATUS,SEX,DTYPE,IPOD,DOMINOB,
     2                   DOUBLEB,MOMINT,RIPOD,RNOBOOK,GESTAGE,BW,
     3                   ABNORM,ABTYPE,DRPRES,DRGRADE,MWPRES,BIRTHAT,
     4                   MTRANS,RMTRANS,BTRANS,RBTRANS,GRAV,PARITY,
     5                   EVINDAB,NOINDAB,EVSB,NOSB,EVND,NOND,EVMB,
     6                   EVCAES,DISPUTE,ELSEWD,C7680
      KLOK = KLOK + 1
      PRTFLG = 1
C     RANGE CHECKS
C     ============
      IF (HSNO(2) .LT. 1 .OR.
     1    HSNO(2) .GT. 9377) THEN
          PRINT 520
          CALL CASEOUT
          END IF
C   A) GROUP 1
      IF (HDS    .LT. 101 .OR.
     1    HDS    .GT. 322 .OR.
     2    QUNO   .LT.   1 .OR.
     3    (QUNO  .GT. 502 .AND. QUNO .NE. 888 .AND. QUNO .NE. 999) .OR.
     4    BDATEDD .LT.  1 .OR.
     5    (BDATEDD .GT. 31 .AND. BDATEDD .NE. 88 .AND BDATEDD .NE. 99) .OR.
     6    BDATEMM .LT.  1 .OR.
     7    (BDATEMM .GT. 12 .AND. BDATEMM .NE. 88 .AND BDATEDD .NE. 99))
     8    THEN
              I=1
              PRINT 530,I
              CALL CASEOUT
      END IF
C   B) GROUP 2
      IF (BSTATUS .LT.  1 .OR.
     1    (BSTATUS .GT.  4 .AND. BSTATUS .LT. 8) .OR.
     2    SEX     .LT.  1 .OR.
     3    (SEX    .GT.  2 .AND. SEX .LT. 8) .OR.
     4    DTYPE   .LT.  1 .OR.
     5    (DTYPE  .GT. 12 .AND. DTYPE .NE. 20 .AND.
     6     DTYPE  .NE. 77 .AND. DTYPE .NE. 88 ) .OR.
     7    IPOD    .LT.  1 .OR.
     8    (IPOD   .GT.  7 .AND.
     9     IPOD   .NE. 77 .AND. IPOD .NE. 88 ))
     1    THEN
              I=2
              PRINT 530,I
              CALL CASEOUT
      END IF
C   C) GROUP 3
      IF (DOMINOB .LT. 1 .OR.
     1    (DOMINOB .GT. 2 .AND. DOMINOB .LT. 7) .OR.
     2    DOUBLEB .LT. 1 .OR.
     3    (DOUBLEB .GT. 5 .AND. DOUBLEB .LT. 7) .OR.
     4    MOMINT  .LT. 1 .OR.
     5    (MOMINT .GT. 2 .AND. MOMINT .LT. 7) .OR.
```

```
78                6    RIPOD   .LT. 1 .OR.
79                7    (RIPOD  .GT. 13 .AND. RIPOD .NE. 20 .AND. RIPOD .NE. 77 .AND.
80                8     RIPOD  .NE. 88 .AND. RIPOD .NE. 99))
81                9     THEN
82                          I = 3
83                          PRINT 530, I
84                          CALL CASEOUT
85                  END IF
86          C     D) GROUP 4
87                  IF (RNOBOOK .LT. 1 .OR. (RNOBOOK .GT. 6 .AND. RNOBOOK .NE. 20 .AND.
88                2    RNOBOOK .NE. 77 .AND. RNOBOOK .NE. 88 .AND. RNOBOOK .NE. 99) .OR.
89                3    GESTAGE .LT. 28 .OR. (GESTAGE .GT. 44 .AND.
90                4    GESTAGE .NE. 77 .AND. GESTAGE .NE. 88 .AND. GESTAGE .NE. 99) .OR.
91                5    BW .LT. 500 .OR. (BW .GT. 5500 .AND.
92                6    BW .NE. 7777 .AND. BW .NE. 8888 .AND. BW .NE. 9999))
93                7    THEN
94                          I = 4
95                          PRINT 530, I
96                          CALL CASEOUT
97                  END IF
98          C     E) GROUP 5
99          C     TO BE CHECKED BY A DIFFERENT PROGRAM
100         C     F) GROUP 6
101                 IF (DRPRES .LT. 1 .OR.
102               1    (DRPRES .GT. 2 .AND. DRPRES .LT. 7) .OR.
103               2    DRGRADE .LT. 1 .OR.
104               3    MWPRES .LT. 1 .OR.
105               4    (MWPRES .GT. 2 .AND. MWPRES .LT. 7) .OR.
106               5    BIRTHAT .LT. 1 .OR.
107               6    (BIRTHAT .GT. 12 .AND. BIRTHAT .NE. 20 .AND.
108               7     BIRTHAT .NE. 77 .AND. BIRTHAT .NE. 88))
109               8     THEN
110                         I = 6
111                         PRINT 530, I
112                         CALL CASEOUT
113                 END IF
114         C     G) GROUP 7
115                  IF (MTRANS .LT. 1 .OR.
116               1    (MTRANS .GT. 2 .AND. MTRANS .LT. 7) .OR.
117               2    RMTRANS .LT. 1 .OR.
118               3     (RMTRANS .GT. 18 .AND. RMTRANS .NE. 20 .AND.
119               4     RMTRANS .NE. 77 .AND. RMTRANS .NE. 88 .AND.
120               5     RMTRANS .NE. 99) .OR.
121               5    BTRANS .LT. 1 .OR.
122               6    (BTRANS .GT. 2 .AND. BTRANS .LT. 7) .OR.
123               7    RBTRANS .LT. 1 .OR.
124               8    (RBTRANS .GT. 16 .AND. RBTRANS .NE. 18 .AND. RBTRANS .NE. 20 .AND.
125               9     RBTRANS .NE. 77 .AND. RBTRANS .NE. 88 .AND. RBTRANS .NE. 99))
126               1     THEN
127                         I = 7
128                         PRINT 530, I
129                         CALL CASEOUT
130                 END IF
131         C     H) GROUP 8
132                  IF ((GRAV .GT. 8 .AND. GRAV .NE. 77 .AND.
133               1     GRAV .NE. 88 .AND. GRAV .NE. 99) .OR.
134               2     (PARITY .GT. 8 .AND. PARITY .NE. 77 .AND. PARITY .NE. 88
135               3                    .AND. PARITY .NE. 99) .OR.
136               4     EVINDAB .LT. 1 .OR.
137               5     (EVINDAB .GT. 2 .AND. EVINDAB .LT. 7) .OR.
138               6     NOINDAB .EQ. 6 .OR.
139               7     EVSB    .LT. 1 .OR.
140               8     (EVSB .GT. 2 .AND. EVSB .LT. 7) .OR.
141               9     (NOSB .GT. 4 .AND. NOSB .LT. 7))
142               1     THEN
143                         I = 8
144                         PRINT 530, I
145                         CALL CASEOUT
146                 END IF
147         C     I) GROUP 9
148                  IF (EVND .LT. 1 .OR.
149               1     (EVND .GT. 2 .AND. EVND .LT. 7) .OR.
150               2     (NOND .GT. 3 .AND. NOND .LT. 7) .OR.
151               3     EVMB .LT. 1 .OR.
152               4     (EVMB .GT. 2 .AND. EVMB .LT. 7) .OR.
153               5     EVCAES .LT. 1 .OR.
154               6     (EVCAES .GT. 2 .AND. EVCAES .LT. 7) .OR.
```

```
155                7    DISPUTE .LT. 1 .OR.
156                8    DISPUTE .EQ. 7 .OR.
157                9    ELSEWD  .LT. 1 .OR.
158                1    (ELSEWD .GT. 5 .AND. ELSEWD .LT. 8))
159                2    THEN
160                         I = 9
161                         PRINT 530, I
162                         CALL CASEOUT
163                 END IF
164                 IF (C7680 .NE. BLANK)
165                1   THEN
166                         PRINT 540
167                         CALL CASEOUT
168                 END IF
169                C    CONSISTENCY CHECKS
170                C    ==================
171                 IF (((BSTATUS .EQ. 1 .OR. BSTATUS .EQ. 2) .AND. ELSEWD .NE. 9) .OR.
172                1    (ELSEWD .EQ. 9 .AND. BSTATUS .NE. 1 .AND. BSTATUS .NE. 2))
173                2    THEN
174                         PRINT 550
175                         CALL CASEOUT
176                 END IF
177                 IF (((BSTATUS .EQ. 3 .OR. BSTATUS .EQ. 4) .AND. ELSEWD .GT. 5) .OR.
178                1    (ELSEWD .LT. 5 .AND. BSTATUS .NE. 3 .AND. BSTATUS .NE. 4))
179                2    THEN
180                         PRINT 550
181                         CALL CASEOUT
182                 END IF
183                 IF((IPOD .EQ. 5 .AND. DOMINOB .NE. 9) .OR.
184                1   (IPOD .NE. 5 .AND. IPOD .NE. 6 .AND. DOMINOB .EQ. 9) .OR.
185                2   (IPOD .EQ. 5 .AND. DOUBLEB .GT. 5) .OR.
186                3   (IPOD .NE. 5 .AND. IPOD .NE. 6 .AND. DOUBLEB .LE. 5) .OR.
187                4   (IPOD .EQ. 5 .AND. MOMINT .NE. 9) .OR.
188                5   (IPOD .NE. 5 .AND. IPOD .NE. 6 .AND. MOMINT .EQ. 9))
189                6   THEN
190                         PRINT 560
191                         CALL CASEOUT
192                 END IF
193                 IF (IPOD .EQ. 6 .AND. (DOMINOB .NE. 9 .OR. DOUBLEB .NE. 9 .OR.
194                1                       MOMINT .NE. 9 .OR. RIPOD .NE. 99 .OR.
195                2                       RNOBOOK .EQ. 99))
196                3    THEN
197                         PRINT 570
198                         CALL CASEOUT
199                 END IF
200                 IF (IPOD .LT. 4 .AND. (DOMINOB .EQ. 9 .OR. DOUBLEB .NE. 7 .AND.
201                1    DOUBLEB .NE. 8 .AND. DOUBLEB .NE. 9 .OR. MOMINT .EQ. 9)).
202                2   THEN
203                         PRINT 580
204                         CALL CASEOUT
205                    END IF
206                 IF((ABNORM .EQ. 2 .AND. ABTYPE .NE. 99999) .OR.
207                1   (ABNORM .NE. 2 .AND. ABTYPE .EQ. 99999) .OR.
208                2   (ABNORM .EQ. 1 .AND. ABTYPE .EQ. 99999))
209                3    THEN
210                         PRINT 590
211                         CALL CASEOUT
212                 END IF
213                 IF((DRPRES .EQ. 2 .AND. DRGRADE .NE. 9) .OR.
214                1  (DRPRES .NE. 2 .AND. DRGRADE .EQ. 9) .OR.
215                2  (DRPRES .EQ. 1 .AND. DRGRADE .EQ. 9) .OR.
216                3  (DRPRES .EQ. 1 .AND. BIRTHAT .GT. 2 .AND. BIRTHAT.LT.7).OR.
217                4  (DRPRES .EQ. 2 .AND. BIRTHAT .EQ. 2))
218                5  THEN
219                       PRINT 600
220                       CALL CASEOUT
221                 END IF
222                 IF ((MWPRES .EQ. 1 .AND. BIRTHAT .GT. 2 .AND.BIRTHAT .LT. 8).OR.
223                1    (MWPRES .EQ. 2 .AND. BIRTHAT .EQ. 1))
224                2    THEN
225                         PRINT 610
226                         CALL CASEOUT
227                 END IF
228                 IF ((MTRANS .EQ. 1 .AND. RMTRANS .EQ. 99) .OR.
229                2    (MTRANS .EQ. 2 .AND. RMTRANS .NE. 99))
230                4     THEN
231                          PRINT 620
```

```
232                       CALL CASEOUT
233                 END IF
234                 IF ((RMTRANS .EQ. 3 .AND. IPOD .EQ. 5) .OR.
235                1  (RMTRANS .EQ. 4 .AND. IPOD .EQ. 5) .OR.
236                2  (RMTRANS .EQ.12 .AND. IPOD .EQ. 5))
237                3   THEN
238                       PRINT 560
239                       CALL CASEOUT
240                 END IF
241                 IF (RMTRANS .EQ. 7 .AND. BSTATUS .NE. 3 .AND. BSTATUS .NE. 4)
242                1   THEN
243                       PRINT 630
244                       CALL CASEOUT
245                 END IF
246                 IF((BTRANS .EQ. 1 .AND. RBTRANS .EQ. 99) .OR.
247                2  (BTRANS .EQ. 2 .AND. RBTRANS .NE. 99))
248                4   THEN
249                       PRINT 640
250                       CALL CASEOUT
251                 END IF
252                 IF ((RBTRANS .EQ. 9 .AND. BSTATUS .NE. 2 .AND. BSTATUS .NE. 4).OR.
253                1    (RBTRANS .EQ. 1 .AND. IPOD .EQ. 5) .OR.
254                2    (RBTRANS .EQ. 6 .AND. IPOD .EQ. 5) .OR.
255                3    (RBTRANS .EQ. 8 .AND. IPOD .EQ. 6) .OR.
256                4    (RBTRANS .EQ.10 .AND. BSTATUS .NE. 3 .AND. BSTATUS .NE. 4).OR.
257                5    (RBTRANS .EQ.18 .AND. ABNORM .NE. 1))
258                6     THEN
259                         PRINT 650
260                         CALL CASEOUT
261                 END IF
262                 IF(GRAV .EQ. 0 .AND. (PARITY .NE. 0 .AND. PARITY .LT. 77 ).AND.
263                1   (EVSB .EQ. 1 .OR.  EVND  .EQ. 1 .OR.  EVMB  .EQ. 1 .OR.
264                2  EVCAES .EQ. 1 .OR. EVINDAB .EQ. 1))
265                3    THEN
266                       PRINT 660
267                       CALL CASEOUT
268                 END IF
269                 IF (PARITY .EQ. 0 .AND.(EVSB .EQ. 1 .OR. EVND .EQ. 1 .OR.
270                1                        EVMB .EQ. 1 .OR. EVCAES.EQ.1 ))
271                2    THEN
272                       PRINT 670
273                       CALL CASEOUT
274                  END IF
275                 IF (GRAV .NE. PARITY .AND.(GRAV .LT. 77 .AND .PARITY .LE. 77 .AND.
276                1                           NOINDAB .LT. 7 .AND. EVMB .EQ. 2 .AND.
277                2                           NOINDAB .NE. GRAV-PARITY))
278                3    THEN
279                       PRINT 680
280                       CALL CASEOUT
281                 END IF
282                 IF(NOSB+NOND .GT. PARITY .AND. (NOSB .LT. 7 .AND. NOND .LT. 7))
283                1    THEN
284                       PRINT 690
285                       CALL CASEOUT
286                 END IF
287                 IF(NOSB+NOND+NOINDAB .GT. GRAV .AND.
288                1(NOSB .LT. 7 .AND. NOND .LT. 7 .AND. NOINDAB .LT. 7))
289                2 THEN
290                     PRINT 700
291                     CALL CASEOUT
292                  END IF
293                 GOTO 10
294           C     WIND UP PROGRAM
295           20    WRITE(6,30) KLOK,KLOKERR
296           30    FORMAT('0 TOTAL CASES CHECKED = ',I5/
297                1       '0 TOTAL ERRORS FOUND  = ',I3)
298                 STOP
299           500   FORMAT(1H1,10(/),' ERRORS IN DATA'//1X,14('='),4(/))
300           510   FORMAT(I2,3I4,I1,2I3,2I2,2I1,2I2,3I1,3I2,I4,I1,I5,3I1,I2,I1,
301                1       I2,I1,3I2,10I1,A5)
302           520   FORMAT('0 ILLEGAL CODE IN HACHE AND SEQUENCE NUMBER -')
303           530   FORMAT('0 ILLEGAL CODE IN GROUP ',I1,' VARIABLE -')
304           540   FORMAT('0 CHARACTERS APPEAR AFTER COLUMN 75 -')
305           550   FORMAT('0 INCONSISTENCY BETWEEN BSTATUS AND ELSEWD -')
306           560   FORMAT('0 INCONSISTENCY WITH IPOD VALUE 5 -')
307           570   FORMAT('0 INCONSISTENCY WITH IPOD VALUE 6 -')
308           580   FORMAT('0 INCONSISTENCY WITH IPOD VALUE 1-4 -')
```

```
309          590   FORMAT('0 INCONSISTENCY BETWEEN ABNORM AND ABTYPE -')
310          600   FORMAT('0 INCONSISTENCY INVOLVING DRPRES -')
311          610   FORMAT('0 INCONSISTENCY BETWEEN MWPRES AND BIRTHAT -')
312          620   FORMAT('0 INCONSISTENCY BETWEEN MTRANS AND RMTRANS -')
313          630   FORMAT('0 INCONSISTENY BETWEEN RMTRANS AND BSTATUS -')
314          640   FORMAT('0 INCONSISTENCY BETWEEN BTRANS AND RBTRANS -')
315          650   FORMAT('0 INCONSISTENCY INVOLVING RBTRANS -')
316          660   FORMAT('0 INCONSISTENCY WITH GRAV = 0 -')
317          670   FORMAT('0 INCONSISTENCY WITH PARITY = 0 -')
318          680   FORMAT('0 INCONSISTENCY BETWEEN GRAV,PARITY AND NOINDAB -')
319          690   FORMAT('0 INCONSISTENCY BETWEEN PARITY AND NOSB AND NOND -')
320          700   FORMAT('0 INCONSISTENCY BETWEEN GRAV, NOSB, NOND & NOINDAB -')
321                END
```

```
      SUBROUTINE CASEOUT
      IMPLICIT INTEGER (A - Z)
      COMMON /FOROUT/ HSNO(3), OCCN, CLASS, HDS, GUNO, BDATEDD, BDATEMM,
     1                BSTATUS, SEX, DTYPE, IPOD, DOMINOB, DOUBLEB, MOMINT,
     2                RIPOD, RNOBOOK, GESTAGE, BW, ABNORM, ABTYPE, DRPRES,
     3                DRGRADE, MWPRES, BIRTHAT, MTRANS, RMTRANS, BTRANS,
     4                RBTRANS, GRAV, PARITY, EVINDAB, NOINDAB, EVSB, NOSB,
     5                EVND, NOND, EVMB, EVCAES, DISPUTE, ELSEWD,
     6                KLOKERR, PRTFLG
      COMMON /FORIN/  C7680
      IF (PRTFLG .EQ. 1) THEN
      WRITE(6,10)(HSNO(I),I=1,3), OCCN, CLASS, HDS, GUNO, BDATEDD, BDATEMM,
     1           BSTATUS,
     1           SEX, DTYPE, IPOD, DOMINOB, DOUBLEB, MOMINT, RIPOD, RNOBOOK,
     2           GESTAGE, BW, ABNORM, ABTYPE, DRPRES, DRGRADE, MWPRES,
     3           BIRTHAT, MTRANS, RMTRANS, BTRANS, RBTRANS, GRAV, PARITY,
     4           EVINDAB, NOINDAB, EVSB, NOSB, EVND, NOND, EVMB, EVCAES,
     5           DISPUTE, ELSEWD, C7680
   10 FORMAT(/30X,I2.2,3I4.4,I1.1,2I3.3,2I2.2
     1      ,2I1.1,2I2.2,3I1.1,3I2.2,
     2       I4.4,I1.1,I5.5,3I1.1,I2.2,I1.1,I2.2,I1.1,3I2.2,10I1,A5)
      KLOKERR = KLOKERR + 1
      PRTFLG = 2
      END IF
      RETURN
      END
```

APPENDIX 6

VARLIABLE LIST FOR HOME BIRTHS SURVEY DATA

Occupation

Social class

Health District

Questionnaire Number

Day of birth

Month of birth

Birth status

Single or multiple birth

Intended place of delivery

Domino booking

Double booking

Mother's intention

Reason why actual and intended place of delivery differ

Reason for no intended place of delivery

Gestational age

Birthweight

Presence of an abnormality in the baby

Type of abnormality present

Doctor present at the delivery

Grade of doctor present

Midwife present at the delivery

Person who delivered the baby

Mother transferred to hospital

Reason for mother's transfer to hospital

Baby transferred to hospital

Reason baby transferred to hospital

Gravidity

Ever had an abortion

Number of abortions

Ever had a stildlbirth

Number of stillbirths

Ever had a neonatal death

Number of neonatal deaths

Ever had a multiple birth

Ever had a caesarean section

Dispute over actual place of delivery

Location of "elsewhere" delivery

Cause of death

Age at death

Social class of parent at death

APPENDIX 7

Variables from OPCS Live/Stillbirth Record

Year of Registration

Month of Registration

District and Sub-District

Entry Number

Institution

Sex

Ligitimacy (at birth registration)

Date of Birth of Child

Expanded Area Code of Usual Residence

Age of Mother at Maternity

Age of Father at Paternity

Legitimate Birth Information

Date of Marriage of Parents

Duration of Mariage

Age of Mother at Marriage

Age of Father at Marriage

Previous Marriage of Mother

Previous Liveborn

Previous Stillborn

Parity

LIVE/STILL INDICATOR

Livebirths

NHS Number

Year of Occurrence

Stillbirths

Duration of Pregnancy in weeks

Year of Occurrence

Cause of Death (9th Revision)

Certification

Occupation of Working Parent

Status of Working Parent

Social Class of Working Parent

Multiple Code

Selection

Expanded Place of Birth of Mother Code

Expanded Place of Birth of Father Code

Date of Birth of Mother

Date of Birth of Father

Mother's age at Maternity Indicator

Father's age at Paternity Indicator

Year of Marriage Indicator

Month of Marriage Indicator

Previous Liveborn Indicator

Previous Stillborn Indicator

Quarter of Creation

Birthweight (grammes)

APPENDIX 8

Information required in birth notification system : Kőrner Recommendations

Chapter 3: Delivery/birth notification, Registration and clinical data sets

Delivery/birth notification

3.1 We recommend that the following data items be collected within 36 hours of each birth whether in hospital or at home for inclusion, as agreed locally, with other information required to be notified to the designated medical officer of the authority:

a. number of previous pregnancies resulting in a registrable birth (parity);

b. date of first ante-natal assessment;

c. birth order (if a multiple birth);

d. live/still birth;

e. birth weight recorded in grams;

f. method of resuscitation used at delivery;

g. place of delivery,

h. original intention for place of delivery;

i. reason for change from original intention if different;

j. date and time of delivery;

k. number of babies;

l. length of gestation assessed at the onset of labour;

m. method of onset of labour;

n. method of delivery;

o. status of person conducting the delivery; and

p. anaesthesia and analgesics administered.

3.2 For births occurring in hospital we recommend that the following additional items be collected to permit linking of the delivery/birth notification with data sets for mother and baby:

a. number/identifier for mother,

b. date of birth of mother, and

c. number/identifier for baby.

3.3 For births occurring outside hospital we recommend that the

following additional items be collected about the mother:

a. date of birth,

b. address code,

c. marital status, and

d. general practitioner.

3.4 The date of the first ante-natal assessment is the date on which the pregnant woman was assessed and arrangements were made for ante-natal care. This is not necessarily the occasion on which arrangements were made for delivery.

3.5 We recommend that a still birth be classified as:

a. ante-partum,

b. intra-partum, or

c. indeterminate.

3.6 We recommend that the method of resuscitation used at delivery be recorded in the way proposed by the British Paediatric Association, namely:

a. positive pressure:

i. nil,

ii. by mask, or

iii. by endotracheal tube.

b. drugs:

i. nil, or

ii. administered.

For local purposes the drugs administered should be specified.

3.7 We recommend that the place of delivery be classified as follows:

a. At a domestic address.

b. In NHS hospital - consultant ward.

c. In NHS hospital - GP ward.

d. In NHS hospital - consultant/GP ward.

e. In private hospital.

f. In other hospital or institution.

g. None of the above a - f.

3.8 Many deliveries do not occur in the place originally intended. The original intention for place of delivery is that designated by the general practitioner and midwife or by the general practitioner and hospital staff and this should be recorded. This decision is normally made when the mother is assessed for delivery and, as a result of this, formal arrangements are made. The classification of the originally intended place of delivery should be the same as used for the actual place of delivery (see paragraph 3.7).

3.9 If the place of delivery is different from the place originally intended, either in the type of place or geographically, we recommend that the reason for the change be classified as follows:

a. Decision made during pregnancy because of change of address.

b. Decision made during pregnancy for clinical reasons.

c. Decision made during pregnancy for other reasons.

d. Decision made during labour for clinical reasons.

e. Decision made during labour for other reasons.

f. Occurred unintentionally during labour.

3.10 We recommend that the WHO definition of gestation be used. This states:

'The duration of gestation is measured from the first day of the last menstrual period (LMP). Gestational age is expressed in completed days or completed weeks; e.g. events occurring 280-286 days after the onset of the last menstrual period are considered to have occurred at 40 weeks gestation'.

The gestation period should be recorded in completed weeks.

3.11 Alternative methods of assessing gestation are:

a. clinical assessment of uterine size,

b. ultrasonic measurements, and/or

c. retrospective clinical assessment of the new born by a paediatrician.

The WHO definition is recommended for those cases where LMP is thought to be reliable. For the remainder a best estimate based on likely LMP and ultrasonic measurement is to be recommended. In the neonatal optional data set there is a data item to allow paediatricians to record their own estimate of the length of gestation.

3.12 We recommend that the method of onset of labour be classified as follows:

a. Spontaneous; the onset of regular contractions whether or not preceded by spontaneous rupture of the membranes.

b. Elective caesarean section; a section carried out before the onset of labour; or, in the case of a planned elective operation, immediately following the onset of labour, when the decision was made before labour.

c. Surgical induction; eg. by amniotomy.

d. Oxytocic drugs; including administration of agents either orally, intravenously or intravaginally with the intention of initiating labour.

e. Combination of surgical induction and oxytocic drugs.

If the methods at (c), (d) or (e) have been used to accelerate rather than induce labour, they should not be recorded under this item.

3.13 We recommend that the method of delivery be classified according to the 9th revision of the ICD. In summary these methods are:

a. Spontaneous, vertex.

b. Spontaneous, other cephalic.

c. Low forceps, not breech.

d. Other forceps, not breech.

e. Ventouse.

f. Breech.

g. Breech extraction.

h. Elective caesarean section (as defined in paragraph 3.12b).

i. Other (non-elective) caesarean section.

3.14 The person conducting the delivery is normally the individual who delivers the baby. However, when the delivery is carried out by a student, the individual supervising the delivery should be recorded as the person conducting it. We recommend that the status of the person conducting the delivery be classified as:

a. hospital doctor,

b. general practitioner,

c. midwife, or

d. other than a - c above.

3.15 We recommend that, as a minimum, data about anaesthesia and analgesics be recorded as follows:

a. Period during which administered:

i. labour or delivery, and

ii. post delivery (after the delivery of the baby up until completion of notification).

b. Anaesthesia or analgesics administered in each period recorded as follows:

i. General anaesthesia, the administration by a doctor of an agent intended to produce unconsciousness.

ii. Epidural or caudal anaesthesia, the injection of a local anaesthetic agent into the epidural space.

iii. Spinal anaesthesia, the injection of a local anaesthetic agent into the subarachnoid space.

iv. General anaesthesia and epidural or caudal anaesthesia.

v. General anaesthesia and spinal anaesthesia.

vi. Epidural or caudal and spinal anaesthesia.

vii. Other than i to vi above including no anaesthesia or analgesics administered.

3.16 The minimum data set recommended in paragraph 3.15 can be expanded for local purposes. Good anaesthetic practice would require more data being collected as follows:

a. Period during which administered:

i. labour,

ii. delivery, and

iii. post delivery (after the delivery of the baby up until completion of notification).

b. Anaesthesia or analgesics administered in each period (yes/no for each item):

i. self administered inhalation,

ii. narcotics,

iii. epidural or caudal anaesthesia,

iv. spinal anaesthesia,

v. local infiltration,

vi. general anaesthesia, and

vii. other.

c. Reason for administering epidural, caudal or spinal anaesthesia:

i. for pain relief, or

ii. as an anaesthetic for an operative procedure.

The full classification has not yet been generally piloted. If it proves feasible to collect it should be considered for inclusion in the national minimum data set at a later date.

Birth Registration

3.17 Although we have not recommended that NHS number and social class should form part of the minimum data set for all patients using a hospital bed, both these items are obtainable for a registrable birth from the Registrar of Births and Deaths. He is responsible for generating the NHS number and specially trained to obtain data about occupation. We therefore recommend that the following data items be obtained from the Registrar for inclusion in the minimum data set for each registrable birth:

a. parental occupation, and

b. NHS number of baby.