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Reports on Public Health and Medical Subjects

No. 108

Report on Confidential
Enquiries into Maternal Deaths
in England and Wales
1958-1960

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MINISTRY OF HEALTH

Reports on Public Health and Medical Subjects

No. 108

**Report on Confidential Enquiries into
Maternal Deaths in England and Wales
1958-1960**

by

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PREFACE

This Report, the third of a series, continues the narrative of investigations into the causes of maternal deaths which have been made every year since the enquiry procedure was revised in 1952.

It is well to be clear as to the object of the exercise. A very small proportion of the total number of births occurring in any one year results in the death of the mother. When this tragedy occurs a searching examination is made into the medical history of the case to ascertain if anything was done or left undone which might have contributed to the fatal issue and, if so, to try to identify those factors which could be regarded as avoidable. This does not necessarily mean that a factor so identified was the cause of the mother's death. It does mean that if the avoidable factor or factors had been recognized or anticipated and handled in accordance with best current practice a fatal issue might have been avoided. The description of such factors, even in some detail, makes more certain their recognition and avoidance in future and so should contribute to the further reduction of maternal mortality.

In the period 1958-1960 with which this Report deals over two million three hundred thousand births were registered. In this very large number there were 928 deaths of women ascribed to pregnancy and childbirth. In the years 1928-1930 there were just over two million births and 7,561 women died; had the maternal death rates of those years applied thirty years later, almost 10,000 women would have died. Even twelve years ago, in the years 1948 to 1950 when there were just over two and a quarter million births, there were 2,158 maternal deaths, giving a rate more than twice that of the period of this report. The reader should therefore keep in mind when perusing these pages not only the high level of safety in childbirth to-day, but also its continuing improvement and the relative infrequency of either unavoidable deaths or of those in which avoidable factors are found. This report deals with the 742 deaths about which confidential reports were obtained.

The fall in the total number of deaths directly due to pregnancy and childbirth has continued through 1958-1960. Toxaemia, haemorrhage, abortion and pulmonary embolism remain the major causes. Although toxaemia remains the commonest cause of death with which avoidable factors are associated, this report records a substantial improvement just as the second report recorded a reduction in the deaths due to haemorrhage. Following the lessons learnt in the earlier stages of this investigation, special efforts have been made to reduce the incidence of fatal toxaemia by greater care in the antenatal period, and it is hoped that further improvement will ensue. The report shows that further reduction in maternal deaths is possible if the standards of best current practice are applied. Human error will always occur, but some of the errors recorded in the report are of a kind which could be eliminated by steady application of accepted principles. These errors are bluntly stated to emphasise the simple nature of corrective action.

It is regrettable that a substantial proportion of maternal deaths is still due to the mother herself, by either neglecting to make any arrangements for her confinement, or by refusing to follow the advice offered by her doctor or midwife. This fact must be a stimulus to both professions to promote better

understanding in the public. But notwithstanding the tragedies recorded in the following pages, the Report is really a record of a period of progress and its merit lies in the dispassionate examination of the causes of failure.

This study is a co-operative effort of all the professional groups concerned—specialists, general practitioners, medical officers of health and midwives. In no other medical field in Britain is this process of strict self-examination so generally used. The contribution made by each of these groups is gratefully acknowledged. The authors have each devoted much time to the preparation of the text and the review of individual reports, but their work is based upon that of the fourteen Regional Assessors whose comments upon each case and discussion of this and the previous draft reports are the foundation of the study.

This report and its predecessors are by-products ; the main purpose of the confidential enquiries is to promote, by local study, the progressive improvement of the maternity services.

G. E. GODBER,

Chief Medical Officer.

*Ministry of Health,
London.*

March, 1963.

1. HISTORY AND METHOD

This report is a continuation of a series of reports on the Confidential Enquiry into Maternal Deaths in England and Wales. The original enquiry was started in 1928, but was completely revised in 1952. A report was published in 1957 for the years 1952-1954 and a further one in 1960 for the years 1955-1957. This report covers the years 1958-1960.

The history and method were described fully in the first report and the subsequent reports have followed the same pattern. The method of collection has been the same and as far as possible the same assessments have been used. The aim of the Enquiry has been to analyse every maternal death occurring in England and Wales and to see whether the death might have been avoided. In the first series in 1952-1954 the proportion of deaths with avoidable factors due directly to pregnancy and childbirth was 43.1 per cent.; in 1955 to 1957 it fell to 40.9 per cent., but in this series in 1958 to 1960 the proportion has risen to 42.5 per cent. The total number of deaths had fallen considerably during the years and so it appeared that more deaths had been prevented among the deaths which were considered unavoidable than among those considered avoidable. To investigate this apparent anomaly a 1 in 5 sample of all forms received for deaths occurring during the year 1952 was reassessed. While it was expected that part of the explanation would be more strict criteria in assessing avoidability, it was found that these had hardly changed. There was, however, a striking difference in the information supplied on the forms. Whereas, previously, a number of deaths were considered unavoidable due to lack of information, the forms now received give frank and detailed clinical information from all concerned with the care of the mother. Much more accurate assessments are now possible compared with the early years of the Enquiry.

The layout of the Report for 1955-1957 followed that of the 1952-1954 report to facilitate comparison between the two series. Two chapters were added—"Sudden death in labour" and "Rupture of uterus" as providing material of considerable clinical interest. The number of deaths from "Rupture of the Uterus" has fallen slightly being only 29 for this series compared with 33 in 1955-1957. In this series two other subjects have been chosen for closer study. One is "Obstructed and assisted labour" and the other is "Booking for confinement".

The total number of deaths directly due to pregnancy and childbirth during the years 1958-1960 has shown a fall of about one-fifth compared with 1955-1957 and two-fifths compared with 1952-1954. This is despite an increase in births from 2,079,275 in 1952-1954 to 2,140,376 in 1955-1957 and now 2,322,229 in 1958-1960.

As in previous years the major causes of maternal death have remained the same—toxaemia, haemorrhage, abortion and pulmonary embolism.

Major causes of maternal death

	1952-1954		1955-1957		1958-1960	
	No.	Per cent.†	No.	Per cent.†	No.	Per cent.†
Deaths due to toxæmia*	246	22	188	22	137	18
Deaths due to hæmorrhage†	188	17	121	14	114	15
Deaths due to abortion	153	14	141	16	135	18
Deaths due to pulmonary embolism..	138	13	147	17	132	18

* Including cases of toxæmic accidental hæmorrhage: — 46 in 1952-54 ; 17 in 1955-57 and 19 in 1958-60.

† Excluding toxæmic accidental hæmorrhage.

‡ Percentage total deaths.

The decline in the number of deaths from toxæmia and hæmorrhage has continued, in this series the greater fall being among deaths from toxæmia. Toxæmia, abortion and embolism cause a similar proportion of deaths, and hæmorrhage has continued to remain the fourth cause.

In the last report it was stated that in the control of toxæmia lay the greatest opportunity of saving maternal lives. Early treatment and more ante-natal care seem to be having their effect for there were 109 less maternal deaths from this cause in this series compared with the years 1952 to 1954.

2. TOXAEMIA OF PREGNANCY

A further fall in deaths from toxæmia is recorded. In 1952 to 1954 there were 246, in 1955 to 1957 there were 188 and in the present series the number has fallen to 137.

Avoidable factors were considered to be present in 77 cases or 56 per cent. This shows a small rise in "avoidability" from 52 per cent. in the first series and 55 per cent. in the second series.

Among the 137 cases of toxæmia 39 women died undelivered, in two of whom a post-mortem Caesarean section resulted in the delivery of a live child. Seven aborted. In the remaining 91 cases, 47 had still births; 42 live births and in two cases the result was not given. One case of triplets with three live infants was recorded as well as seven cases of twins, in four of which both infants lived, in one one infant lived and the second was stillborn and in one case both infants were stillborn.

DURATION OF PREGNANCY

The duration of pregnancy in the 39 women who died undelivered was as follows :—

At term	..	8	30 weeks	..	6
38 weeks	..	1	28 weeks	..	2
36 weeks	..	3	26 weeks	..	3
34 weeks	..	1	24 weeks	..	3
33 weeks	..	2	20 weeks	..	1
32 weeks	..	5	16 weeks	..	1
31 weeks	..	1	Unstated	..	2

The duration of pregnancy at delivery in the remaining 98 women was as follows :—

At term	..	29	31 weeks	..	1
39 weeks	..	3	30 weeks	..	3
38 weeks	..	4	29 weeks	..	3
37 weeks	..	11	28 weeks	..	2
36 weeks	..	7	26 weeks	..	4
35 weeks	..	5	24 weeks	..	1
34 weeks	..	9	16 weeks	..	1
33 weeks	..	2	10 weeks	..	1
32 weeks	..	6	Unstated	..	6

As it can be seen from these tables, the duration of pregnancy in five out of 39 women who died undelivered and 3 out of 98 who were delivered, was 24 weeks or less. In the majority of these cases there was some doubt about the diagnosis and they may not have been true cases of pre-eclamptic toxæmia.

Among the remainder however, the short duration of pregnancy is of particular importance. Thus 17 out of 39 women who died undelivered and 26 out of 98 of those who were delivered were between 28 and 34 weeks pregnant. Unfortunately there was not sufficient information to say accurately at what stage of pregnancy the symptoms first appeared. It does, however, point to the need for careful antenatal care at an early stage in pregnancy if some of these deaths are to be avoided.

ACTUAL CAUSE OF DEATH

An attempt has been made to classify the actual cause of death in the 118 cases excluding the cases of accidental haemorrhage with toxæmia (21 deaths) described under haemorrhage. It will be seen that 16 patients had some degree of accidental haemorrhage, which was not regarded as being the cause of death and in subsequent tables these are not considered separately.

Eclampsia	56
Complicated by cerebral haemorrhage	16
Complicated by anuria	8
Complicated by accidental haemorrhage	5
Complicated by pulmonary embolism	1
Complicated by ruptured i.c. aneurysm	1
Pre-eclamptic toxæmia	39
Complicated by cerebral haemorrhage	8
Complicated by anuria	12
Complicated by accidental haemorrhage	11
Complicated by ruptured i.c. aneurysm	1
Liver necrosis (acute yellow atrophy)	12
Complicated by cerebral haemorrhage	1
Renal failure	4
Due to malignant hypertension	1
Due to congenital cystic kidneys	1
Due to diabetes	1
Due to severe anaemia	1
Haemorrhage from the liver	1
Hyperemesis	1
Post anaesthetic vomiting (Mendelson's syndrome)	1
Ileus following Caesarean Section	2
Doubtful	2
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AGE

Table I. Age distribution in the deaths due to toxæmia, compared with the age distribution among all registered births in England and Wales in 1958-60.

Age	Pre-eclamptic Toxæmia		Eclampsia		Accidental haemorrhage with Toxæmia		All Toxæmia		Total registered births
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	Per cent.
Under 20 ..	5	8.1	2	3.6	1	5.2	8	5.8	6.2
20-24 ..	12	19.4	16	28.6	4	21.1	32	23.4	30.4
25-29 ..	9	14.5	16	28.6	1	5.2	26	19.0	31.2
30-34 ..	9	14.5	14	25.0	7	36.8	30	21.9	19.3
35-39 ..	22	35.5	5	8.9	3	15.8	30	21.9	10.2
40 + ..	5	8.1	3	5.4	3	15.8	11	8.0	2.7
Total ..	62	100	56	100	19	100	137	100	100

PARITY

Table II. Distribution of parity among deaths due to toxaemia compared with the distribution among all registered legitimate births in England and Wales 1958-60.

Parity	Pre-eclamptic Toxaemia		Eclampsia		Accidental haemorrhage with Toxaemia		All Toxaemia		All registered legitimate live births
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	Per cent.
1	30	48.4	30	53.6	6	31.6	66	48.2	38.6
2	6	9.7	11	19.6	3	15.8	20	14.6	30.6
3	6	9.7	6	10.7	3	15.8	15	10.9	15.6
4	3	4.8	1	1.8	2	10.5	6	4.4	7.4
5	4	6.5	2	3.6	1	5.2	7	5.1	3.6
6 + ..	10	16.1	4	7.1	3	15.8	17	12.4	4.2
Not stated ..	3	4.8	2	3.6	1	5.2	6	4.4	—
Total ..	62	100	56	100	19	100	137	100	100

AVOIDABLE FACTORS

Cases classed as pre-eclamptic toxaemia and eclampsia have not been considered apart from the remainder included in this section.

In the 137 cases included under the heading of all toxaemia avoidable factors were present in 77, an "avoidability" of 56 per cent. The fall in the number of deaths due to toxaemia during the three triennial periods has been marked and is even greater than is shown by the totals because the number of women at risk has steadily risen. The fall in the "unavoidable" cases has been proportionately greater than in the "avoidable", because more information is now provided as a basis for classification and so "avoidable" factors are more completely assessed.

1952-1954	..	246 cases	..	52 per cent. avoidable factors.
1955-1957	..	188 cases	..	55 per cent. avoidable factors.
1958-1960	..	137 cases	..	56 per cent. avoidable factors.

Among the 77 cases which were classed as avoidable, 90 separate avoidable factors were identified. In all except two deaths, the avoidable factor occurred during the antenatal period.

Seventeen of the 77 cases with avoidable factors had been booked for hospital confinements, 27 had arranged to have their confinements at home, 16 were booked for a general practitioner maternity home, one for a private nursing home and 16 had made no arrangements.

The major avoidable factors were as follows :—

(a) *Lack of co-operation from the patient*

In this series the number of avoidable factors for which the patient or her relatives were responsible has increased.

In 24 out of the 77 avoidable deaths, the patient was solely responsible and shared the responsibility in seven others. This compares with 15 out of 103 cases in the last report. Unless there is strong evidence to show that every effort has been made by those in professional attendance to persuade an uncooperative patient to accept advice the responsibility is at least shared by them. Among these cases was a 6-gravida who took no steps to seek antenatal care until the 36th week, although her three previous pregnancies had been complicated by toxæmia. Another was a 15-gravida who invariably failed to report her pregnancies. It is difficult to see what can be done to help these women who deliberately avoid antenatal care or refuse to accept professional advice. As in the previous report most of the cases in which the patient alone was responsible were those of multiparae. Seventeen out of the 24 such cases were multiparae with an average parity of five ; six were primigravidae and in one the parity was not known.

(b) *Inadequate Antenatal Care*

In 48 cases, the avoidable factor was considered to be some lapse in the standard of antenatal care now expected. In a few instances the lapse could be regarded as major, in some, lack of appreciation of the dangers of toxæmia, in some, failure to call a consultant or to seek hospital admission ; in others the refusal of a hospital to admit a patient when such admission was clearly a matter of urgency. In four cases a doctor mistakenly accepted a case for home confinement and in one case the patient insisted on being confined at home against advice.

Lack of co-operation between doctor, local health authority and hospital involved a doctor on two occasions, a local health authority on two occasions, and a hospital on three occasions. In one case a hospital did not follow-up a patient who had failed to attend.

There are 5 individuals who may be concerned in the provision of adequate antenatal care. These are the general practitioner, the local health authority clinic medical officer, the midwife, the consultant (who must accept responsibility for his hospital service) and the patient. The avoidable factors have been allotted to these individuals and the patient as follows :—

General Practitioner	..	..	..	..	36
Clinic Medical Officer	..	..	..	..	5
Midwife	..	..	..	..	0
Consultant	..	..	..	..	12
Patient	..	..	..	..	24
<hr/>					
Total	..	..	..	..	77
<hr/>					

In a lesser degree two or more of the above were jointly responsible in 11 cases. Since one of the commonest avoidable factors is failure to refer the patient to hospital and only the general practitioner can make this mistake, he is bound to figure more often.

The examples quoted in the last report are applicable to cases in the present series. In a number of cases signs of toxæmia were regarded as requiring no more than an injunction to take more rest. In other cases no antenatal records were kept.

Examples of inexplicable errors are the following :—

A woman with a history of severe toxæmia during the previous pregnancy was booked for a home confinement. When hypertension and albuminuria developed, the doctor took no action and left a midwife to conduct the labour alone. When a fit occurred, still nothing was done and it was not until several further fits had occurred that she was sent into hospital.

In another case a primigravida of 21 reported at a clinic for the first time at 28 weeks. She was found to have signs of severe pre-eclamptic toxæmia. The only action taken was to book an out-patient appointment at a hospital for six days later. This young woman died from cerebral haemorrhage three days after reporting to the clinic.

A third case was a 4-gravida with a bad obstetric history booked for home confinement. She was found to have severe pre-eclamptic toxæmia and was told to rest at home. When admitted to hospital two weeks later she had 10 parts per 1,000 of albumin and a haemoglobin of 38 per cent. She died undelivered a few hours after admission.

(c) Confusion of Responsibility

This was the avoidable factor in five cases compared with 12 in the previous report.

While most of this chapter has been devoted to discussing how a further 77 deaths might have been avoided, the remarkable achievement of the last years should not be forgotten. It is among toxæmia cases that the greatest saving of life has been made since the series of enquiries was begun in 1952. There were 58 less deaths from this cause recorded in the second series compared with the first and 51 less in the third compared with second series. In no other cause of maternal death has such a fall occurred.

SUMMARY AND CONCLUSIONS

1. There were 137 deaths from toxæmia (including 21 deaths of accidental haemorrhage with toxæmia) in 1958 to 1960 compared with 246 in 1952 to 1954 and 188 in 1955 to 1957. In 1952 to 1954 the death rate from toxæmia per 100,000 total births was 11·8 which has fallen to 5·9 in this present series, i.e. a reduction of 50 per cent.

2. Avoidable factors were considered to be present in 77 or 56 per cent. of cases. The patient was solely responsible in 24 out of 77 cases. In 48 the standard of antenatal care was inadequate and there was some confusion of responsibility in five cases.

3. HAEMORRHAGE

The cases in this chapter are those shown under the International Classification (Appendix Tables 1 and 2) under the headings number 643, 644, 670, 671 and 672. As in the last two reports, the nine deaths from post partum haemorrhage following Caesarean section have been excluded as the haemorrhage was regarded as a post-operative complication rather than as post partum haemorrhage in the usually accepted sense.

In all, 130 cases have been considered compared with 138 and 220 in the previous reports. The following table shows the number of deaths in each clinical group and the number in which avoidable factors were considered to be present.

Table IV. Number of deaths in each clinical group and the number in which avoidable factors were considered to be present.

	Number of deaths	Deaths with avoidable factors	
		Number	Per cent.
Accidental haemorrhage, toxæmic and non-toxæmic	44	19	43·2
Placenta prævia	25	19	76·0
Post partum haemorrhage with retained placenta	15	8	53·3
Other post partum haemorrhage	46	23	50·0
Total	130*	69	53·1

* This number includes 16 cases of Toxaemia with ante partum haemorrhage which are not included in the table on page 2.

Table V below shows that the risk of death from haemorrhage is greater in older than in younger women. In the case of placenta prævia nearly two-thirds of the deaths occurred in women over the age of 35. This distribution is even more marked in this series than it was in that of 1955-1957.

AGE

Table V. Age distribution among deaths due to haemorrhage compared with the distribution among all births 1958-60.

Age	Accidental Haemorrhage		Placenta Prævia		P.P.H.		All cases		Total registered births
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	Per cent.
Under 20 ..	1	2·3	—	—	3	4·9	4	3·1	6·2
20-24 ..	8	18·2	1	4·0	12	19·7	21	16·2	30·4
24-29 ..	7	15·9	1	4·0	12	19·7	20	15·4	31·2
30-34 ..	11	25·0	7	28·0	19	31·1	37	28·5	19·3
35-39 ..	10	22·7	11	44·0	10	16·4	31	23·8	10·2
40 + ..	7	15·9	5	20·0	5	8·2	17	13·1	2·7
Total ..	44	100	25	100	61	100	130	100	100

Table VI shows the parity distribution among the women who died from haemorrhage compared with all registered legitimate live births. The table again demonstrates the increased risk of death from all types of haemorrhage in the higher parities. Over one-fifth of the deaths occur in women who have already had five or more children (parity 6+) and in the case of placenta praevia it is over one-third.

PARITY

Table VI. Parity distribution among all deaths due to haemorrhage compared with the distribution among all legitimate births 1958-60.

Parity	Accidental Haemorrhage		Placenta Praevia		P.P.H.		All cases		Registered legitimate live births
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	Per cent.
1	12	27.3	3	12.0	14	23.0	29	22.3	38.6
2	8	18.2	4	16.0	15	24.6	27	20.8	30.6
3	5	11.4	3	12.0	15	24.6	23	17.7	15.6
4	5	11.4	3	12.0	4	6.6	12	9.2	7.4
5	2	4.5	3	12.0	4	6.6	9	6.9	3.6
6 + ..	11	25.0	9	36.0	9	14.8	29	22.3	4.2
Not stated ..	1	2.3	—	—	—	—	1	.8	—
Total ..	44	100	25	100	61	100	130	100	100

PRE-EXISTING ANAEMIA

The evidence provided by the investigations suggests that there has been an increase in the number of patients whose haemoglobin was estimated during pregnancy and recorded. In the present series the haemoglobin content of the blood was recorded in 62 out of the 130 deaths from haemorrhage compared with 39 out of 138 deaths in the previous series, that is, in 48 per cent. compared with 28 per cent., and for the entire investigation the percentage was 36.9. No information as to the findings was given in 4 cases; in the remainder 23 had haemaglobin estimations between 60-80 per cent. and 8 under 60 per cent. The remainder were over 80 per cent.

ACCIDENTAL HAEMORRHAGE

The deaths from accidental haemorrhage have been analysed as in the previous report. They have been divided into three groups.

Group A. Cases of toxæmia with accidental haemorrhage in which the cause of death was eclampsia or other complication of toxæmia. There were 16 of these and they have been included among the toxæmia cases.

Group B. Cases of accidental haemorrhage in women who also exhibited signs of toxæmia in whom the cause of death was accidental haemorrhage. There were 21 such cases.

Group C. Cases of accidental haemorrhage with no evidence of pre-existing toxæmia. These numbered 23.

GROUP A. *Toxæmia cases which also had accidental haemorrhage*

Of the 16 cases, 5 were considered to be unavoidable ; in 11 avoidable factors were present. In no less than seven of these the patient or her relatives were solely responsible. In four no professional advice had been sought until an acute emergency arose and in three the patient refused to co-operate and would not accept the advice given. In the remaining 4 cases, the antenatal care was inadequate in two, a hospital being responsible in one case and a doctor in another. A third patient should have been sent to hospital earlier by the doctor and in a fourth case a patient who failed to attend was not followed up because of administrative confusion for which hospital, local health authority and the doctor share the responsibility. These 16 cases are included in the tables in the section on toxæmia. One patient was delivered by Caesarean section.

GROUP B. *Accidental haemorrhage with toxæmia*

While ante-partum haemorrhage was regarded as the major cause of death in the 21 cases, immediate blood loss was the direct cause in only 15 ; in the remaining six cases the acute anaemia was followed by anuria from which the patient died. In nine no avoidable factor was found ; two others were classed as doubtful and in the remaining ten avoidable factors were present. In three of these the patient had failed to seek any professional advice and a fourth patient delayed going to hospital in spite of medical advice. In another case a hospital neglected to follow up a woman having her eighth baby who was known to be a bad risk. In three further cases a doctor's antenatal care was inadequate ; in one of these pre-eclamptic toxæmia was grossly neglected as well as later accidental haemorrhage in a maternity home ; in another case the patient was wrongly booked for a maternity home and consultant advice was not sought until too late ; in another case the hospital failed to admit a booked case earlier. Eight of the 21 cases were booked for home confinement, four for hospital and four for a maternity home. Five had made no arrangements at all.

Six cases in this group were primigravidae, six were having their second or third babies, two their fourth, one her fifth, one her sixth, one her seventh, two their eighth, one her twelfth and in the remaining case no information was available. Six cases were under 30, ten between 30 and 40 and five over 40. Two patients were delivered by Caesarean section.

GROUP C. *Accidental haemorrhage without toxæmia*

There were 23 cases in this group in which 14 were considered to be unavoidable and nine to have avoidable factors. Two of these nine cases were booked for hospital confinement, one for a maternity home and six for home confinement.

The avoidable factors in the two hospital cases were poor antenatal care by the hospital. There was failure to co-operate with the patient's doctor in one case ; in the other the hospital failed to admit the patient early enough. The

patient booked for a maternity home had inadequate antenatal care, the accidental haemorrhage was badly managed and there was confusion over medical responsibility. There were avoidable factors in the six cases booked for home confinement. In the first the patient refused to go to hospital and her relatives failed to call in her doctor until she was seriously ill. In the second the patient had inadequate antenatal care due partly to her failure to co-operate and partly to her doctor. In the third case the patient was sent into hospital when the flying squad should have been called, and when she was admitted a Caesarean section was performed before measures to resuscitate her had had time to take effect. The fourth case was wrongly booked for home confinement. In the fifth case evidence of severe anaemia was ignored and in the sixth case a woman aged 43 expecting her ninth baby, clearly in poor health and suffering from anaemia, was booked for home confinement and no action was taken to investigate and treat the anaemia.

Fourteen women died directly from shock and haemorrhage and nine from anuria.

Among the 23 cases, ten were under 30 years of age, eleven were between 30 and 40 and two over 40. Six women were primigravidae, seven were having their second or third babies, three their fourth, one her fifth, three their sixth, two their ninth and one her eleventh. Three patients were delivered by Caesarean section.

PLACENTA PRAEVIA

There were 25 deaths from placenta praevia with avoidable factors present in 19 (76 per cent.). Although the number of cases is slightly lower the proportion with avoidable factors is higher than in the two previous reports. The figures for 1952-54 were 29 cases, 16 avoidable (55 per cent.) ; for 1955-57, 28 and 12 avoidable (43 per cent.).

Thirteen cases were delivered by Caesarean section, nine were undelivered and three were delivered spontaneously.

Avoidable Factors

Of the 19 deaths with avoidable factors, four were booked for hospital confinement, two for a maternity home, eight for home confinement and five had made no arrangements. Of the hospital cases, the avoidable factors were poor antenatal care and poor treatment of placenta praevia in one, delay in transfusion in another, unwise retention of a known case of placenta praevia in a small ill-equipped hospital in the third and in the fourth the patient discharged herself against medical advice.

Two cases were booked for confinement in a maternity home. In one, early warning haemorrhages were ignored and later, the flying squad was not called. In the second the patient received inadequate antenatal care. Of the five cases where no arrangements were made, four patients had made no attempt to seek professional advice and a doctor was called only after serious haemorrhage had occurred. Thereafter everything possible was done. In the fifth case the patient might have been saved if the doctor had sent for the flying squad instead of sending the patient to hospital ; she died in the ambulance.

Of the eight cases booked for home confinement two patients refused to go to hospital after a warning haemorrhage and another expecting her seventh baby

insisted against advice on being confined at home. The same happened with an eight-gravida whose relatives failed to send for help until a serious haemorrhage had occurred. In this case the doctor did not send for the flying squad but sent the patient to hospital ; she died in the ambulance. In one case there was confusion of responsibility between the doctor, the midwife and the local authority clinic and when the patient eventually reached hospital the treatment was open to criticism. In another patient expecting her sixth baby severe anaemia during pregnancy was ignored by the doctor who had accepted her for home confinement. In one case the doctor did not send the patient to hospital after a small antepartum haemorrhage. He twice examined her vaginally at home, the second examination being followed by catastrophic haemorrhage. Finally there was a case in which a patient was put in an ambulance and sent to hospital when a flying squad should have been called. The patient was moribund on arrival.

POST-PARTUM HAEMORRHAGE

There is a small decrease in the number of deaths from post-partum haemorrhage compared with the 1955-57 series. The number then was 70 compared with 61 in this series. In the 1952-54 series the number was 113. Again there has been a striking fall in the cases in which the haemorrhage occurred during the third stage of labour. In 1952-54 there were 53, in 1955-57, 24, and in the present series only 15 out of the 61 cases fall into this group. It is of interest to note that in 19 of the 61 cases there was also some degree of antepartum haemorrhage.

Post-partum haemorrhage with retained placenta

In three out of 15 cases there was little or no bleeding before the placenta was removed manually. In one case the patient was delivered at home ; after two hours she was removed to hospital with the placenta in situ. Ten hours after delivery the placenta was manually removed and the patient then had some haemorrhage. In the second case the patient was delivered at home and the flying squad was summoned because of the retention of placenta. The patient died under the anaesthetic. There was no bleeding. In the third case, also a home confinement, there was some doubt as to whether there was much bleeding. The patient recovered after manual removal, then died suddenly six hours later.

Eight deaths had avoidable factors. Six of these patients were wrongly booked for home confinement, and one for a maternity home. This patient had a history of post-partum haemorrhage in a previous confinement and in the Assessor's view the evidence showed bad management of the third stage by both the doctor and the flying squad which was called. Of the patients booked for home confinement one patient expecting her eighth baby was solely to blame because she could not be persuaded to accept a hospital booking. In two cases, instead of the flying squad being summoned the patient was sent to hospital with retained placenta. In one case a midwife booked a patient with a history of retained placenta and failed to call the flying squad when this occurred again. In two further cases bad management by the hospital was the main factor.

In one case where the estimate of haemoglobin was low no action was taken by the doctor to treat anaemia.

All patients in this category were between the ages of 18 and 37. One was a primigravida, five were expecting their second baby, six their third, two their fifth and one her eighth.

Post-partum haemorrhage not associated with retained placenta

In 23 of the 46 cases in this group an avoidable factor was present. Seven of these were booked hospital cases. In six, the hospital staff failed to realize the serious state of the patient; transfusion was delayed and sometimes inadequate. In one case, antenatal anaemia was not treated, concealed accidental haemorrhage was not diagnosed and no blood was available for transfusion in advance. In one case death was due to an incompatible transfusion.

Among the remaining 16 cases, there were eight wrongly booked, five for home confinement and three for a maternity home. In one case only was a patient wrongly sent to hospital instead of the flying squad being sent for. In four cases there was undue delay in sending for the flying squad. In four cases antenatal anaemia was not treated. In five cases there was failure to realize the serious state of the patient. In one case the husband failed to call the doctor until too late and one patient who had made no arrangements and had not sought professional advice was dead before a doctor was called.

The age distribution was as follows :—

Age					No.
Under 30	..	..	..	..	21
30-39	..	..	..	..	20
40 and over	..	..	..	..	5
					—
					46
					—

Fourteen were primigravidae, 16 were having their second or third babies, six their fourth, one her fifth, three their sixth, four their seventh and two their eighth.

The Avoidable Factors in all deaths from haemorrhage

As in the deaths from toxæmia, the avoidable factors have been allotted to the individuals concerned. Again it must be pointed out that the consultant must accept responsibility for his hospital service. The general practitioner is responsible for deciding when to ask for the consultant's help and this is the point at which he is at risk of error whereas the consultant is not.

Responsibility for avoidable factors

General practitioner	..	..	..	..	..	32
Local Authority Medical Officer	..	..	..	..	..	2
Midwife	..	..	..	..	..	2
Consultant	..	..	..	..	..	15
Patient and her relatives	..	..	..	..	..	18
						—
						69
						—

In a lesser degree two or more of the above were jointly responsible in ten cases.

SUMMARY AND CONCLUSIONS

1. There were 130 deaths from haemorrhage of which 69 (53·1 per cent.) had avoidable factors. This compares with 220 and 138 deaths in the 1952-1954 and 1955-1957 reports of which 61·4 and 52·2 per cent. respectively had avoidable factors.

2. The remarkable drop in the number of deaths from post-partum haemorrhage with retained placenta noted in the 1955-1957 report has continued despite an increase in the number of births. Thus in 1952-1954 there were 53 deaths, in 1955-1957 there were 24 and in the present series there were 15 deaths.

3. The haemoglobin estimation was recorded in 48 per cent. of those patients dying from haemorrhage compared with 28 per cent. of cases in the previous report, and 36·9 of patients in the present series dying from all causes. Half the patients who died from haemorrhage and had had a haemoglobin estimation recorded showed a level of over 80 per cent.

4. PULMONARY EMBOLISM

The cases considered in this section are those shown in the International Statistical Classification (Appendix Tables 1 and 2) under No. 648 (other complications arising in pregnancy) where the embolism occurred during pregnancy, and No. 684 where the embolism occurred during labour or the puerperium. In the Reports on the Confidential Enquiry into Maternal Deaths 1952-1954 and 1955-1958 those cases where the embolism was associated with and not due to pregnancy were assigned to rubric No. 465. However, from 1958 the 1955 edition of the International Statistical Classification has come into use and all cases of pulmonary embolism during pregnancy are now included under rubric No. 648.

As in the previous reports, where the patient was dying from some other cause and the pulmonary embolism was the final incident, death has been ascribed to the actual cause of death. Thus, although pulmonary embolism was the immediate cause of death in 27 cases of Caesarean section (see Chapter 7) five cases have been excluded from this chapter as the embolism was considered to be the terminal event and not the true cause of death.

In the present series, the number of deaths ascribed to pulmonary embolism has fallen, although the number of women at risk has risen.

1952-54	..	..	..	..	138
1955-57	..	..	..	..	157
1958-60	..	..	..	..	132

They were distributed as follows :—

	1952-54	1955-57	1958-60
Deaths during pregnancy	4	17	30
Deaths following vaginal delivery..	104	114	80
Deaths following Caesarean Section	30	26	22

The rise in deaths during pregnancy may be due to better notification.

Deaths during Pregnancy

Again the 30 cases where death occurred during pregnancy present no consistent pattern. The duration of pregnancy varied between 8 weeks and term—

- 16 during the 1st trimester
- 3 during the 2nd trimester
- 11 during the 3rd trimester.

Ages ranged from 23 to 44 years with an average of 32. Parity ranged from one to seven. The importance of the second pregnancy noted in the last report (seven out of 17) was not confirmed in this series of 30 cases. Nine occurred in the first, four in the second, seven in the third, five in the fourth and five later.

In two cases there was a history of thrombosis in a previous pregnancy. In one of them, carefully watched, no clinical evidence of thrombosis was found and she died suddenly at 30 weeks. The source of the embolus was found post mortem to be the popliteal vein. Five other cases with varicose veins brought the total of cases in which past or present trouble was recorded to seven out of 30.

Of the remaining 23 cases, 11 were apparently healthy. Embolism was proved post mortem in all and the source found in ten ; four cases were under treatment for hyperemesis early in pregnancy, two had toxæmia, one developed pneumonia, one followed laparotomy for a tumour, one followed a threatened miscarriage. One patient had a history of old pelvic tuberculosis while two others complained of vague pains.

In four cases there was a record of haemoglobin estimation. Anaemia was mentioned once, a patient with haemoglobin of 71 per cent. was successfully treated before the embolism occurred.

In no case were anticoagulants used.

In 29 out of the 30 cases, a post mortem examination confirmed the diagnosis and the source of the embolus was found in 24.

An avoidable factor was found in one case only.

Deaths Occurring after Delivery

Deaths following vaginal delivery

There were 80 cases in this group.

In 43 there was no clinical reason to expect embolism. Pyrexia was present in four cases and five were suffering from anaemia successfully treated in four. Once again the records do not furnish enough positive information to establish a relationship between embolism and early ambulation, but again it is clear that the majority were walking about as would be expected in view of the time since delivery and a number had resumed normal duties when embolism occurred.

Because of venous thrombosis or a warning embolism prior to the fatal one, the possibility of a pulmonary embolism should have been anticipated in 32 cases. Four women had pyrexia and two were suffering from anaemia one of whom was successfully treated.

Table VII. Onset of fatal embolism

The figures in brackets are the number of cases confirmed by post-mortem examination.

Days after Delivery	Cases with no Warning		Suspected Cases	
	Present Series	1955-1957	Present Series	1955-1957
Under 24 hours	3 (3)	6 (4)	3 (3)	—
2-7 days	10 (9)	13 (11)	7 (5)	5 (3)
8-14 days	15 (11)	15 (13)	13 (5)	8 (3)
15-28 days	14 (11)	9 (6)	5 (1)	24 (12)
Over 28 days	1 (1)	5 (5)	4 (2)	9 (5)
Total	43 (35)	48 (39)	32 (16)	46 (23)

In the report for 1955-57 attention was drawn to the fact that where there was evidence of thrombosis under 30 per cent. died within two weeks of delivery while in those without clinical evidence of thrombosis 70 per cent. died within two weeks. This now appears to be of no significance as the corresponding figures in the present series are 72 per cent. and 65.1 per cent.

In three cases the embolism followed a surgical operation during the puerperium; one was laparotomy on the fifth day; one for sterilization on the sixth day and the third was dilatation and curettage for retained fragments of placenta on the 21st day.

The two remaining cases were a case of status epilepticus who died four hours after a normal delivery, and a case in which incompatible blood had been given followed by anuria.

Deaths following Caesarean Section

Twenty-two deaths from pulmonary embolism following Caesarean section are considered in this section of the report. In six cases, thrombosis was recorded. Death occurred within 24 hours of operation in two cases, within two to seven days in three cases, between eight and 14 days in nine cases, between 15 and 28 days in six cases and in two cases on the 36th and 47th days respectively.

Anticoagulant Therapy

Anticoagulants were used in nine cases after delivery. On one occasion treatment was instituted as a precaution in the case of a woman who had had thrombosis after a previous labour. Because of wound infection following Caesarean section, another patient was also treated as a precaution. In three cases anticoagulants were administered when thrombosis occurred and in four cases anticoagulants were given after embolism had occurred. Again there was no report of haemorrhage during treatment.

Anaemia

In 43 out of the 102 cases there is a record of one or more haemoglobin estimations having been made during pregnancy. In nine cases there was evidence of anaemia being present before delivery.

Avoidable Factors

Avoidable factors were considered to be present in 20 of the 102 cases which occurred after delivery. As in the previous report, these figures are of little significance and, in the main, related to the management of pre-disposing conditions.

Age and Parity of all patients who died from pulmonary embolism

Table VIII. Age distribution of deaths from pulmonary embolism compared with all registered births

Age						Deaths from Pulmonary Embolism		Total Registered Births
						No.	Per cent.	Per cent.
Under 20	..	..	..	..	..	6	4.5	6.2
20-24	..	..	..	..	..	18	13.6	30.4
25-29	..	..	..	..	..	35	26.5	31.2
30-34	..	..	..	..	..	28	21.2	19.3
35-39	..	..	..	..	..	31	23.5	10.2
40 +	..	..	..	..	..	14	10.6	2.7
Total	..	..	..	..	..	132	99.9	100.0

Table IX. Parity distribution of deaths from pulmonary embolism compared with all registered births

Parity							Deaths from Pulmonary Embolism		Registered Legitimate Live Births
							No.	Per cent.	Per cent.
1	..	..	..	..	..	..	48	36.4	38.6
2	..	..	..	..	..	..	27	20.5	30.6
3	..	..	..	..	..	..	17	12.9	15.6
4	..	..	..	..	..	..	14	10.6	7.4
5	..	..	..	..	..	..	9	6.8	3.6
6 +	..	..	..	..	..	..	14	10.6	4.2
Not stated	..	..	..	..	..	..	3	2.3	—
Total							132	100.1	100.0

SUMMARY AND CONCLUSIONS

1. Death was caused by pulmonary embolism in 132 cases of which 30 occurred during pregnancy, 80 followed vaginal delivery, and 22 followed Caesarean section.

2. Hæmoglobin estimations during pregnancy were recorded in 43 of the 102 cases where death occurred after delivery and there was evidence of anaemia in only nine.

3. The observation in the previous report that where thrombosis or other warning sign was detected, death occurred less commonly within 14 days of delivery than when the thrombosis was unsuspected, has not been confirmed.

5. ABORTION

During the years 1952-1954, 153 maternal deaths were considered to be due to abortion; in 1955-1957 this number fell to 141. In the present series the decline has continued and during 1958-1960 there were 135 deaths. The decrease was mainly due to a fall in the year 1959, when there were 35 deaths only compared with 53 in 1958 and 47 in 1960. A similar decline was noted by the Registrar General and was not therefore due to cases being missed by this enquiry. However, as stated in the previous report the number of missing cases tends to be higher among the deaths from abortion. As the number of patients who had abortions and did not die is unknown, it is not possible to say whether there has been any change in the actual death rate. However, if the number of abortions has increased in the same way as the total number of births, then it is probable that the death rate from abortions has declined.

Deaths following abortion have been considered under two headings, those following spontaneous abortion and those after procured abortion.

There was evidence that in 82 of the 135 deaths, i.e., in 61 per cent. of the deaths, the abortion was procured either by the patient herself, or by some other person. All cases were considered to have avoidable factors. These deaths are really a social rather than a medical problem. Very little of medical interest has been obtained from the forms received.

Table X. Age Distribution among deaths from abortion

Age	Procured Abortion		Other Abortions*		Total Abortions		All Births
	No.	Per cent.	No.	Per cent.	No.	Per cent.	Per cent.
Under 20	5	6.1	1	1.9	6	4.4	6.2
20-24 ..	20	24.4	10	18.9	30	22.2	30.4
25-29 ..	17	20.7	16	30.2	33	24.4	31.2
30-34 ..	15	18.3	13	24.5	28	20.7	19.3
35-39 ..	20	24.4	7	13.2	27	20.0	10.2
40-44 ..	5	6.1	6	11.3	11	8.1	2.7
Total ..	82	100.0	53	100.0	135	99.8	100.0

* Includes one case of therapeutic abortion.

Table X shows the age distribution among deaths following abortion. It can be seen that the smallest number occurs among patients under 20 years of age. However, under the age of 25 and between the ages of 35 to 40, a much higher proportion of the abortions are procured than between the ages of 20 to 35.

Table XI. Parity Distribution among deaths following abortion

Parity	Procured Abortion		Other Abortions		Total Abortions		Legitimate Live Births
	No.	Per cent.	No.	Per cent.	No.	Per cent.	Per cent.
1	12	17.9	10	20.4	22	19.0	38.6
2	14	20.9	13	26.5	27	23.3	30.6
3	18	26.9	7	14.3	25	21.6	15.6
4	5	7.5	8	16.3	13	11.2	7.4
5	8	11.9	4	8.2	12	10.3	3.6
6	2	3.0	3	6.1	5	4.3	1.9
7	5	7.5	1	2.0	6	5.2	1.0
8	1	1.5	1	2.0	2	1.7	0.6
9	1	1.5	1	2.0	2	1.7	0.3
10	—	—	1	2.0	1	0.9	0.2
11 +	1	1.5	—	—	1	0.9	0.2
Multip. unkn. . .	2	—	1	—	3	—	—
Not stated ..	13	—	3	—	16	—	—
Total ..	82	100.1	53	99.8	135	100.1	100.0

Table XI shows the parity distribution of all deaths following abortion. It can be seen that mothers who have had no, one or two babies contribute roughly similar proportions and there is a steady decline after this. However, 22 per cent. of deaths occurred among women who have had four or more children compared with 8 per cent. of the same group who had registered legitimate live births or 22 per cent. of "true" maternal deaths. Further detailed analysis of both age and parity groups produces rather small figures, suggesting that among the younger women the risk is greater with the smaller parities, but among the older women the risk is greater with the higher parities.

Marital status

Table XII shows the marital status of the patients who died following an abortion. Unfortunately the returns were incomplete and in nearly half it was not stated.

Table XII. Marital status of the patients who died following an abortion

	Procured abortions		Other abortions		Total
Married	23	..	23	46
Unmarried	24	..	7	31
Not stated	35	..	23	58
		82		53	135

If these figures are analysed according to age and parity, over half of the deaths from abortion following extra-marital pregnancy are among women under the age of 25 years. The parity distribution for this group is roughly similar to that of the total number of births in the country, but among the deaths from abortions in married women the number of primiparae is only about one-tenth of the total.

Spontaneous abortions

There were 53 cases of spontaneous abortion of which eight were considered to have avoidable factors. In 42 cases details were given concerning the pregnancy. Table XIII gives details of the length of gestation of these cases.

Table XIII. Length of gestation in the cases of spontaneous abortion

0-4 weeks	..	..	..	..	1
5-8 weeks	..	..	..	..	8
9-12 weeks	..	..	..	..	14
13-16 weeks	..	..	..	..	6
17-20 weeks	..	..	..	..	3
21-24 weeks	..	..	..	..	8
25-28 weeks	..	..	..	..	2
Total	..	..	..	..	42

Arrangements for confinements

Only eight cases had made any arrangements for their confinement—three had booked for home care and five for hospital. All eight patients were multiparae, four had had previous abortions, two had had a previous stillbirth and only in one patient were all previous confinements normal. Four of the patients died after haemorrhage which was followed by anuria in three of them. The remaining four women died from sepsis.

Of the eight cases, five deaths were considered unavoidable, two were doubtful and one had avoidable factors. This patient had had two previous normal confinements, but she was booked for hospital because of her home circumstances. She was admitted for two days for a threatened abortion and discharged with a haemoglobin of 77 per cent. ; six weeks later she was attended by her general practitioner and midwife having had a serious haemorrhage. She was nursed at home for four days and then sent to hospital by which time her haemoglobin was 19 per cent. Despite all attempts at resuscitation she died four days later after another severe haemorrhage.

No useful information could be obtained regarding the other cases of spontaneous abortion. The seven cases with avoidable factors were all due to the patient or relative who failed to obtain medical care.

SUMMARY AND CONCLUSIONS

1. 135 deaths were considered to be due to abortion of which there was evidence to suggest that 82 were procured. All these deaths were considered to have avoidable factors.

2. 53 deaths were due to spontaneous abortion of which eight were considered to have avoidable factors. Seven of these factors were due to the patient or her relative for failing to obtain medical care. In the remaining case the general practitioner and midwife failed to recognize the severity of the patient's illness. Eight cases only had made arrangements for their confinement.

6. CARDIAC DISEASE ASSOCIATED WITH PREGNANCY

In the present series there were 66 deaths as the result of cardiac disease which was present as a complication of pregnancy, compared with 121 in the 1952-54 enquiry and 102 in the second enquiry. Several matters of interest are noted below.

Age

The age distribution amongst deaths due to cardiac disease is shown in Table XIV and is compared with the distribution among all registered births. The picture is almost a duplicate of that shown in the previous reports. The added danger associated with the older age groups, to which attention had previously been drawn, has once more been ignored by those in charge of patients and it undoubtedly contributed to a number of maternal deaths. Emphasis on the necessity for making proper arrangements for a forthcoming confinement receives a special section in the present report. Table XIV shews the age distribution of deaths from cardiac disease but account must be taken of the progressive reduction in rheumatic fever over the past twenty years with the result that a smaller proportion of women at earlier ages will have rheumatic valvular lesions compared with those over 30.

Table XIV. Age distribution of deaths from Cardiac Disease

Age	Deaths from Cardiac Disease		Total Registered Births
	Number	Percentage	Percentage
Under 20	—	—	6.2
20-24	6	9.1	30.4
25-29	21	31.8	31.2
30-34	16	24.2	19.3
35-39	17	25.8	10.2
40 +	6	9.1	2.7
Total	66	100.0	100.0

Parity

Table XV shows the distribution of parity among deaths due to cardiac disease compared with the distribution among all registered births in 1958-60.

Table XV. Distribution of Parity among deaths due to Cardiac Disease

Parity	Deaths due to Cardiac Disease		Total Registered Births
	Number	Percentage	Percentage
1	16	24.2	38.6
2	19	28.8	30.6
3	15	22.7	15.6
4	7	10.6	7.4
5	3	4.5	3.6
6 +	6	9.1	4.2
Total	66	99.9	100.0

In 1952-54 the percentage of deaths from cardiac disease in first pregnancies was 50·4 per cent. and in the second series 38·2 per cent. In the present report the percentage in this group has fallen still further to 24 per cent., and this also may reflect the decline in the incidence of rheumatic fever in the last two decades. The proportion of deaths among the fourth and higher parities remains greater than the general distribution of births.

Nature of the Cardiac Lesion

The findings are virtually identical with those in the preceding reports. Post-mortem examinations had been made in the majority of cases. The nature of the Cardiac Lesion in the 66 cases was as follows :—

Rheumatic heart disease (including mitral and aortic valve disease)	54
Disease of the coronary arteries	4
Bacterial Endocarditis	4
Others	4
	—
	66
	—

Table XVI. Time of Death in relation to Confinement

	Number	Percentage
Died in Pregnancy	29	44
Died in Labour	11	17
Died within 24 hours of completion of labour	6	9
Died in puerperium (excluding first 24 hours)	14	21
Died at operation of Caesarean Section	6	9
Total	66	100

The time of death corresponds closely with the findings in previous reports.

As before, the present series confirms what seemed to be apparent from preceding reports, that death from acute heart failure may occur at any period of pregnancy. The figures for previous reports are given for comparison.

Table XVII. Duration of pregnancy when death occurred

Duration of pregnancy at which death occurred	1952-4	1955-7	1958-60	Total
16-19 weeks	4	9	2	15
20-23 „	6	8	6	20
24-27 „	7	9	6	22
28-31 „	9	9	7	25
32-35 „	7	9	3	19
36-39 „	7	7	5	19
Total	40	51	29	120

Treatment of Heart Disease in Pregnancy

In nearly one in ten the deaths from cardiac disease occurred at the time of Caesarean section but in no instance was an avoidable factor considered to be

present. The indications for operation were as follows :—

In one case a previous Caesarean section was the indication ; placenta praevia accounted for another, acute pre-eclamptic toxæmia for a third, post-maturity for a further three. One patient died at the time of operation for valvotomy and three other women had undergone this operation sometime in the past for mitral stenosis.

The Avoidable Factors

At least one avoidable factor was found to be present in 21 cases or in just under one-third of the total. In three other records the classification was that of doubtful, and these were classed as unavoidable, though in all three it was almost certain that trouble could have been avoided ; the records however lacked necessary information.

Deficient Antenatal Care

Again, as in previous reports, very poor antenatal care was noted in nearly half of the cases in which an avoidable factor was present. As the sole object of the Confidential Reports is to discover whether mistakes are committed which are preventable, it is only by their publication and appreciation that they will be made less frequently in the future. In each one of these patients valvular disease of the heart was known to be present or the diagnosis was correctly made when the patient first sought advice at the beginning of her pregnancy. Eight patients were under the care of a general practitioner and in two cases the hospital bore the responsibility. In the first group consideration did not seem to have been given to the desirability of seeking advice from a consultant physician, nor did it appear that the patient was told of the need for additional rest at any time during her pregnancy. One woman, with known mitral and aortic disease was indeed certified as being fit for a "nitrous oxide and air" anaesthetic. In the case of the two women whose care was the responsibility of a hospital, both were admitted to hospital and both were discharged home after a stay of varying duration. There was no mention in either case of shortage of hospital beds as an explanation for this. No arrangements seemed to have been made for any care or medical attendance on the women while at home and both were re-admitted twice in heart failure after a very short interval.

The Patient's Attitude

In six instances the patient was uncooperative and in this she was encouraged by her relatives. In all but one of these patients agreement for a home confinement proved to be most unwise. "Rest at home" is virtually impossible when the home contains a young family. These are the very women who had prevailed upon their doctors to be responsible for a domiciliary confinement. Doubtless the agreement was influenced by apparent normality of preceding pregnancies and labours, and in the mistaken belief that valvular disease of the heart is a static condition.

Arrangements for the Confinement

In at least eight instances arrangements for a domiciliary confinement, or for confinement in a small Maternity Home, were made. The unwisdom of this course is only too apparent from the following examples.

Domiciliary confinement was arranged for :—

1. A woman nearly 45 years of age who was pregnant for the fifth time and was known to suffer from valvular disease of the heart. Admittedly from the mechanical aspect her preceding labours had been uneventful but on the last two occasions she had developed quite severe pre-eclamptic toxæmia. Despite all these contra-indications she was booked for home confinement. She died of a recurrence of acute infective endocarditis.

2. A woman of 35, with known valvular disease of the heart was to be confined in a small Maternity Home. Whereas the three previous pregnancies had been normal from the purely obstetric aspect, "abnormal tiredness" had been noted. No attempt was made to obtain a Consultant's opinion. Induction of labour was performed for post-maturity. The baby weighed less than six lbs.

Confusion of Responsibility

The deaths of three women seemed to be directly the result of confusion of responsibility. Again the responsibility for the care of the patient when she was not an in-patient in the hospital was not clearly determined. Obviously the midwife could not be held to be responsible for the welfare and observation of a pregnant woman suffering from cardiac disease. It appeared that the patient's doctor and the Medical Officer of the Local Health Authority Antenatal Clinic each believed the other to be accepting responsibility, or alternatively both assumed that the hospital had made provision.

Failure to follow up the non-attendance of a patient

The risks present in four cases would have been less if immediate steps had been taken to find out the reason why a patient failed to attend at an Antenatal Clinic on her scheduled date. Two of these were the responsibility of a hospital and the remaining two that of a local Health Authority Antenatal Clinic.

Typical examples are :—

1. A woman aged 35 who was known to suffer from valvular disease of the heart had been booked at a hospital for her second confinement. She attended regularly and was last seen at the calculated 22nd week of pregnancy. She was noted to be "ill" and was sent home to "rest in bed", and told to report in one week's time. This appointment she failed to keep and death occurred five days later.

2. In the second case, antenatal care was shared between hospital and local Health Authority Antenatal Clinic. A mother of three children and in the fourth decade of her life it was improbable that the patient would have been able to take adequate, if any, rest. Her date of attendance at about the 29th week came and went and seven days later death occurred suddenly from acute heart failure. Subsequent inquiries elicited the information that she "had not been herself" for the preceding few days.

Failure to seek Antenatal Care

There were two instances in which a woman who suffered from cardiac disease either wilfully concealed her pregnancy or made no attempt to inform her doctor. In both death from acute heart failure occurred in pregnancy.

SUMMARY AND CONCLUSIONS

1. For the second time there has been an appreciable decrease in the number of pregnant women in whom death occurred as the result of cardiac disease.
2. Of 66 women whose deaths were believed to be due to cardiac disease which was present as a complication of pregnancy, in at least 21 instances, 32 per cent., an avoidable factor was considered to be present.
3. Among the 66 deaths of women known to be suffering from cardiac disease there were 15 cases which did not receive any hospital care. No effort should be spared by all concerned to convince any pregnant woman who is suffering from cardiac disease that hospital care and responsibility is her chief safeguard.
4. The danger of the operation of Caesarean section in pregnant women suffering from cardiac disease is again demonstrated.

7. CAESAREAN SECTION

The number of deaths associated with but not necessarily due to Caesarean section was 130 compared with 183 in the first and 184 in the second report. The reduction in the actual number of deaths is considerable. The estimated percentage of Caesarean sections for all births has risen as well as the number of births, but the death rate per 1,000 Caesarean sections has fallen very considerably. This is shown in Table XVIII which lists the estimated number of Caesarean sections and the rate.

Table XVIII. Estimated number of Caesarean sections and the death rate

	1957	1958	1959	1960
Total births in N.H.S. Hospital	448,176	457,206	464,293	490,622
Total births in non-N.H.S. Hospital ..	27,620	26,765	26,384	27,186
	475,796	483,971	490,677	517,808
Percentage of Caesarean sections in N.H.S. Hospital (In Patient Sample)	3.8	3.9	4.4	4.5
Estimated number of Caesarean sections in all hospital deliveries	17,950	18,680	22,630	23,300
Total births in England and Wales	739,996	757,003	764,402	800,824
Percentage of Caesarean sections for all births	2.4	2.5	3.0	2.9
Deaths from Caesarean section (true maternal and associated deaths)	60	46	46	48
Estimated number of deaths per 1,000 Caesarean sections	3.3	2.5	2.0	2.1

As in the previous reports the estimate of the number of Caesarean sections performed each year and the death rate are based on the assumption that the number of Caesarean sections per 1,000 confinements found from the Hospital In-patient Enquiry conducted by the Ministry of Health and the General Register Office can be applied to all hospital deliveries.

Because of lack of information and other reasons it was not possible in previous reports to comment fully on all the deaths which occurred. In this Report sufficient information was available for all deaths from Caesarean section to be included.

Immediate Cause of Death

The following table gives the immediate cause of death in the present series. As has previously been the case the list of causes does not correspond with those given in the Appendix Table 1 in which many deaths following shortly after Caesarean section are classed to the condition for which the operation was undertaken.

Table XIX. *Caesarean Section*

Avoidable factor distribution according to immediate cause of death.

Immediate Cause of Death 1958-60	All Deaths		Death with Avoidable Factors	
	No.	Per cent. Distribution	No.	Per cent. with avoidable factors
Haemorrhage and shock	57	43.8	32	56.2
Pulmonary Embolus	27	20.9	2	7.4
Sepsis	23	17.7	6	26.1
*Toxaemia of pregnancy	9	6.9	—	—
Valvular disease of the heart ..	3	2.3	—	—
Anaesthetic death	5	3.8	1	20.0
Other causes	6	4.6	—	—
Total	130	100.0	41	31.5

* Called "Generalized toxic necrosis" (a term used generally by pathologists) in the previous report.

The table overleaf is comparable with Table XV on page 31 of the 1955-1957 report. Table XX below shows the changes in the percentages—for easy comparison—of the various causes of death and the percentage of deaths with avoidable factors for each cause.

Table XX. *Proportion of deaths according to the immediate cause*

	All Deaths			Deaths with avoidable factors		
	1952-54	1955-57	1958-60	1952-54	1955-57	1958-60
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Haemorrhage and shock	37.1	24.4	43.8	33.8	34.1	56.2
Pulmonary embolus	18.3	18.3	20.9	12.5	30.3	7.4
Sepsis and Ileus	14.9	16.7	17.7	38.5	36.7	26.1
Valvular disease of the heart	3.4	8.3	2.3	— A	26.7	—
Cerebral haemorrhage	— B	5.6	—	— B	10.0	—
Toxaemia of pregnancy	— B	6.1	6.9	— B	63.6	—
Anaesthetic deaths	6.9	6.1	3.8	41.7	36.4	20.0
Other causes	19.4 C	14.4	4.6	27.5 D	3.8	—
Total	100	99.9	100.0	29.7	29.4	31.5

A. Figures are not available for the 1952-1954 report.

B. These figures are included with "Other Causes" for 1952-1954.

C. Figures marked B are included with this figure.

D. Figures marked A and B are included with this figure.

As before, deaths stated to have been caused by haemorrhage and shock have been classed together, for in the latter blood loss was nearly always noted to have been excessive. The percentage of deaths following the operation of Caesarean section associated with haemorrhage show a considerable increase when compared to previous reports; this will receive more detailed consideration.

The proportion of deaths caused by pulmonary embolus remains remarkably constant at a figure of about 20 per cent., and deaths from sepsis (death from ileus was not certified as having occurred on any occasion) remain at a figure of about 17 per cent. On four occasions it was considered that the death resulted directly from the anaesthetic as the result of inhalation of vomited material.

Out of 41 cases in which at least one avoidable factor was present, 32, that is four out of every five, died from loss of blood. In many cases more than one avoidable factor was apparent. Of the thirty-two cases, a hospital was responsible for the confinement in only seven. Of these, a note was made, in two instances that no blood was available and in a third that transfusion was done with incompatible blood. It is difficult to understand why arrangements for blood were not made when a Caesarean operation was decided on. The remaining cases have already been mentioned in other sections, and in them it would seem that an important contributory factor was a failure on the part of those responsible to appreciate the seriousness of the condition.

Eleven of 25 of these women had arrangements made for the confinement to take place at home, and the remaining 14 in a Maternity Home. In seventeen cases at least, such arrangements were certainly unwise and contributed materially to the maternal death. In at least two the error constituted the direct cause of a fatal issue. Of the twenty-five cases, three women were over the age of 40, twelve between 35-40, and five, all grand multiparae, between 30-34. Only five were under the age of thirty.

A similar picture is presented when the parities of these women are considered. Twelve women were grand multiparae, seven pregnant for the sixth time, one for the seventh and two each for the eighth and ninth occasion. In addition, many of these women gave a history of illness in previous pregnancies, of difficulty in previous labours or of severe post-partum haemorrhage. Each of the five cases in the lower age and parity group gave a history of previous and sometimes serious trouble in a previous confinement. Thus, in them, pregnancy had been complicated by antepartum haemorrhage on four occasions, and by pre-eclamptic toxæmia on three others. Three women had previously given birth to a dead baby and in six others labour had been unduly lengthy and terminated either by a difficult forceps delivery or by extraction of a foetus lying transversely or presenting by the breech. Five women had previously suffered from excessive blood loss during or after the third stage of labour. The worst example was a woman over forty years of age, pregnant for the eighth time, whose previous confinements had been anything but straightforward, who had previously had Caesarean section performed and whose confinement was planned to take place in a small Maternity Home. She developed a sharp antepartum haemorrhage for which the doctor performed "an emergency Caesarean section". Her condition at the time of operation was noted to be bad and no blood was available.

Indeed, the condition of the patient immediately prior to operation was recorded to have been definitely poor in fifteen out of these twenty-five cases. Seven women were in a state of exhaustion, having been in labour for an unduly lengthy period. In some cases unsuccessful attempts had already been made to deliver the baby with the forceps at home, or on arrival at hospital, or both.

Six others had suffered from antepartum haemorrhage and no steps seem to have been taken to restore the blood loss. It would appear that the natural anxiety to empty the uterus as quickly as possible caused the serious general condition of the patient to be overlooked. One woman probably succumbed to a very prolonged anaesthesia and in the remaining case the operation was performed on a woman while she was in a state of eclamptic coma.

Deficient ante-natal care was apparent also in this group. Three women who had noticed slight antepartum bleeding were "sent home to rest". Three others in whom pre-eclamptic toxæmia had been discovered, received similar advice. A woman in whom "severe anaemia" had been observed in pregnancy did not appear from the records to have received any treatment.

In at least four cases criticism could be made of the technique employed at the operation and of the experience and skill of the surgeon, though in no case were these matters assessed as constituting an avoidable factor. Nonetheless the wisdom of proceeding to perform salpingectomy, when at the same time excessive blood loss was noted to be occurring, could at least be questioned and such was noted in two records.

Lastly, in only one of these twenty-five cases was there any evidence that help had been sought from a Consultant or from the Flying Squad and on that occasion the call went out far too late. Even accepting the unsuitable arrangements for the confinements of the majority of these women, a call for help made at the appropriate time would almost certainly have given a very different result.

Indications for operation

The following analysis is presented giving the indications for operation and the cause of death under each heading.

<i>Indication for operation</i>		<i>Cause of Death</i>	
Pre-eclamptic toxæmia 21 cases	..	Diffuse toxic necrosis ..	9
		Pulmonary embolus ..	7
		Sepsis	2
		Collapse at operation ..	1
		Haemorrhage	1
		Cerebral haemorrhage ..	1
Uterine inertia 20 cases	..	Haemorrhage	9
		Sepsis	6
		Pulmonary embolus ..	4
		Collapse at operation ..	1
Placenta Praevia 17 cases	..	Haemorrhage	16
		Pulmonary embolus ..	1
Post-maturity 8 cases ..	..	Collapse at operation ..	3
		Pulmonary embolus ..	3
		Sepsis	1
		Haemorrhage	1
Foetal distress 8 cases..	..	Sepsis	4
		Pulmonary embolus ..	1
		Haemorrhage	1
		Heart failure	1
		Suicide	1

Other indications for operation were failed forceps seven, repeat Caesarean section six, disproportion five (planned operations), concealed antepartum haemorrhage five, external antepartum haemorrhage four, prolapse of cord four, unstable lie four, diabetes two, fibroids two, carcinoma of rectum two, and on one occasion for each of the following :—breech presentation, valvular disease of the heart, a poor obstetric history, rising antibody titres, rupture of spleen, splenic aneurism, spontaneous pneumothorax, muscular dystrophy, nephritis, poliomyelitis, carcinoma of cervix, cerebral tumour and finally for “a small foetus”.

Toxaemia of pregnancy

In those cases in which operation was performed for acute and severe toxaemia of pregnancy, the pathologist found at autopsy that the cause of death in the majority was what was described as diffuse toxic necrosis, the changes being present especially in the liver and kidneys, but noticed also in the heart and uterine musculature.

Uterine inertia

In at least 14 out of the 20 cases under the heading of uterine inertia, labour had been induced and induction had been followed by painful, irregular and ineffective contractions. Too often no details are given as to the method used to induce labour. Either induction of labour is a procedure more frequently adopted than is generally recognized, or alternatively, it is potentially a factor to be considered more seriously as one that may influence maternal mortality. During the year 1959 in the Hospital In-patient Enquiry it was found that 11·3 per cent. of all hospital deliveries had a surgical induction—23·8 per cent. of all forceps deliveries followed surgical induction and 27·8 per cent. of all Caesarean sections deliveries. Spontaneous delivery followed in 72·0 per cent. of all cases induced. Other points of interest are that 40·4 per cent. of all cases of toxaemia were surgically induced. 17·1 per cent. of all cases of sepsis had been surgically induced and 4·0 per cent. of all induced cases had sepsis compared with 2·5 per cent. of non-induced cases. Certainly in each of the three Confidential Reports on Maternal Mortality induction of labour is frequently noted and a special study may be justified in any subsequent analysis.

Placenta Praevia

Again, as in previous reports, the cause of death in cases of placenta praevia treated by Caesarean section was found to be haemorrhage. From the individual records of these patients it would seem that more attention could be paid to the making of proper arrangements for the confinement at the time of booking and that there must be a greater appreciation of the significance of even slight bleeding in the later weeks of pregnancy. Outstanding in these cases was the failure to summon expert help or seek consultant opinion before arranging transfer to hospital. In the majority the operation had to be performed as an emergency, or at least as a matter of urgency, at or near term. Earlier diagnosis and earlier admission to hospital might well have allowed the operation to have been arranged two or three weeks before term, in the absence of bleeding and on a patient properly prepared and in good state of health.

SUMMARY AND CONCLUSIONS

1. A survey has been made of 130 deaths following Caesarean section. The calculated maternal mortality following the operation for the country in 1959 was probably about 2.0 per 1,000 Caesarean sections compared with 3.5 in 1955. The actual number of deaths has shown an appreciable drop, from 180 in 1952-1954 to 130 in this present series.

2. In approximately one-third of the cases in this series one or more avoidable factors were present.

3. The avoidable factors were not to be found so much in the actual performance of the operation as in the events which preceded the operation. These would seem to be quite clear and can be listed as follows :—

- (a) Grave mistakes made in the initial arrangements for the confinement.
- (b) Deficient pre-natal care. This was seen in those women whose operation was undertaken because of a severe degree of pre-eclamptic toxæmia. Too often the case had been watched at home and transfer to hospital arranged far too late. Antepartum bleeding did not seem to be treated as an indication for either the summoning of an expert opinion or a request for help from the Flying Squad.
- (c) The serious significance of delay in labour was apparently unrecognized. Some patients were sent to hospital when it would have been wiser to ask for assistance to come to them in their own homes or to the Maternity Homes. The value of expert opinion or of the Flying Squad in the cases under review does not seem to have been appreciated.
- (d) Exactly similar, but more emphatic, comment could be made on the adverse effect of repeated failure to effect delivery either by manipulation or with the use of the obstetric forceps. All such procedures are likely to produce some degree of shock and are accompanied by prolonged anaesthesia thus prejudicing the state of a woman for whom delivery by Caesarean section becomes necessary.
- (e) In hospital, and especially when the indication for Caesarean section is the occurrence of antepartum bleeding, there has been too little attention paid to the restoration of the blood volume before operation, or inadequate preparation has been made to replace blood that might be lost in very considerable amounts during and immediately after operation.

4. The operation of Caesarean section is one that demands an experienced surgeon or at least supervision by such a person. Neither the decision that the operation is indicated, nor the actual performance of the operation, should ever be the responsibility of a relatively junior medical officer, or indeed of any doctor who has not had considerable experience of such work.

8. DEATHS DUE TO COMPLICATIONS OF ANAESTHESIA

The improvement apparent in the last report has not been fully maintained.

Deaths due to complications of Anaesthesia

	1952	1953	1954	1955	1956	1957	1958	1959	1960
Avoidable ..	—	—	—	11	8	5	12	7	5
Unavoidable ..	—	—	—	1	3	3	1	2	3
Total ..	15	15	19	12	11	8	13	9	8

In the period 1958–1960 there were four cases about which there was insufficient information for any conclusion to be reached.

Inhalation of Stomach Contents

Inhalation of vomited or regurgitated stomach contents continues to be the commonest cause of death. It accounted for 17 of 30 cases. In one of these, where the patient was moribund from haemorrhage due to incomplete abortion, death was considered unavoidable. In another patient who vomited, this was the probable cause of death though the information was so meagre that it was classed as doubtful.

Inhalation during forceps delivery	10 (1955–7 : 10)
Inhalation during Caesarean section	4 (1955–7 : 6)
Inhalation during completion of abortion ..	2
Inhalation during dilatation of cervix	1

Intubation of the trachea does not appear to have been planned in any of these cases though after vomiting had occurred it was carried out in two. In no case where vomiting was reported had anything been taken by mouth for many hours before the incident. In one patient who had not had a meal for three days, solid food was found in the stomach at post-mortem. The only safe assumption in any parturient woman is that the stomach is full. The passage of a stomach tube will not guarantee emptying but it will reduce intragastric pressure and make vomiting and regurgitation less likely. Its routine use is not generally accepted as it usually proves unnecessary but, if it is as effective as it is thought to be routine passage of a tube should reduce deaths associated with anaesthesia.

In one case the anaesthetic mask had been strapped to the patient's face, contrary to instructions : this patient vomited and died immediately of asphyxia. In two cases the fatal vomiting occurred during recovery from anaesthesia. In one of these, a schizophrenic woman taking 200 mgm. chlorpromazine a day, reflex depression from this may have played a part.

Mendelson's Syndrome

Of the patients who died from inhalation of vomitus, 11 developed Mendelson's syndrome. This results from the inhalation, often of quite small quantities, of regurgitated stomach contents and the incident may pass unnoticed by the unobservant. There follows a period, perhaps of a few hours, when the patient may have recovered consciousness and appear well before the sudden onset of severe pulmonary oedema and peripheral circulatory failure. Death follows

within a few minutes or up to an hour or two afterwards. Recently parturient women seem to be particularly susceptible to this and Hausmann and Lunt think it may be associated with failure of adrenocortical response as a result of suppression of functions during pregnancy by hormones secreted by the placenta. It is not known how many women inhale vomit during labour without serious harm ensuing ; they may well be the majority. Nevertheless it seems that little or nothing was known about this condition or about its treatment.

Review of these cases suggests that if every woman for forceps delivery under general anaesthesia in the lithotomy position had a cuffed tube passed into her trachea by a competent anaesthetist this complication might be prevented (two patients died after attempts at intubation which proved too difficult for the anaesthetist in charge).

Delivery in the lateral position might be a possible alternative since the lithotomy position with full flexion of the lower limbs is more likely to favour regurgitation than any other posture, and is thus best avoided during induction and recovery. Pudendal nerve block for forceps delivery might also avoid this hazard.

When inhalation of stomach contents has occurred suction is needed to clear the air passages.

Any woman who has vomited during delivery needs to be watched closely for some hours, even if she has recovered consciousness and appears well.

Anaesthetic Agents

Three patients died after receiving chloroform. One died suddenly when under treatment by a flying squad for retained placenta. No anaesthetic apparatus was available. The second had anaesthesia induced with chloroform-ether mixture, followed by ether, and died at the beginning of attempted external version, in her own home. The third died, in spite of adequate treatment in hospital, from extensive lacerations and haemorrhage. She was found to have acute liver atrophy and kidney necrosis which were thought not to be due to the chloroform given for attempted forceps delivery in her home.

Two patients died after halothane. One was given halothane in an open mask to the point of apnoea : she died of asphyxia two minutes later. The other was given thiopentone, followed by halothane, and appears to have died suddenly though the manner of death was not specified. Since halothane is also capable of producing marked reduction in uterine tone, with an increased risk of post-partum haemorrhage, these cases indicate the advisability of limiting its use in obstetrics to the skilled anaesthetist who is fully cognizant of its dangers as well as its advantages.

One patient with toxæmia and chronic anaemia died after the intravenous injection of 2.5 mg. neostigmine, preceded by 1.2 mg. atropine, to reverse curarization. Two patients failed to recover from the effects of tubocurarine given for Caesarean section. In one the cause seemed obscure ; the other appears to have been a case of true neostigmine-resistant curarization, though her general condition gave no reason to expect this.

The two patients previously mentioned died after difficult and traumatic tracheal intubation. One death was judged unavoidable. In the other case, inflation down the tube produced extensive surgical emphysema, the patient became cyanosed and died. In two others misplacement or kinking of the tube caused asphyxia which contributed to their deaths.

Local Anaesthetic Agents

Two deaths were associated with the use of lignocaine. One patient had a caudal epidural injection of 30 ml. containing 375 mg. lignocaine, 39 mg. amethocaine and 1:200,000 adrenaline, which produced only partial relief from pain. Half an hour later pain became severe and a further injection was made of 20 ml. containing 150 mg. lignocaine, 10 mg. amethocaine and 1:200,000 adrenaline. This was followed immediately by generalised convulsions which ultimately proved fatal. This was almost certainly the result of an overdose by present standards, the total being 525 mg. lignocaine and 49 mg. amethocaine, though within the limits acceptable at that time. The accepted maximum dose of lignocaine has been progressively reduced over the years as similar cases have been reported and is now 500 mg. in 0.5 per cent. solution for infiltration and the maximum dose of amethocaine is 100 mg. The current notion that the virtually identical side-effects of lignocaine and amethocaine are not additive because the method of elimination of the two drugs are different, is perhaps ill-founded. The second patient, a woman with pyelonephritis and toxæmia, collapsed and died half an hour after the injection of 2 per cent. lignocaine (amount not specified) for pudendal nerve block for forceps delivery. This case was classified as doubtful, but **it is thought unnecessary to use stronger than 0.5 per cent. lignocaine for this purpose.**

The Administrators of the Anaesthetic

There is insufficient information to show if there has been a change in the picture presented in the last report.

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9. OBSTRUCTED AND ASSISTED LABOUR

In the Second Report on Confidential Enquiries into Maternal Deaths in England and Wales, 1955-7, two short sections, Nos. 9 and 10 were devoted to sudden death in labour and rupture of the uterus respectively. Consideration of the cases that were included in these sections immediately suggested that insufficient attention may have been given in the past to maternal deaths following abnormal and assisted labour, and that in any further series an inquiry into this matter might be productive of valuable information.

From the case records in the present series the notes of some 115 cases were investigated, in all of which labour had been abnormal or in which assistance had been necessary. Out of this number 43 cases were extracted in which definite obstruction occurred in labour. Not included in this latter group are a number of instances in which the completion of the birth of the baby was effected by a very low forceps delivery the indication for which may have been a somewhat unyielding perineum or maternal illness (for instance there were women who were suffering from valvular disease of the heart, from myasthenia gravis, from megaloblastic anaemia, three were in coma, etc.). These cases were not in fact cases of obstructed labour, but of assisted labour.

Of the 43 cases of obstructed labour, the patient was under the care of a hospital in ten instances, general practitioners were in charge of 32 of whom 18 were delivered at the patient's own home and 14 in a general practitioner Maternity Home. In one case no arrangements had been made prior to the confinement.

Obstructed Labour : Hospital booked cases

Maternal death occurred on ten occasions where the obstruction and delivery occurred in hospital. In each instance the patient had been under the care of the hospital throughout her pregnancy. On seven occasions repeated attempts had been made to effect delivery with the aid of the obstetric forceps. In three of these patients a stillborn baby eventually was delivered, but death occurred either during labour from shock and collapse, or immediately after from uncontrollable haemorrhage. Two other babies, both stillborn, were delivered finally by Caesarean section, the death of the mother occurring at the time of operation. In five cases rupture of the uterus had occurred during the lengthy attempts at forceps delivery. In four of these, laparotomy had been performed as soon as the diagnosis had been made, in two instances before delivery of the baby, and in two instances after the delivery of the placenta. The cause of death was usually noted as being due to shock or haemorrhage but one woman lived for three days to die of septicaemia due to *Cl. Welchii*.

Three cases perhaps deserve brief descriptions. The first was that of a woman in her fifth pregnancy. Previous labours had always been difficult and on the last occasion Caesarean section had been performed. The presence of a minor degree of pelvic contraction had been diagnosed, but a trial of labour was decided upon. The scar of the previous operation gave way and death occurred. No avoidable factor was considered to be present as the decision had been arrived at after a full appreciation of the facts of the case.

The next two cases however fall into a different category. The first, a young woman who had previously had a difficult forceps delivery was found in her second labour in hospital to have "an impacted shoulder" presentation. The foetal heart could not be heard and Caesarean section was performed. Death occurred from haemorrhage. The second of these patients, in her fourth pregnancy, was found during labour to have the foetus presenting by the breech. External cephalic version was attempted late in labour by a junior doctor, on his own responsibility and resulted in rupture of the uterus.

In the seven cases in which for various reasons, death occurred following or during attempted delivery with the forceps, a House Surgeon was the responsible medical officer on five occasions and a "locum Registrar" in the remaining two cases. In these cases it was not recorded that a more experienced medical officer was present at any stage. Indeed, in two of the reports, the Consultant makes the observation to the effect that he wished he had been informed of the case before disaster had occurred. **Nevertheless responsibility must rest upon the Consultant** in such cases to ensure that the organization of the department is such as to prevent the assumption of too great responsibility by juniors. Explicit instructions may indeed be broken, but there should be no doubt in the junior's mind of their intention.

The parity of these women is worthy of note. In only two instances did the obstruction occur in a first labour, the remaining parities being two, three, six, seven and ten. In nearly every case previous deliveries had been completed with more or less difficulty on more than one occasion, and in the case of the ten-para, every single one of her babies had been delivered with the aid of the forceps.

Obstructed Labour : Confinement at home or in a Maternity Home

Analysis of the 33* cases in which obstructed labour seemed without doubt to have been the cause of death and where arrangements had been made for the confinement to take place at home (18), or in a general practitioner Maternity Home (14), is certainly productive of information from which lessons may be learned that could lead to some further reduction in maternal mortality and a concurrent but much greater reduction in maternal morbidity and perinatal mortality. It is solely for these reasons that this account is submitted.

Obstruction in labour occurring in the patient's own home

Of the 18 cases in which this happened, transfer to hospital was arranged on ten occasions. In only one case a Consultant was called to see the patient before transfer ; in none was the flying squad called.

Consideration will first be given to the ten patients who were transferred to hospital. In six women the forceps were applied in an attempt to overcome the obstruction and the application was repeatedly made after varying intervals by the patient's doctor. Delivery of the baby was not successful. On arrival at hospital the general physical state of all these women was far from satisfactory. In two instances arrangements were made for Caesarean section but in neither case did the patient survive the operation. Foetal death had occurred in utero.

* Included in this group, making 19 in all, is the patient for whom no arrangements had been made for the confinement.

In the remaining four women, further attempts were made in hospital to deliver the baby with the forceps. On two occasions the House Surgeon was successful, but the baby was stillborn. Fatal sepsis caused death of the mothers within a space of a few days. In the case of the remaining two women, collapse and death occurred at the actual time at which the House Surgeon was vainly trying to complete the delivery. Post-mortem examination in both cases showed that rupture of the uterus had occurred.

In each of the above cases the contra-indications to a home confinement were clear. Three women were over 40 years of age and the others over 30. All except two were pregnant for the fifth or more time. Three gave histories of considerable difficulty in previous confinements and one woman had had a hydatidiform mole in her last pregnancy. In one case in which between the unsuccessful attempts to deliver the baby with the forceps in her own home and the woman's arrival at hospital, a hand had appeared below the foetal head, the House Surgeon "was instructed to perform internal podalic version". In the last case, in spite of a correct diagnosis having been made of a contracted pelvis, "trial of labour" at home was planned.

The remaining five cases in which obstruction of labour occurred in the patient's own home and for which transfer to hospital was arranged can be described briefly as follows :—

- (a) Aged 23, five-para, previous labours complicated by malpresentation. Emergency admission as a shoulder presentation. Subsequent delivery very difficult and was followed by severe post-partum haemorrhage.
- (b) Aged 42, four-para. Antenatal care appeared to have been the responsibility of the midwife. At the onset of labour an arm prolapsed. Patient's doctor was phoned and he arranged for an ambulance. The patient arrived at hospital moribund. Rupture of the uterus had occurred.
- (c) Aged 26, first pregnancy. Labour started several days later than was expected. After four days in labour, an attempt to assist with the forceps resulted in the delivery of the foetal head. Efforts to deliver the shoulders failed and arrangements were made to transfer the patient to hospital. A stillborn baby weighing over 10 lbs. was eventually delivered. Infection with *Cl. Welchii* followed.
- (d) Aged 23, first pregnancy. Developed pre-eclamptic toxæmia but was kept at home. Labour prolonged and finally under chloroform anaesthesia several unsuccessful attempts were made to complete delivery with the forceps. The patient was then transferred to hospital where, on arrival, the uterus was described to be in a state of tonic contraction. Subsequent delivery of the baby was most difficult and was followed by virulent sepsis.
- (e) Aged 18, first pregnancy. After 36 hours in labour repeated attempts at forceps delivery succeeded in the delivery of a baby weighing over 10 lbs. The baby arrived face to pubes and there was a complete tear of the perineum. The patient was then removed to hospital with the placenta in utero. Subsequent haemorrhage was fatal.

Death due to obstructed labour occurred in eight instances when the woman was confined in her own home and was not transferred to hospital. It is considered that a brief description of these cases provides valuable lessons.

In five of these women the cause of obstruction appeared to have been due to a malposition of the occiput, in two others, to a shoulder presentation with prolapse of the arm, and in the remaining case, to a "rigid cervix". In spite of the stated cause of the obstruction in the last case its inclusion in this group may not be correct. As, however, several unexpected features are present a short summary is given.

The woman, nearing 40 years of age was expecting her 14th baby. She seems to have been difficult to manage, but agreement was reached that her confinement should take place in her home. All went well until the later weeks of pregnancy when she developed symptoms of a not too severe concealed accidental haemorrhage for which treatment with pitocin was started. Although it was believed that this resulted in the onset of labour, cervical dilation was slow and "obstructed labour" was diagnosed. This was dealt with by perforation of the foetal skull with subsequent extraction. Violent and uncontrollable loss of blood occurred.

In two other cases, obstruction was due to a shoulder presentation with prolapse of the arm. Both were multiparae over 30 years of age and both had experienced abnormal labours in the past. In one, a most difficult extraction of the baby by the general practitioner was followed by a fatal loss of blood. In the second patient, antenatal care seemed to have been irregular and the midwife arrived to find "both arms hanging out". Following prolonged efforts by the patient's doctor, a stillborn baby was eventually delivered and the patient survived for several days. Post-mortem examination showed that the uterus contained a considerable portion of the placenta.

In the remaining five cases, labour became obstructed owing to a malposition of the foetal skull. Delivery was effected or attempted in each case with the obstetric forceps and in two of these cases there was prolonged administration of chloroform. The flying squad was summoned to one patient, but the call for help was sent too late. Lastly, a multipara in her thirties, the births of all whose babies had been difficult and necessitating assistance, was booked for confinement in her home. Obstructed labour occurred in the second stage and several lengthy attempts to deliver the baby were made by the doctor with no success. Internal podalic version was then attempted. A call for help was sent too late when the patient had collapsed.

Obstructed labour occurring in cases booked for confinement in a Maternity Home

There were 14 such cases and in three instances, following unsuccessful and repeated attempts at delivery, transfer to hospital was arranged. Two women were delivered, by Caesarean section, of dead babies, one mother succumbed at the operation and the other died of sepsis a few days later. The remaining patient died during attempts by the House Surgeon to deliver the baby with forceps; subsequent examination showed that rupture of the uterus had occurred.

Death of the remaining 11 women occurred in the Maternity Home and in all these cases the obstruction in labour appeared to have been caused by a malposition of the occiput. In order to try to overcome an obstruction in labour caused in these patients by a posterior or lateral position of the occiput, forceps were used with most variable success. In all but two instances the baby was stillborn, and a successful rotation to an occipito-anterior position is noted on only two occasions. In nearly all these women the preceding labour had been unduly lengthy, although five of the patients were in their early twenties and in them a quick and easy labour might have been expected. Four others, multiparae, who were over 30 years of age, had had reasonably straightforward confinements in the past. In both groups a long first stage of labour, to which was added delay in progress in the second stage of labour, was a clear warning that something was seriously wrong. However, as already stated, attempts were made to assist these women with forceps. On no occasion was there any record that help had been summoned from a Consultant or from a flying squad. Six women died undelivered or immediately after the delivery of the dead baby. The cause of death was usually certified as being due to shock. Post-mortem examination was made in only two cases. A specialist anaesthetist was noted to be present on only one occasion. The Matron of the Maternity Home gave chloroform to another woman whose labour was followed by severe post-partum haemorrhage which failed to respond to all the usual remedial measures. This is not surprising as the post-mortem examination showed an unsuspected acute inversion of the uterus.

In five of the 11 cases, labour had been induced—post-maturity seemed to be the indication—and inertia was most marked in these cases.

Three cases stand out as unusual and perhaps a more detailed account of the several avoidable factors which were present is justified.

Arrangements were made for a woman, five-para, in her late thirties to be confined in a Maternity Home. Previous confinements had not been normal, indeed the last one had been complicated by placenta praevia. Toward the end of the first stage of labour the nursing staff, noticing an unusual amount of bleeding, informed the doctor by telephone and he ordered an injection of pitocin. As the bleeding continued the procedure and the advice were repeated. Eventually the collapse of the woman occurred. On arrival of the doctor, a most difficult forceps extraction on an unconscious woman was undertaken, following which, further pitocin having been given to prevent bleeding, the loss of blood continued.

The second case showed an even greater number of unusual features. The woman aged 40, who was expecting her ninth baby, had had pre-eclamptic toxæmia in three of her last pregnancies. Notwithstanding her age, parity and the history of pre-eclampsia, arrangements were made for her confinement in a Maternity Home. Nor were these arrangements altered when she again developed pre-eclamptic toxæmia. Labour was induced and progress was slow. Eventually several attempts were made to deliver the baby with forceps ; all failed and she died undelivered.

In the last patient, repeated attempts at forceps delivery, made by more than one doctor, resulted in the delivery, face to pubes of a stillborn baby described as "a natural stillbirth". Unfortunately uterine rupture had occurred.

Assisted Labour

So far in this section consideration has been given to 43 cases in which definite obstruction occurred in labour. In ten instances this occurred in hospital booked cases, and in 33 others the confinement took place in the patient's own home or in a general practitioner Maternity Home.

In addition to these 43 cases, assistance, nearly always by the use of forceps, was rendered on at least 72 other occasions. Genuine obstruction did not appear to be present in any of these cases and in the majority the indication for assistance was some illness or state of the mother or foetus which demanded that the baby should be delivered within a reasonably short time.

The causes of these maternal deaths are analysed in Table XXI.

Table XXI. Place of Confinement

<i>Patient's own home.</i>	<i>Maternity Home.</i>	<i>Hospital.</i>
Toxaemia 5	Toxaemia 6	Haemorrhage .. 11
Haemorrhage .. 5	Haemorrhage .. 6	Embolus 10
Pulmonary Embolus 3	Pulmonary Embolus 2	Toxaemia 5
Sepsis 2	Sepsis 1	Anaesthesia .. 5
Ruptured Uterus .. 1	Anaesthesia .. 1	Ruptured Uterus .. 2
Food Poisoning .. 1	Pituitary Cyst .. 1	Sepsis 1
Pulmonary	Megaloblastic	
Tuberculosis 1	Anaemia 1	Myasthenia Gravis .. 1
		Heart failure .. 1
Total 18	18	36

The following observations are made on the above cases. Most of the deaths from toxaemia occurred in women who developed eclampsia or an acute toxaemic state suddenly during labour. This certainly was the case in those patients delivered in hospital. However, in some of the patients delivered in their own home or in a Maternity Home the toxaemic state had been noted to be present for some time before the onset of labour and removal to hospital before the onset of labour would have been a wiser plan.

The incidence of serious post-partum haemorrhage is bound to be influenced to some extent by a preceding assisted delivery necessitating a general anaesthetic. Whereas the total number of deaths from loss of blood, 22 in all, following a low forceps application is not large, this number would have been much reduced if blood for transfusion had been readily available. In not one of these cases confined at home or in a Maternity Home was any mention made that help had been sought from the flying squad. Of the group confined in hospital, a note was made in eight of the 11 cases, either to the effect that "no blood was available" or that "available blood was not of the correct group" yet every region has a complete blood transfusion service and lack of suitable blood argues also lack of foresight.

The anaesthetic deaths were due usually to the inhalation of regurgitant vomit, though in three cases chloroform was used and in another an unwise amount of an unusually high concentration of xylocaine was employed to block the pudendal nerves. Rupture of the uterus had probably preceded the forceps delivery in the three cases. The only other comment worthy of attention is the low incidence of sepsis both in and out of hospital.

It may be argued that if the number of births in England and Wales is in the region of 800,000 per annum and if the incidence of forceps delivery is estimated at about 10 per cent., then undue attention has been directed to a relatively very small number of fatalities. Be this as it may, the belief is held that an analysis of these cases, about 100 in all, has shown that in them there existed several factors that contributed to a fatal result, the avoidance of which should not have presented insurmountable difficulty.

The incidence of an avoidable factor in the above series was as follows :—

*Table XXII—Cases of obstructed labour**

	<i>Confinement arranged in hospital</i>	<i>Confinement arranged in Maternity Home</i>	<i>Confinement arranged in patient's home</i>
Avoidable factor(s) present	6	10	17
Doubtful	1	3	1
No avoidable factor present	3	1	—
Total	10	14	18

* One woman, in addition, had made no arrangements for her confinement.

*Table XXIII. Cases of assisted labour**

	<i>Confinement arranged in hospital</i>	<i>Confinement arranged in Maternity Home</i>	<i>Confinement arranged in patient's home</i>
Avoidable factor(s) present	6	12	10
Doubtful	6	—	1
No avoidable factor present	24	6	7
Total	36	18	18

* One woman, in addition, had made no arrangements for her confinement.

This group of cases represents a declining element in obstetric practice. The remedy is usually some physical procedure in which few now have the opportunity of acquiring much experience. The more complex obstetrical manoeuvres should surely be undertaken only by those with sufficient experience of them or under the direct supervision of such a person. The house officer should be given no option but to call his chief; the general practitioner should always reflect on the advantage of calling a consultant before he attempts some unfamiliar manoeuvre—if indeed he does it himself at all. Moreover the possibility that such manoeuvres may become necessary can commonly be foreseen and the place of confinement should be one which offers the best opportunity of a successful result—the hospital obstetric unit. If these cases are now few, it is all the more reason for placing them in expert hands.

SUMMARY AND CONCLUSIONS

1. In the present series of cases the records show that labour was assisted on at least 115 occasions.

2. In 43 instances obstruction had occurred in labour and in 72 others the assessors found no serious cause for delay.

3. An analysis has been made of the cause, management and results in both groups.

4. The incidence of an avoidable factor has been given. In many of the cases more than one avoidable factor was present, but in this group by far the most important avoidable factor was the making of an unwise arrangement for a confinement to take place in the patient's own home or in a Maternity Home.

In the hospital booked cases it would appear to be justifiable to draw attention to the following points :—

- (1) Review of any case of prolonged labour.
- (2) The necessity for a junior medical officer always to report to the responsible Consultant all cases in which it is believed that labour is obstructed.
- (3) That the dangers of unskilled and unsuccessful attempts to overcome such an obstruction are certainly very great and that this fact may not be sufficiently appreciated.
- (4) The risk of rupture of the uterus in such cases is definite.
- (5) The risk of prolonged anaesthesia must be considerably greater in an exhausted or exsanguinated patient.
- (6) A correct assessment of the degree of any obstruction in labour may be a matter of considerable difficulty and is likely to be estimated correctly only by those with considerable experience in obstetrics.

In the domiciliary booked cases, in addition to the above there would have appeared to have been lacking generally an appreciation :—

- (1) Of the necessity, and advantages, of seeking advice and help from the flying squad.
- (2) Of the dangers attendant on the despatch of cases of obstructed labour to hospital.
- (3) Of the increased risk of complications arising in the third stage of labour and of post-partum haemorrhage in all cases in which labour has been assisted and when a general anaesthetic has been given, and
- (4) Lastly, mistakes are still being committed in the relatively simple matter of making suitable arrangements for every confinement, after careful consideration of all the facts relevant to a particular case.

10. ARRANGEMENT FOR THE CONFINEMENT

In both the preceding Reports on Confidential Enquiries into Maternal Deaths in England and Wales, and also in this latest Report there are two outstanding factors that were considered as avoidable. Both stand out almost above all others as examples in which death of the mother might have been prevented because a remedy could easily have been found. They are (a) **the making of an unwise arrangement for a forthcoming confinement** and (b) **inadequate antenatal care**. It is to the former that attention is directed in this section.

During the last fifteen or so years several publications have appeared on this subject amongst which those published by Sir Dugald Baird and his co-workers in Aberdeen are outstanding. Those authors have repeatedly emphasised the vital importance of giving the most careful consideration to matters such as the woman's age, her parity, her social conditions and, of course, because it is bound up with all these, her general physique and health. That Baird's observations may have not been appreciated by all, will have become abundantly clear to those who have read the reports of the Confidential Enquiries on Maternal Mortality.

It is possible that insufficient notice has been taken of the emphasis which has been given to this important and easily corrected avoidable factor in these publications. Thus in the Report for 1952-54 (p. 44 in the penultimate paragraph) appear the words, "and thirdly, the unwise acceptance for confinement at home or in small Maternity Homes of women with a known high risk in pregnancy, especially in the higher parities and older age groups" and in the Report for 1955-57 on p. 50, in the third paragraph, "Some mistakes made by the domiciliary services, such as wrong booking for confinement". Apart from references made to this avoidable factor in those sections dealing with the more important conditions that cause maternal death this is all that can be found. If insufficient emphasis on the importance of sensible arrangements for the confinement has been made in the past, an attempt will now be made to correct this omission. There is probably no better way in which to illustrate what is meant by incorrect arrangement for a confinement than to give some examples that have presented themselves in this the third series.

Out of the 996 deaths in the present series (360 of which had avoidable factors) the making of unwise arrangements for the confinement contributed either solely, or conjointly with other factors, to at least one quarter of those cases in which the mother lost her life and where an avoidable factor was present. The blame should not be laid only on the doctor or midwife; indeed, in many instances the patient herself, aided by well meaning but misguiding relatives and friends, provided an apparently insuperable obstacle. Moreover, on not a few occasions hospital staff were at fault in their acceptance or rejection of cases for admission. In these cases there appears to have been lack of a clearly understood policy agreed by each element in the maternity services of the area.

Examples

Case No. 1. A home confinement was arranged for a woman aged 42 who was expecting her sixth baby. From a purely obstetric point of view the

mechanics of the preceding labours had been reasonably normal. This patient was "known to have valvular disease of her heart", but as the previous labours had been uneventful, both she and her doctor agreed to a home confinement. Late in pregnancy twins were correctly diagnosed, but even this led to no change in the original arrangements which remained operative. As might be expected this patient experienced extreme tiredness and was "advised to rest in bed at home"—although her circumstances can hardly have been conducive to action on that advice. Labour started prematurely and she died undelivered from acute heart failure.

The contra-indications to a home confinement are clear :—

- (1) She was known to be suffering from valvular disease of the heart.
- (2) She was 42 years of age.
- (3) She was expecting her sixth baby.
- (4) She was later known to be carrying twins.

In addition, at no time was expert advice sought from a consulting physician and there was lack of appreciation of the impossibility in her case of "rest in bed at home".

Case No. 2. A home confinement was taken by the family doctor for a woman aged 39 who was expecting her seventh baby. Previous labours had been complicated by two breech presentations and the present pregnancy continued well past the calculated expected date. Labour was fierce and the foetal head remained high above the pelvic brim. Forceps delivery was attempted and failed, and the patient was sent to hospital. Caesarean section was performed and a baby, who did not survive, was delivered. The patient died shortly after the completion of the operation. Death was certified as being due to "shock". This may well have been correct as the woman was probably far from fit; she had suffered great pain, had experienced a failed forceps operation under a general anaesthetic, was probably dehydrated and ketotic before the operation and had a moderate haemorrhage during and immediately afterwards.

There were other defects in the case provided but the initial mistake was almost certainly the agreement to a home confinement.

Case No. 3. Arrangements were made for confinement at home in the case of a woman aged 28 who was expecting her third baby. In both the previous confinements the foetal head failed to engage at the end of pregnancy. On both occasions admission to hospital was necessary and in the last confinement difficulty had been experienced with the third stage of labour with resulting severe loss of blood. With this woman's past obstetric history a hospital confinement would have been a wise arrangement.

Case No. 4. For a young and healthy woman arrangements had been made for her first confinement to take place in a maternity home. A correct diagnosis was made of pelvic contraction and a trial of labour was planned. After 48 hours the trial was judged a failure and death occurred shortly after Caesarean section in a unit where such a procedure would certainly not have been undertaken from choice.

Case No. 5. Is almost identical with the preceding case except that the age of the patient was 36. Transfer to hospital was decided upon after more than three days labour when the patient's general condition was far from satisfactory.

Case No. 6. A woman aged 42 was booked for a home confinement for her ninth pregnancy. Previously she had post-partum haemorrhage. After 36 hours in labour she was transferred to hospital where Caesarean section was performed for prolapse of the cord. Death occurred from haemorrhage.

Case No. 7. Arrangements were made for the confinement in a maternity home for a woman aged 38 for her first confinement. She was known to suffer from valvular disease of the heart and late in pregnancy developed pre-eclamptic toxæmia. Death occurred during an operation for Caesarean section.

Case No. 8. Arrangements were made for a woman aged 30 to have her third confinement in a small maternity home. Caesarean section had been performed in the second pregnancy and it was planned to repeat this operation. The patient died of haemorrhage. The arrangements for replacement of possible blood loss in a small maternity home are likely to be almost non-existent and severe loss of blood at the time of operation for Caesarean section is a not uncommon complication.

Case No. 9. A woman aged 38 was booked to have her fifth confinement in a small maternity home. A transverse lie of the foetus was persistent and the decision was made to perform Caesarean section. Death occurred from "uncontrollable haemorrhage".

Case No. 10. Responsibility was taken for a woman aged 43 to have her third confinement in her own home. Previous pregnancies and labours had been normal. She developed pre-eclamptic toxæmia and was told to "rest at home" but eclampsia supervened. Admission to hospital might have been more likely to ensure more adequate rest and certainly more frequent observation when she developed pre-eclamptic toxæmia. Death occurred from eclampsia.

Such therefore are examples of what is meant by the term, "making unwise arrangements for the confinement".

As an aid to the making of the best possible arrangements for any confinement it has been usual to list the indications for *hospital* care and responsibility on the following lines :—

1. All women who suffer from any illness that in any way impairs their general state of health. Obvious examples that come to mind are diseases such as valvular disease of the heart or diabetes.
2. Of equal or greater importance is grand multiparity. Parity greater than four is accompanied by a diminishing margin of safety and over nine the risk of death is very greatly increased.
3. All primigravidae over the age of 30, and multiparae over the age of 35 should be confined in hospital. The safety margin begins to contract over this age.
4. Any woman who has had abnormal previous pregnancies, labours or puerperia. In this respect the importance of previous toxæmia is generally recognized but the same cannot be said of previous post-partum haemorrhage.

5. For social reasons.

6. Primigravidae. Most women prefer to arrange for their first confinement to take place in hospital, not because they feel it to be dangerous at home, but because they feel it is safer in hospital—quite a different thing. After all, childbirth is a new experience and must be considered to be a trial.

7. Multiple pregnancy.

The first three of these should be regarded as absolute indications.

So much for guidance in the making of *hospital* bookings. But very often the patient first seeks advice, quite correctly, from her general practitioner and this procedure will surely become more frequent in the future. The list just cited and drawn up for use by those responsible for booking patients for hospital care is based upon abnormal factors. But those confinements arranged to take place at home should be selected on grounds of normality.

The advice that should be given therefore would be better if stated in a more positive manner and could be outlined as follows :—

At the present time it is sensible to consider making arrangements for a home confinement or for confinement in a G.P. Maternity Home for patients who fulfil the following criteria at the time of booking :—

1. As far as can be ascertained the woman's general physical state is unimpaired.
2. She is pregnant for the second, third or fourth time, the previous pregnancies, labours and puerperia have been normal and she is under 35 years of age.
3. She is a primigravida under 30 years of age.
4. She is Rhesus positive, or is known to have no antibodies.
5. The home conditions are suitable.

The list is quite short and perfectly easily understood. It would not be out of place to offer the suggestion to the effect that such arrangements must not be contemplated unless the doctor is prepared to accept responsibility for pre-natal care, care in labour and care after delivery.

The position must be reviewed at 36 weeks or earlier if complications arise.

Frequently it has been stated that in spite of constant persuasion and explanation by doctor, midwife and others concerned, women will refuse to accept advice that arrangements should, or even must be made for hospital care and responsibility. It would seem that in all these cases it must be mistaken kindness for any doctor, or midwife, to accede to the wishes of the patient and her family unless it is clear that the patient will otherwise go unattended. The duty of the medical and nursing professions is clear, and it is to advise patients for their own safety. Surely only very few patients would carry their resistance to such lengths.

11. THE AVOIDABLE FACTORS IN THE WHOLE SERIES

Reports of 742 deaths directly due to pregnancy and childbirth were received for this Enquiry for the years 1958 to 1960. 928 were ascribed to these causes by the Registrar General. Of the 742 reported deaths 315 or 42·5 per cent. had avoidable factors. This does not mean that death could or should have been averted but that a major factor in the fatal outcome could have been averted and that the outcome might have been different. Deaths which were associated with, although not directly due, to pregnancy and childbirth numbered 254, of which 45 or 17·7 per cent. had avoidable factors. The Registrar General ascribed 255 deaths to this category.

163 deaths, of which 90 had avoidable factors, were due to abortion and ectopic pregnancy. The deaths from abortion with avoidable factors have been described in Chapter 5. Ectopic pregnancy is not really relevant to this enquiry. Deaths where the anaesthetic was involved have been analysed in Chapter 8 and are not included in this Chapter. Therefore among over 2 million births, 225 deaths due to and 45 associated with pregnancy and childbirth are known to have had avoidable factors and there may have been a small number among the deaths on which reports were not obtained. This compares with 357 and 53 in the first three-year series.

In order to avoid unjust imputation of blame to persons or particular professional groups, it was decided in the report for 1955-59 to ascribe the avoidable factors to the services in which they were made, that is, domiciliary or hospital, except where the patient herself contributed to her death. The factors were further sub-divided into the period of pregnancy or childbirth in which they occurred. In this report it has been decided to ascribe the factor to the person who was responsible for the mistake. It cannot be stressed too strongly, however, that comparisons between the categories of persons making the mistake should not be made; they would be highly misleading. This is particularly true of such factors as wrong booking and calling for the flying squad. A consultant can only make a mistake about booking if he refuses hospital confinement to a patient, whereas a general practitioner has to decide which of his patients he will send to hospital and which he will care for himself. He has also to persuade the patient to accept his advice. A consultant can only refuse to send the flying squad if it is requested whereas a general practitioner or midwife has to decide at what stage a flying squad will be summoned. These factors are among the more common mistakes in the domiciliary service. On the other hand, the Consultant has been held responsible for the conduct of his junior officers. Therefore mistakes made by them, e.g. failure to obtain assistance from a senior member of staff has been ascribed to the Consultant Obstetrician, for it is his responsibility to see that help is not only always available, but that his staff know when to call for it.

Of the 270 deaths with avoidable factors, mistakes were made in the antenatal period in 180; during labour in 42; during the puerperium in nine; during antenatal care and during labour in 32 cases; during antenatal care and the puerperium in 6. In one case mistakes were made during antenatal care, during labour and during the puerperium. It is manifestly easier to detect errors of judgment by hindsight than in the stress of the time, and then detection should not be taken as an imputation of blame to anyone.

AVOIDABLE FACTORS WHICH OCCURRED DURING THE ANTENATAL PERIOD

There were 180 deaths where the mistakes were made entirely during the antenatal period.

1. *Hospital booked patients*

The Consultant Obstetrician was considered responsible for the avoidable factors in 18 cases booked for hospital confinement. The principal factor was failure to follow-up patients who did not keep their appointments at antenatal clinics. The second most important factor was inadequate antenatal care including two patients whose anaemia was neglected. There were other deaths which might have been avoided if the patient had been admitted earlier for in-patient care. One patient admitted to hospital with hypertension was unwisely allowed to go home on several occasions. Two patients were refused a hospital booking. In one case there was lack of co-operation between the various departments of the hospital and in another the junior medical staff were responsible for inadequate in-patient care.

2. *Nursing Home or general practitioner Unit*

There were 20 deaths where the avoidable factor occurred during the antenatal period in nursing homes and general practitioner units. In 19 cases the general practitioner alone made the mistake and in one the general practitioner and the consultant shared the responsibility. In just under half the cases the patients had clear indications for care in a consultant unit, including one patient with congenital heart disease, and another with mitral stenosis, who subsequently developed toxæmia. The lives of two patients might have been saved if they had been referred to the consultant unit earlier. Another important factor was inadequate antenatal care. In one case warning haemorrhages were ignored and the flying squad was not sent for.

A developing anaemia was overlooked in the one patient where both the consultant and general practitioner were involved.

3. *Domiciliary Care*

There were 122 deaths where the domiciliary services were involved.

The persons who made the mistakes can be listed as follows :—

General practitioner	..	..	..	..	..	..	44
Local Authority Medical Officer	..	..	..	..	..	..	2
Midwife	..	..	..	..	..	..	3
Patient	..	..	..	..	..	..	53
G.P. and Local Authority M.O.	..	..	..	..	..	..	1
G.P. and Midwife	..	..	..	..	..	..	3
G.P. and patient	..	..	..	..	..	..	12
G.P. and other	..	..	..	..	..	..	1
G.P., Local Authority M.O. and Midwife	1
G.P., Local Authority M.O. and patient	1
G.P., Midwife and patient	1

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5. *Hospital and Domiciliary Services*

In 16 cases both services were involved as follows :—

Consultant and General Practitioner	7
Consultant and Midwife	1
Consultant and patient	5
Consultant, general practitioner and patient	2
Consultant, general practitioner, local authority Medical Officer and midwife	1
	—
	16
	—

In the cases where both the consultant in hospital and general practitioner were involved, there was lack of co-operation which resulted in the patient obtaining inadequate antenatal care. In one case the patient should have been referred for in-patient antenatal care earlier. In another, no-one took responsibility for the patient's antenatal care so that anaemia went untreated.

Where the consultant and patient were concerned, the patient defaulted from the appointment made for her to be seen at hospital antenatal clinics or refused to be admitted to hospital. However, no attempt had been made by the hospital either to investigate her failure to attend or to persuade her to be admitted early. In one case there was lack of co-operation between the physician, obstetrician and psychiatrist, so that a difficult patient failed to obtain antenatal care early enough.

In other instances where several persons were involved, there was a lack of co-operation which resulted either in the patient not being booked for hospital confinement or not being sent to hospital early enough.

6. *Maternity Home and Domiciliary Services*

Two patients booked for a maternity home died during the antenatal period. In both cases the responsibility was shared between the general practitioner and patient. In one, the doctor ignored a persistent albuminuria and hypertension and the patient refused to go to hospital. In the second the patient refused hospital confinement and the general practitioner failed to obtain needed consultant advice.

7. *Hospital, Maternity Home and Domiciliary Services*

In one case there was complete lack of co-operation between the consultant obstetrician, the general practitioner and the local authority medical officer.

AVOIDABLE FACTORS DURING LABOUR

1. *Hospital*

There were 27 deaths which might have been avoided by better care from the hospital ; in 26, the consultant or his junior medical staff were responsible and in one the midwife was at fault.

All cases showed evidence of unsound clinical practice. Junior staff attempted treatment and operative deliveries without first consulting their senior colleagues or the consultation was by telephone only. In a few cases the third stage of labour was badly managed and blood transfusion was not given early enough, the seriousness of the patient's condition not being realized. In two cases incompatible blood transfusions were given.

2. Nursing Home or Maternity Home

There were five deaths during labour. In one the consultant obstetrician failed in the clinical management of the case. In the remaining four, the general practitioner either made an error of judgment or failed in the clinical management of the case.

3. Domiciliary

There were eight cases where death might have been avoided during labour. In five cases the general practitioner either failed to summon the flying squad, or sent the patient to hospital instead of calling for the squad, or made an error of clinical judgment.

In one case a midwife failed to detect a transverse lie of the foetus.

In two cases the flying squad was at fault. In one there was a shortage of blood and in the other there was poor treatment of an inverted uterus with a retained placenta.

4. Hospital and Domiciliary

In one case a general practitioner sent a patient to hospital instead of calling the flying squad. When she arrived she was given ergometrine for an antepartum haemorrhage due to a placenta praevia.

5. Maternity Home and Domiciliary

In one case inadequate care was given by both the general practitioner and the flying squad.

AVOIDABLE FACTORS DURING THE PUERPERIUM

There were nine deaths during the puerperium which might have been avoided. Three occurred in hospital where the consultant was responsible; of these, two were discharged too early from hospital and in another, operation for sterilization was carried out on the sixth day of the lying-in period.

One case occurred in a general practitioner maternity home when the doctor should have transferred her to hospital.

Four deaths occurred at home, in one the patient had discharged herself from hospital against medical advice and in another failed to summon medical aid. In one case the general practitioner failed to take notice of warning signs of a phlebitis. In the remaining case, the patient discharged herself too early from hospital and worked at home while febrile. She was then refused admission to hospital.

AVOIDABLE FACTORS WHICH OCCURRED DURING MORE THAN ONE PERIOD OF PREGNANCY AND CHILDBIRTH

There were 32 deaths where avoidable factors occurred both during the antenatal period and labour. Six deaths where the avoidable factors occurred during the antenatal period and the puerperium and one where factors occurred in all three. In the last, this was due to the patient who failed to seek any medical care until after her baby was born.

Of the 32 deaths : five were hospital booked cases and the consultant or his junior staff were responsible ; seven were booked maternity home cases where the general practitioner was responsible in five and the general practitioner with either the midwife or the patient in the remainder ; 11 domiciliary cases, where the general practitioner was responsible for five, the patient for three, the midwife for one and the remainder shared by the general practitioner and the midwife or local authority medical officer ; in the remaining nine cases the hospital and domiciliary services each shared responsibility.

The factors themselves were similar to those already described, wrong booking for confinement, poor antenatal care, and failure to obtain consultant help. Among the eleven domiciliary cases were two cases of particular interest. One where the care was shared by the general practitioner and local authority medical officer, there was bad management of both antenatal care and labour giving a total of six avoidable factors for one patient ; and in the other, originally booked by the midwife as her own case, there were four avoidable factors, including the administration of anaesthetic by the doctor who was also undertaking the delivery.

In the nine cases where both the domiciliary and hospital services were at fault, the number of people who contributed to the failure is particularly striking. In two cases four persons were involved and in four others, three. In one case a general practitioner made repeated attempts at induction with pitocin in a cottage hospital and then transferred the patient to a consultant unit where the house surgeon failed to realize the significance of the violent labour and the consultant repeated the pitocin induction.

Of the six cases where the antenatal care and care during the puerperium were considered inadequate, four cases were domiciliary only and one hospital and domiciliary combined. In one case where the general practitioner delayed sending the patient to hospital the patient was discharged on the fifth day of the puerperium to lodgings from which she was evicted two days later.

SUMMARY AND CONCLUSIONS

1. There were in all 270 maternal deaths with avoidable factors in a period of three years during which there were over 2 million births.

2. Details are given of the reasons why these deaths were considered to have avoidable factors. The number of avoidable factors according to the persons who made the mistakes including both shared and full responsibility was as follows :—

Consultant or his medical staff	85
General practitioner	136
Local authority medical officer	12
Midwife—hospital or domiciliary	19
Patient or relative	91
Other	4

3. While this chapter has detailed some of the most distressing incidents which led to the death of these women, it has to be remembered that these are extremely rare occurrences. Nor does it mean that these lives could definitely have been saved ; it only means that there was a factor in the clinical history of the patient which led to a chain of events which ultimately caused her death. If the mistakes had not been made the pattern of events might have been different.

The lapses of one person or professional group should not be compared with those of another person or group. People working under different circumstances are liable to make different mistakes. It cannot be emphasized too strongly that these are only occasional faults and they are highlighted because they are so few.

APPENDIX I

Table 1. Deaths due to Pregnancy and Childbirth

Inter-national List No.	Cause of Death	1958			1959			1960			1958-1960		
		R.G.	Enquiry Series		R.G.	Enquiry Series		R.G.	Enquiry Series		R.G.	Enquiry Series	
			Total	Avoid-able		Total	Avoid-able		Total	Avoid-able		Total	Per-centage
640	Pyelitis and pyelonephritis	4	1	—	2	—	—	1	1	—	7	2	0.0
641	Other infections of genito-urinary tract during pregnancy	—	—	—	1	—	—	—	—	—	1	—	0.0
642	Toxaemia of pregnancy	58	38	21	50	32	21	60	38	23	168	108	60.2
643	Placenta praevia	—	6	5	—	3	2	—	8	7	—	17	82.4
644	Other haemorrhage of pregnancy	9	10	2	3	15	10	1	5	2	13	30	46.7
646	Anaemia of pregnancy	2	1	1	1	1	1	2	2	—	5	4	50.0
647	Pregnancy with malposition of foetus in uterus	—	1	1	—	—	—	—	—	—	—	1	100.0
648	Other complications arising from pregnancy	19	9	1	27	17	1	18	9	1	64	35	8.6
645	Ectopic pregnancy	13	7	—	12	10	—	17	11	—	42	28	0.0
650	Abortion without mention of sepsis or toxæmia	25	21	16	16	16	11	23	19	12	64	56	69.6
651	Abortion with sepsis	35	31	18	29	19	14	33	27	18	97	77	64.9
652	Abortion with toxæmia without mention of sepsis	3	1	—	2	—	—	6	1	1	11	2	50.0
660	Delivery without complication	6	2	—	4	—	—	3	—	—	13	2	0.0
670	Delivery complicated by placenta praevia or A.P.H.	16	5	3	18	7	2	24	10	5	58	22	45.5
671	Delivery complicated by retained placenta	8	10	5	3	2	2	7	3	1	18	15	53.3
672	Delivery complicated by other postpartum haemorrhage	25	22	11	20	15	5	12	18	9	57	55	45.5
673	Delivery complicated by abnormality of bony pelvis	—	—	—	1	1	—	2	—	—	3	1	0.0
674	Delivery complicated by disproportion or mal-position of the foetus	11	8	5	7	12	5	10	10	3	28	30	43.3

Inter- national List No.	Cause of Death	1958			1959			1960			1958-1960		
		R.G.	Enquiry Series		R.G.	Enquiry Series		R.G.	Enquiry Series		Total	Enquiry Series	
			Total	Avoid- able		Total	Avoid- able		Total	Avoid- able		Total	Avoid- able
				No.			Per- centage						
675	Delivery complicated by prolonged labour of other origin	10	4	2	10	7	1	14	7	—	18	3	16.7
676	Delivery with laceration of perineum, without mention of other laceration	—	—	—	—	1	—	—	—	—	1	—	0.0
677	Delivery with other trauma	10	17	11	7	15	8	16	13	5	45	24	53.3
678	Delivery with other complications of childbirth	10	15	4	19	14	1	20	15	2	44	7	15.9
680	Puerperal urinary infection without other sepsis	—	1	—	—	1	—	1	—	—	2	1	50.0
681	Sepsis of childbirth and the puerperium	9	8	3	14	11	3	7	7	3	24	9	37.5
682	Puerperal phlebitis and thrombosis	23	2	—	19	—	—	19	—	—	2	—	0.0
683	Pyrexia of unknown origin during the puerperium	—	—	—	—	—	—	—	—	—	—	—	0.0
684	Puerperal pulmonary embolism	17	33	5	11	35	9	8	33	6	101	20	19.8
685	Puerperal eclampsia	6	5	1	6	3	1	2	2	1	10	3	30.0
686	Other forms of puerperal toxæmia	2	—	—	1	—	—	1	—	—	—	—	0.0
687	Cerebral haemorrhage in the puerperium	5	2	1	3	2	1	2	4	1	8	3	37.5
688	Other and unspecified complications of the puerperium	2	1	—	4	—	—	1	1	—	2	—	0.0
689	Mastitis and other disorders of lactation	—	—	—	—	—	—	—	—	—	—	—	0.0
	Maternal deaths omitting those due to ectopic pregnancy and abortion	252	201	82	231	191	74	231	187	69	579	225	38.9
	Maternal deaths due to ectopic pregnancy and abortion	76	60	34	59	45	25	79	58	31	163	90	55.2
	TOTAL MATERNAL DEATHS	328	261	116	290	236	99	310	245	100	742	315	42.5

Table 2. Deaths not classed to Pregnancy or Childbirth but associated therewith

Cause of Death	1958			1959			1960			1958-1960		
	Enquiry Series		R.G.*	Enquiry Series		R.G.*	Enquiry Series		R.G.*	Enquiry Series		Avoidable
	Total	Avoidable		Total	Avoidable		Total	Avoidable		Total	No.	Percentage
I. <i>Infective and Parasitic Diseases</i>	8	—	4	12	2	2	2	—	14	23	2	8.7
Tuberculosis	1	—	—	5	1	—	—	—	—	5	1	20.0
Amoebiasis	—	—	—	1	—	—	—	—	—	1	—	0.0
Meningococcal Infection	—	—	—	—	—	—	—	—	—	1	—	0.0
Tetanus	—	—	—	1	—	—	—	—	—	1	—	0.0
Acute poliomyelitis and late effects	6	4	—	1	—	—	—	—	—	5	—	0.0
Chickenpox	—	—	—	—	—	—	—	—	—	1	—	0.0
Herpes Zoster	—	—	—	—	—	—	—	—	—	1	—	0.0
Infectious Hepatitis	—	—	—	4	1	—	—	—	—	7	1	14.3
Other infective and parasitic diseases	1	—	—	—	—	—	—	—	—	1	—	0.0
II. <i>Neoplasms</i>	15	12	9	9	1	16	8	—	40	29	1	3.4
III. <i>Allergic, Endocrine System, Metabolic and Nutritional Diseases</i>	5	2	3	3	1	2	2	1	10	7	3	42.9
IV. <i>Diseases of Blood and Blood-forming organs</i>	1	4	—	1	1	—	1	—	1	6	3	50.0
V. <i>Mental, Psychoneurotic and Personality Disorders</i>	—	—	—	—	—	—	—	—	1	—	—	0.0
VI. <i>Diseases of Nervous System and sense organs</i>	6	8	5	9	—	3	7	—	14	24	1	4.2
VII. <i>Diseases of Circulatory System</i>	38	33	25	29	9	25	16	6	88	78	25	32.1
Rheumatic Fever	1	—	15	1	—	15	—	—	57	1	—	0.0
Chronic Rheumatic Heart Disease	26	8	3	15	5	6	10	6	14	51	19	37.3
Other diseases of heart	5	—	—	7	1	—	3	—	—	14	1	7.1

Cause of Death	1958			1959			1960			1958-1960			
	R.G.	Enquiry Series		R.G.*	Enquiry Series		R.G.*	Enquiry Series		R.G.*	Total	Enquiry Series	
		Total	Avoid- able		Total	Avoid- able		Total	Avoid- able			No.	Per- centage
Hypertensive heart disease	2	2	2	3	4	3	1	—	—	6	6	5	83.3
Other diseases of circulatory system	4	1	—	4	2	—	3	3	—	11	6	—	0.0
VIII. <i>Diseases of Respiratory System</i>	7	8	2	17	18	1	6	9	2	30	35	5	14.3
Acute upper respiratory infection	—	—	—	—	1	—	—	—	—	—	1	—	0.0
Influenza	2	3	—	—	6	—	—	2	—	—	11	—	0.0
Pneumonia	4	5	2	—	6	1	—	4	1	—	15	4	26.7
Bronchitis	1	—	—	—	—	—	—	1	—	—	1	—	0.0
Other diseases of Respiratory System	—	—	—	—	5	—	—	2	1	—	7	1	14.3
IX. <i>Diseases of digestive system</i>	11	10	—	7	7	1	10	10	1	28	27	2	7.4
Diseases of buccal cavity and oesophagus	1	—	—	—	—	—	—	—	—	—	—	—	0.0
Diseases of stomach and duodenum	1	1	—	—	—	—	—	1	—	—	2	—	0.0
Appendicitis	3	2	—	—	1	—	—	1	—	—	4	—	0.0
Hernia of abdominal cavity	—	1	—	—	1	—	—	1	—	—	3	—	0.0
Other diseases of intestines and peritoneum	5	4	—	—	3	—	—	6	—	—	13	—	0.0
Diseases of liver, gallbladder and pancreas	1	2	—	—	2	1	—	1	1	—	5	2	40.0
X. <i>Diseases of Genito-urinary System</i>	1	1	—	3	2	1	—	2	—	4	5	1	20.0
XIII. <i>Diseases of Bones and organs of movement</i>	2	3	—	1	—	—	3	3	—	6	6	—	0.0
XIV. <i>Congenital Malformation</i>	2	3	—	4	1	—	5	5	1	11	9	1	11.1
XVI. <i>Symptoms and ill-defined conditions</i>	—	—	—	—	1	—	—	1	—	—	2	—	0.0
XVII. <i>Accidents, poisoning and violence</i>	2	1	—	4	—	—	2	2	1	8	3	1	33.3
TOTAL	98	94	16	82	92	17	75	68	12	255	254	45	17.7

* The R.G.'s figures are not available in detail for 1959 and 1960; therefore only the total number of deaths in some disease groups are given.

Age and Parity of the Mothers in the Series

As in the former reports this report has again brought out the need for a careful selection of patients for hospital confinement.

Table 3. Age of mother, 1958-1960

Age	Numbers		Percentage Distribution		Total Registered Births
	" True " maternal	Associated	" True " maternal	Associated	
Under 20	20	8	3.5	3.1	6.2
20-24	92	40	15.9	15.7	30.4
25-29	131	62	22.6	24.4	31.2
30-34	142	67	24.5	26.4	19.3
35-39	133	51	23.0	20.1	10.2
40+	60	24	10.4	9.4	2.7
N.S.	1	2	0.2	0.8	—
Total	579	254	100	100	100

Table 3 shows the age distribution of the mothers in the enquiry compared with the age distribution of all mothers in England and Wales for the same period. It shows, as in the previous reports, that there is a higher proportion of fatalities among women over the age of 30 years.

Table 4. Parity 1958-1960

Parity	Numbers		Percentage Distribution		Total registered legitimate live births
	" True " maternal	Associated	" True " maternal	Associated	
1	200	78	34.5	30.7	38.6
2	102	59	17.6	23.2	30.6
3	82	45	14.2	17.7	15.6
4	55	26	9.5	10.2	7.4
5	41	12	7.1	4.7	3.6
6+	89	26	15.4	10.2	4.2
N.S.	10	8	1.7	3.1	—
Total	579	254	100	100	100

Table 4 shows the parity distribution of mothers in the enquiry compared with the mothers of registered legitimate live births. The slightly lower proportion of primigravidae among the maternal deaths which was noted in the 1955-1957 report compared with the 1952-1954, has continued.

Table 5. "True" Maternal Deaths : Age and Parity of the 568 women whose age and parity was known

Age	1		2		3		4		5		6	
	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.	No.	Per cent.
Under 20 ..	19	3.3 (4.7)	—	— (0.8)	—	— (0.1)	—	—	—	— (0.0)	—	—
20-24 ..	64	11.3 (17.9)	15	2.6 (9.4)	6	1.1 (2.8)	3	0.5 (0.7)	2	0.4 (0.2)	—	—
25-29 ..	57	10.0 (10.6)	25	4.4 (11.8)	14	2.5 (5.6)	15	2.6 (2.4)	9	1.6 (1.0)	8	1.4 (0.7)
30-34 ..	33	5.8 (3.9)	35	6.2 (6.1)	22	3.9 (4.4)	13	2.3 (2.4)	14	2.5 (1.2)	22	3.9 (1.4)
35-39 ..	22	3.9 (1.3)	22	3.9 (2.1)	29	5.1 (2.2)	19	3.3 (1.6)	7	1.2 (1.0)	34	6.0 (1.5)
40 + ..	5	0.9 (0.2)	5	0.9 (0.4)	11	1.9 (0.5)	4	0.7 (0.4)	9	1.6 (0.3)	25	4.4 (0.7)

Table 5 gives a more detailed analysis of the age and parity of the mothers. It shows, as in the previous report, that the proportion of deaths among primigravidae is still lower than the proportion among registered legitimate live births where the mother is under the age of 30. Primigravidae over the age of 30 and multiparae over the age of 35, and women at any age having their fifth or more baby continue to be at higher risk.

The figures shown in brackets are the percentages in each age and parity group among all legitimate births in England and Wales.

Table 6. Death rates per 100,000 live births and stillbirths from maternal causes for England and Wales by hospital regions

Hospital Regions							Years		
							1952-1954	1955-1957	1958
Newcastle .. .. .	..	..	..	..	..	..	75.8	62.7	40.8
Leeds .. .. .	..	..	..	..	..	..	66.9	53.2	43.8
Sheffield .. .. .	..	..	..	..	..	..	73.8	51.9	39.3
East Anglian .. .. .	..	..	..	..	..	..	53.3	49.8	29.4
North West Metropolitan .. .. .	..	..	..	..	..	..	68.7	49.3	38.5
North East Metropolitan .. .. .	..	..	..	..	..	..	73.3	51.1	38.4
South East Metropolitan .. .. .	..	..	..	..	..	..	69.0	42.0	39.2
South West Metropolitan .. .. .	..	..	..	..	..	..	76.9	55.6	43.8
(a) South West Met. .. .. .	..	..	..	..	..	..	—	—	38.9
(b) Wessex .. .. .	..	..	..	..	..	..	—	—	52.0
Oxford .. .. .	..	..	..	..	..	..	62.3	35.9	21.2
South Western .. .. .	..	..	..	..	..	..	80.9	50.8	43.1
Birmingham .. .. .	..	..	..	..	..	..	70.1	58.5	36.0
Manchester .. .. .	..	..	..	..	..	..	80.9	62.8	44.4
Liverpool .. .. .	..	..	..	..	..	..	53.2	62.4	37.2
Wales (including Monmouthshire) .. .. .	..	..	..	..	..	..	88.5	79.3	51.4
ENGLAND AND WALES .. .. .	..	..	..	..	..	..	72.4	55.5	40.0

Table 6 shows the death rates per 100,000 total births from maternal causes by hospital region. This table has not been published in previous reports. It has been compiled by the Registrar General from the national returns and the figures for the previous years have also been included for comparison. The table shows the wide variation from region to region, the maternal death rate for Oxford Regional Hospital Board being the lowest and that for Wessex Regional Hospital Board the highest.

APPENDIX II

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The present issue contains the following papers:
On the question of the origin of the human race
by the late Sir John Lubbock, Bart.
On the question of the origin of the human race
by the late Sir John Lubbock, Bart.

At the meeting of the Society on the 10th of January
1881, the following papers were read:
On the question of the origin of the human race
by the late Sir John Lubbock, Bart.

On the question of the origin of the human race
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