

A CRITICAL REVIEW BY THE MINISTRY OF HEALTH OF ENGLAND AND WALES OF THE REPORT OF A THOUSAND MATERNAL DEATHS*

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Three hundred years ago, in 1660, from information supplied by Sir James Y. Simpson and E. V. Sieveking, the maternal mortality rate in London was about 1 in 40 births and one hundred years later only about half the figure. A century ago a distinct improvement had occurred, for only about 1 in 200 women died in childbirth in England and Wales, a rate in modern terminology of 5 per 1,000.

We are about to consider a survey of the causes of over 1,000 maternal deaths when the rate over a period of 3 years was slightly over one-tenth of that figure.

THE REPORT

The Report on a Confidential Enquiry on Maternal Deaths in England and Wales that was published in July this year contains information of the greatest interest and value. The investigation concerned was the second of its nature and followed a similar, if simpler, enquiry, namely that of a Departmental Committee on Maternal Mortality and Morbidity appointed in 1928 by the then Minister of Health. The Committee published a final Report in 1932 and, whereas

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many imperfections were apparent in the lack of, or method of, collection of necessary material, the results were considered fully to justify the continuation of the work. This was done year by year and the findings appeared in successive Annual Reports of the Chief Medical Officer of the Ministry of Health. In 1949 maternal mortality was a subject for discussion at the XIIth British Congress of Obstetrics and Gynaecology held in London. At the time reference was made to a parallel investigation into maternal deaths in the USA, in which there were apparent obvious advantages in the use of expert opinion. The President of the Congress, Sir Eardley Holland, suggested to the Minister of Health the possibility of adopting a similar method in England and Wales and, after consultation with various bodies, a new scheme was drawn up for the obtaining of information, which scheme was so designed as to include evidence from all who might be able to contribute to the explanation of any maternal death.

This improved method of enquiry came into operation in 1952 and, presented in the briefest manner possible, it consists in the collection by the medical officer of health of the district of statements from the local authority's domiciliary midwives or antenatal clinics, from hospitals or

general practitioners, or from anyone else who could possibly assist. In every instance the information is forwarded to the local consultant obstetrician for the area who, as a most valuable member of the team of enquiry, is able to add details known to himself or, when desirable, can obtain further additional and valuable clinical evidence. At this stage the enquiry form is nearing completion and is submitted to the Regional Assessor, who is a senior obstetrician of high standing in the area of each Regional Hospital Board. From the statements made on the report, amplified if desirable by further confidential enquiry, the regional assessor states his opinion about the cause of death and also whether any avoidable factor is present. The final assessment and classification of the reports is then done by the Ministry's consultant advisers in obstetrics, and it is here possible to attempt to iron out the slight variation in standard inevitably existing among the 15 regional assessors and thereby to present a more uniform picture.

The whole enquiry, which is anonymous, is regarded as strictly confidential and for medical use only. Apart from its value in the production of a report, all concerned have had an opportunity to review the clinical course of the patient and of the action taken. Each must benefit from this, however experienced he or she may be, or whether his or her work was performed in a hospital obstetric unit, a maternity home, or the patient's own home. As one whose task it has been to review every report, I can testify how greatly they contributed to my own knowledge of obstetrics. It is my intention to try to present in this address what appears to me to be some of the findings of major importance and interest, from which, therefore, the most valuable lessons may be learned.

The series covers not only deaths directly due to pregnancy and childbirth but also deaths ascribed to other conditions occurring in association with pregnancy and childbirth, as, for instance, heart disease. These will be referred to as 'associated' deaths. In all, confidential reports had been received of 1,094 deaths in the former group and 316 'associated' deaths during the 3 years 1952-54. The *International Statistical Classification of Diseases, Injuries and Causes of Death* (6th revision, 1948) was used and it is not proposed to consider the difficulties that were occasionally experienced in allotting the correct rubric.

Throughout the Report attempts were made to assess what was termed 'the primary avoidable factor'. Never, except when this factor pointed to deficient administration was this referred back to those in clinical charge of the patient. Its assessment was for one purpose, and one purpose only, and that was constructive and not destructive. The whole object in its determination was to see whether it would be possible, by discovering the nature of factors that contributed to the deaths of these women, to identify any that might be avoided in the future. If this was the case, then good would be done by their publication and the likelihood of their repetition probably lessened. It will be seen that in this respect much may be accomplished. It was to the regional assessors only that the direct questions were put: 'Do you consider that any avoidable factor existed and if so at what point did it lie?' The replies were either 'No' or 'Yes' or 'Doubtful'. The 'doubtfuls' were not numerous and were always transferred, usually because the evidence was not sufficient, into the 'No avoidable

factor' group. As a final editor, however, I had no doubts whatever that in the great majority of cases labelled 'doubtful' an avoidable factor did exist and might have been discovered after further searching enquiry and personal questioning. This course was never followed as it would inevitably have destroyed mutual confidence and would soon, as a direct result, have destroyed that atmosphere of cooperation and willingness to help. In short, it would have done more harm than good.

The preliminaries may now be considered to be over and attention can be directed to the more important and clinical findings. In order that the whole subject be viewed in a correct perspective and lest the subsequent review of the causes of maternal death in childbirth convey an entirely erroneous and exaggerated impression of the very great safety of this desirable and physiological process, it is necessary to remind those who already are aware, and to tell those others who are unaware, of the fact that the figure for maternal mortality has sunk steadily over the last few decades to a level that would hardly have been thought possible 50, or indeed 25, years ago. This is immediately apparent when it is pointed out that the 1,410 deaths reviewed in this Report (representing some 80% of all maternal deaths) are but a tiny fraction of the 2,052,000 confinements that occurred in England and Wales during the 3 years 1952-54; 25 years ago a similar number of deaths would have occurred in 6 months, instead of 3 years. It was in spite of this tremendous improvement, and in the belief, however, that still more might be accomplished, that the present enquiry was initiated. Let us consider what it has achieved; in this account the mention of figures and statistics will be reduced to a minimum.

Primary Avoidable Factor

In the enquiry the first fact that emerged was that a primary avoidable factor existed in certainly no less than 43% of all deaths in the series. It is interesting to note that in a recent publication of a parallel enquiry in Massachusetts, Jewett¹ gave an almost identical figure of 47%. In both series about 10% of the cases were classed as 'doubtful' or 'undetermined', and for reasons already stated it would be fair to say that an avoidable factor was present in at least half of all maternal deaths.

Causes of Maternal Deaths

The nature of the chief causes of maternal deaths in England and Wales in the enquiry series can be set out as in Table I. These four conditions together account for two-thirds of the deaths due to pregnancy and childbirth.

TABLE I. CHIEF CAUSES OF MATERNAL DEATHS *

	No. of cases	% of total
Deaths due to toxæmia (including toxæmic antepartum haemorrhage)	246	22
Deaths due to haemorrhage (excluding toxæmic antepartum haemorrhage)	188	17
Deaths due to abortion	153	14
Deaths due to pulmonary embolus	138	13

* 1,094 deaths, in the 3 years 1952-54 directly due to pregnancy or childbirth (England and Wales).

In the 316 deaths associated with pregnancy and childbirth, heart disease is pre-eminent, accounting for no fewer than 121 cases or more than one-third of the total.

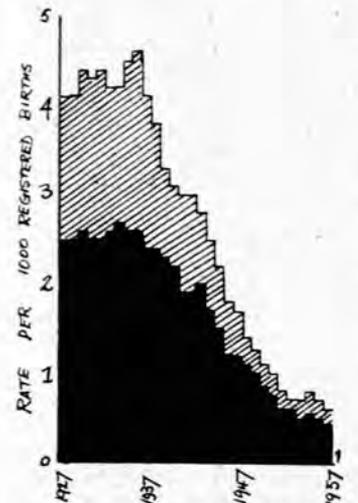


Fig. 1. Maternal mortality (per 1,000 births) from (1) sepsis and (2) other causes.

Attention is directed to the humble position occupied by puerperal sepsis. Not long ago this condition could truly be described as the nightmare of midwifery. Year after year it headed the list of fatal causes of maternal death and its position appeared impregnable. It was not affected by the efforts of clinicians or administrators to provide a better service, or by the greatly improved education of medical students and midwives, or by the provision of increased facilities for hospital confinements; the institution of antenatal clinics and the widespread appreciation of prenatal care made no difference and, lastly, no effect was apparent concurrent with the rapid advances of our general knowledge in all branches of medicine. In the present enquiry puerperal sepsis accounted for only 42 deaths or about 4% of the total deaths. In the series investigated by the Departmental Committee on Maternal Mortality and Morbidity whose report was published in 1932, the comparable figure for puerperal sepsis was 37% of maternal deaths. The steady and truly dramatic decline in the contribution made by puerperal sepsis is shown in Fig. 1.

TOXAEMIA OF PREGNANCY

Toxaemia of pregnancy now occupies the unenviable position as the chief cause of maternal death; in all, 246 cases, or nearly one-quarter of the deaths due to pregnancy and childbirth in this series. Avoidable factors were believed to be present in 128 cases or 52%.

The 246 cases were divided on clinical evidence into 'pre-eclampsia', 'eclampsia', and 'accidental haemorrhage with toxaemia', and it is of interest to note that no fewer than 90 fell into the first group (pre-eclampsia). This fact appeared to be unusual in that death occurring in the pre-eclamptic state was not commonly observed. However, the reports contained a full account of the post-mortem findings in 68 instances (Table II) and this left only 22 in which the pathologist's opinion was inconclusive.

For some years there has existed a general appreciation of the increased risk of death from toxaemia with increasing age and increasing parity. The present investigation clearly confirms this fact, as is demonstrated in Figs. 2 and 3. In a

break-down of the figures according to the presence or absence of an avoidable factor no consistent variation was apparent in the matter of the parity, but this did not seem to be so in the case of the age of the patient. Reference is made below to a possible explanation (in the review of the nature of the avoidable factor).

TABLE II. POST-MORTEM FINDINGS IN 68 DEATHS FROM TOXAEMIA OF PREGNANCY

Massive hepatic and/or renal necrosis (including acute yellow atrophy of the liver)	29
Cerebral haemorrhage	13
Cardiac failure (severe hypertension)	9
Uraemia	5
Cerebral thrombosis	4
Pulmonary embolus	3
Renal cortical necrosis	2
Peritonitis after Caesarean section	2
Suprarenal haemorrhage	1
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A survey of the arrangements made by the patient for her confinement brings out information of interest and perhaps of importance and is summarized in the following

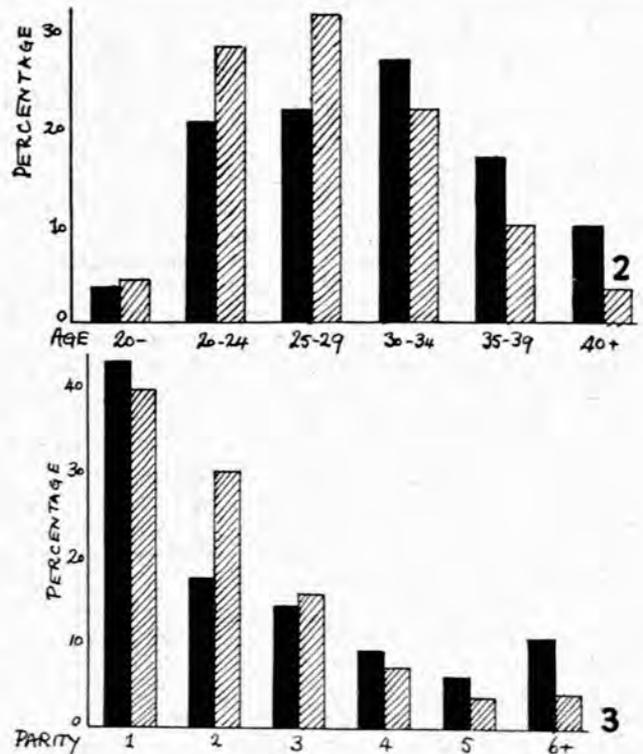


Fig. 2. Percentage distribution of maternal deaths from toxaemia (shown in black) and of all registered births (shown hatched) according to maternal age.

Fig. 3. Percentage distribution of maternal deaths from toxaemia (shown in black) and of all registered births (shown hatched) according to parity.

Fig. 4. It is at once clear that there is a great difference in the proportion of deaths with avoidable factors amongst those women who had made arrangements for their confinement at home compared with those who had placed themselves under the supervision of a hospital.

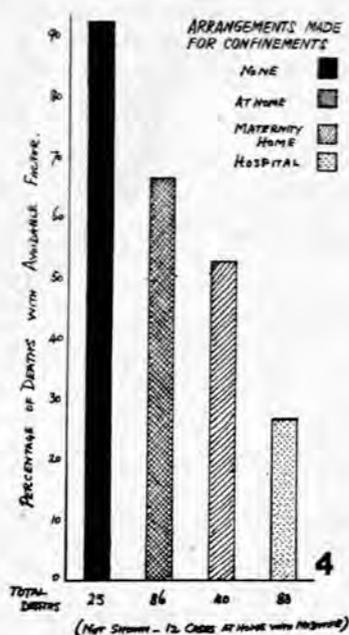


Fig. 4. Toxaemia: percentage of deaths with avoidable factor according to arrangements made for confinement.

may indicate that the appearance of toxaemia of pregnancy is an indication for hospital care and that this suggestion was not implemented.

It is only by a scrutiny of the nature of the avoidable factors that we may expect to learn where the obstetric service is likely to fail and from this metaphorically to make an attempt to plug the holes, however small they may be, in a leaking ship. In many cases more than one avoidable factor was present, but of all perhaps the most striking (to me at any rate) was the part played by the patient herself. The report shows that in a number of instances, in spite of the fact that the woman was really ill and in spite of the urgent requests of doctors and midwives, the suggestion that arrangements be made for her immediate admission to hospital was turned down time and again. In this the sick patient was often supported by ignorant or stupid relatives. Whether more can be done by health and education services in the future remains to be seen.

The most serious contributory cause to the group with an avoidable factor lay in the lack of provision for adequate antenatal care. On 59 occasions it was apparent that there had been an obvious failure in the accepted standard of prenatal supervision. Again it is only fair to point out what a minute fraction this constitutes of the total antenatal visits of the two million women who underwent their confinement in the years under review. The figure may indeed be increased by those forms registered as 'doubtful', but this small addition would make no appreciable difference. Nevertheless, antenatal care did fail and need not have failed—and this both in quality and quantity. Faults were found in all branches of the service. If the patient's arrange-

ments were made for confinement at home transfer to hospital was delayed until it was too late; or if she were under the care of a hospital her admission on the appearance of symptoms and signs of toxæmia was not immediate. An excuse, for which there existed no justification whatever, was occasionally made that no beds were available. If genuine difficulty did indeed exist, it indicated the necessity for an immediate survey of bed allocation by both clinicians and administrators, who should be guided by the fact that the number of antenatal beds in any obstetric unit should be assessed, not in proportion to the number of beds provided for parturient women, but rather on the size of the population served by the hospital.

Another fault in the antenatal service repeatedly appeared. Either no record was kept by the hospital, clinic, doctor or midwife of the dates on which the patients were to be next seen, or if such a record were kept and the patient did not attend, no effective steps were taken to discover why. Time and time again the reason for non-attendance was discovered, too late, to be illness of the patient. The value of an accurate attendance-card system and the rigid adherence to the rule that non-attendance demands immediate enquiry—and this not by letter post—must surely be accepted. In the present series in every case but one this particular failure was recorded in the antenatal service attached to a hospital unit.

In a number of instances the avoidable factor lay in the arrangement for the confinement to take place at the patient's home. The mistake was indisputable in this group and it would not be unfair to state that it was the cause of death in these women. Thus home confinement was agreed to when the woman had had pre-eclamptic toxæmia in previous pregnancies, or when she was 40 or more years of age.

HAEMORRHAGE

In all, no fewer than 220 women in the series under review lost their lives from loss of blood. Haemorrhage was either the direct cause of death or it initiated a train of events that led to death, as in some cases of accidental haemorrhage in which the patient ultimately succumbed to anuria.

The 220 cases were grouped as shown in Table III. All

TABLE III. DEATHS DUE TO HAEMORRHAGE

	Cases
Accidental haemorrhage	78
Placenta praevia	29
Postpartum haemorrhage with retained placenta	53
Other postpartum haemorrhage (excluding haemorrhage following Caesarean section)	60

the deaths from accidental haemorrhage are included, whether they were thought to be due to pre-eclamptic toxæmia or not. This was done because, whatever their cause, points in common were present in their management. There is also the well-known difficulty in the clear demarcation of toxæmic and non-toxæmic accidental haemorrhage. Deaths due to haemorrhage following Caesarean section have been excluded, since these were regarded clinically as a post-operative complication; they are considered below.

The occurrence of death from haemorrhage in relation to age and parity are shown in Figs. 5 and 6. Again they confirm clinical experience and show that the risk of haemor-

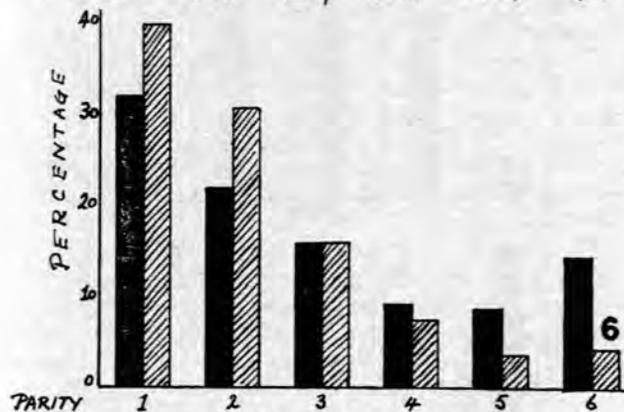
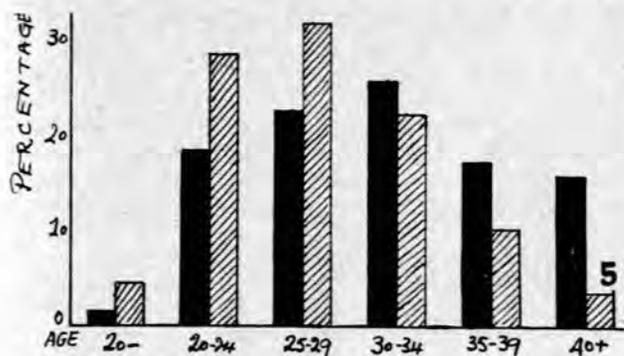


Fig. 5. Percentage distribution of maternal deaths from haemorrhage (shown in black) and of all registered births (shown hatched) according to maternal age.

Fig. 6. Percentage distribution of maternal deaths from haemorrhage (shown in black) and of all registered births (shown hatched) according to parity.

rhage is greater in the older age-groups and in women of the higher parity.

It is when attention is drawn to the incidence of the avoidable factor that valuable information may be forthcoming. Figs. 7 and 8 show the proportion of deaths with avoidable factors present in relation to the arrangements made for the confinement. Allowance must, of course, be made for the small number of cases under a few of the headings, but it is clear that wherever the arrangements were made for the confinement to take place at the patient's own home or in a maternity home the incidence of avoidable factors was raised and was particularly high in cases of post-partum haemorrhage. In regard to the significant difference in the incidence of avoidable factors when arrangements were made for a domiciliary confinement as compared to the hospital series, the words of the Report read: 'This, of course, is not to say that domiciliary care is less safe for the normal, but it does suggest a greater risk, as might be expected, for the abnormal or for those cases in which, by reason of higher age or parity, there is likelihood that abnormality may arise.'

The analysis of the avoidable factors falls in the main into the headings considered already under toxæmia of pregnancy. Thus it was found that the quality of antenatal supervision was inadequate, in that no notice had been taken by the patient or by the doctor of slight, but warning, loss of blood in pregnancy, or that antenatal care was irregular, or that difficulties were said to be experienced

in the arrangement for admission to hospital or, lastly, that the arrangement for domiciliary confinement was made in most unsuitable cases. But it is in the management of the actual haemorrhage when it had occurred that the majority of avoidable factors were discovered. It is necessary here to remind you that in the small and thickly populated British Isles, the practical value of the Emergency Obstetrical Team, usually called the Flying Squad, has over recent years been proved time and again. These teams are so organized and so placed that they are within reach of about 30 minutes of any but the very few thinly populated parts of the country. At any rate, this applies to the whole of England and Wales and to most of Scotland. It was the lack of appreciation of the value of summoning expert aid to the patient that made all the difference between life and death. Instead of doing so, arrangements were made for the transfer of the patient, often only a very short distance, to hospital, and this when she was either dangerously ill through loss of blood, or alternatively when it was probable that the disturbance that must inevitably accompany the journey would almost certainly precipitate further, and perhaps fatal, loss of blood in a case of placenta prævia. The Flying Squad possesses the personnel, skill and equipment simply and safely to resuscitate the patient and has thereby almost removed the hazards of the subsequent transfer of the patient from her home to the hospital.

Another point that became apparent was the lack of appreciation of the risk of moving a patient from her home to a hospital with the placenta undelivered. In at least 21 instances this provided a primary avoidable factor. In many of these fatal cases comparatively little haemorrhage had occurred before arrangements were made for the trans-

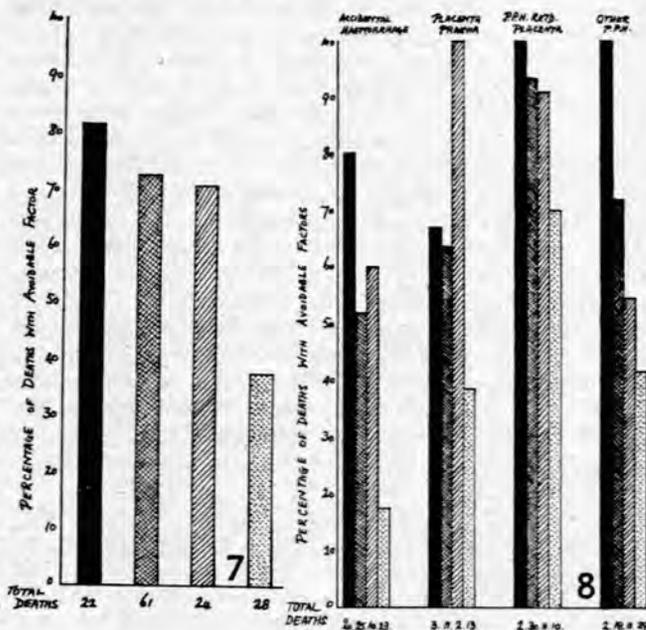


Fig. 7. Haemorrhage: percentage of deaths with avoidable factor according to arrangements made for confinement (arrangements indicated in same manner as in Fig. 4).

Fig. 8. Accidental haemorrhage, placenta prævia, PPH with retained placenta, other PPH: percentage of deaths with avoidable factor according to arrangements made for confinement (arrangements indicated in same manner as in Fig. 4).

ference of the patient, and in every case she arrived almost moribund and in a state of shock that proved irreversible.

There is no doubt that the move to hospital of women who are still in the third stage of labour has been done in the past and still is done today. The doctor should ask himself most seriously whether alternative arrangements would not be wiser.

PULMONARY EMBOLISM

Although it was found that the cause of death in 138 women was massive pulmonary embolus, it is perhaps sad to have to admit that, partly owing to lack of information, but mostly owing to our almost complete lack of understanding of this condition, no constructive information was obtainable. The incidence of avoidable factors was therefore considered negligible.

ABORTION

In the series under review death from and directly due to abortion occurred in no fewer than 153 women, and this condition occupies fourth place as a cause of maternal mortality. In 108 instances the death was regarded as avoidable because the abortion was known to have been procured by the woman herself in 58 instances and by some other person in 19 instances, and in the remainder the specific information was lacking. A few facts of importance emerged from the reports. Firstly, the number of procured abortions was just 4 times as great in married as it was in single women. It was further noted that the majority of single women were living in what was classed as 'comfortable' circumstances, whereas a considerable number of the married women were classed as 'poor'. This suggests that the latter group, living under poor conditions, might have had a struggle to keep a home together and acted in the belief that they could not contemplate another addition to the family. Sepsis accounted for over half the deaths and air embolus for a quarter. In 50 instances of procured abortion the method used was the injection under pressure of some fluid, usually soap and water, into the vagina and occasionally, possibly, into the cervix. Every single death from air embolus followed the use of this method. Bacteriological examination showed the dominance of *Cl. welchii* as the pathogenic organism in those cases where infection was a factor. All with experience of the care of patients who have procured abortion, or have had abortion procured, will already know that for every death countless other women go through a dangerous illness from which they may never completely recover. Perhaps a minor complication is that many of them are left sterile.

The problem is just as much a social problem as it is medical, but it is one that will have to be tackled sooner or later all over the world.

CARDIAC DISEASE

Following closely in importance on abortion, cardiac disease associated with pregnancy and childbirth accounted for 121 deaths.

The age analysis (Fig. 9) again shows the increased risk amongst the older age groups. Fig. 10, however, tells us

that death from cardiac disease, in the great majority of cases mitral valve disease, occurs in a high proportion of first pregnancies. There seemed to be no special time in pregnancy when death was likely to occur in this group and the incidence here of what was considered to be an avoidable factor was low. The explanation lies probably in the very great difficulty in giving an accurate prognosis of the manner in which a diseased heart is likely to behave during a first

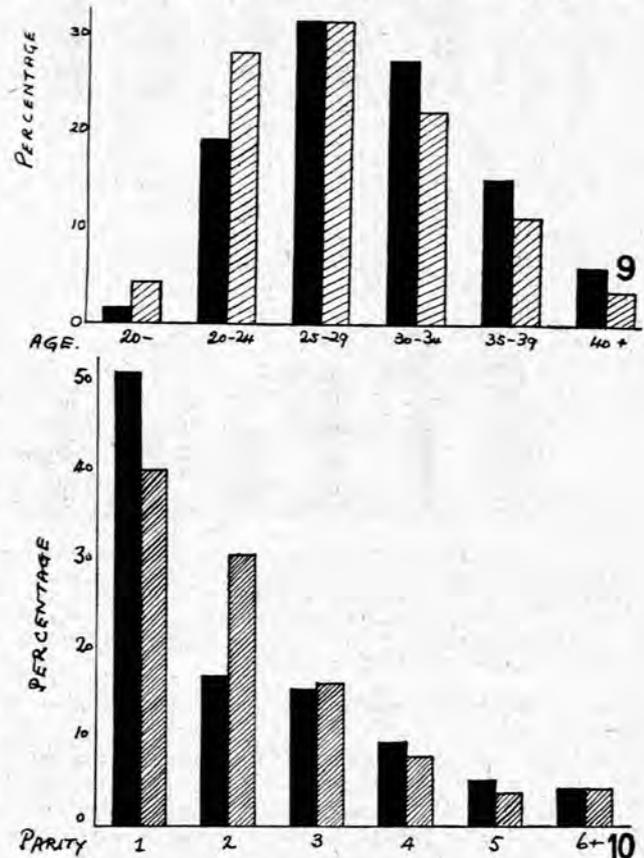


Fig. 9. Percentage distribution of maternal deaths from cardiac disease (shown in black) and of all registered births (shown hatched) according to maternal age.

Fig. 10. Percentage distribution of maternal deaths from cardiac disease (shown in black) and of all registered births (shown hatched) according to parity.

pregnancy. About one-third of the cases died in pregnancy, about one-third died during or immediately after delivery, and the remaining third during the puerperium. This is mentioned because it is commonly taught that death from heart failure is not common during labour and that the most dangerous time for the mother is in the early days of the puerperium.

An analysis of the incidence of the avoidable factor once more shows a repetition of findings that have already been noted. An avoidable factor was obviously present in about one-third of the total number of cases in which death occurred from heart failure, and this proportion would be appreciably increased by a number of records that from lack of necessary information had to be classed as 'doubtful'.

Once more the patient herself, aided by ignorant and probably stupid or selfish relatives, provided an avoidable

factor in that the acceptance of advice given about the wise management of pregnancy was flatly refused. In a few instances antenatal care, for one reason or another, was frankly inadequate, but throughout the series there existed a definite, and what might be termed general, failure to appreciate the absolute value of, and necessity for, a reasonable period of rest in bed in hospital for some weeks before the onset of labour.

Several of the patients were multiparae and in these cases the assumption appeared to have been made that because the woman had successfully accomplished previous pregnancy, labour and the puerperium with little evidence of cardiac embarrassment, therefore this happy state could be anticipated indefinitely. It was as though the problem was regarded as being analagous to that of the patient who was suspected of having a slight degree of pelvic contraction and whose first confinement provided valuable information on the likelihood of normal labour in the future. Such an analogy, of course, is completely unjustified in any woman suffering from valvular disease of the heart, for this surely is a progressive disorder. That such indeed was the case was demonstrated in those women whose death occurred from heart failure in their 5th or 6th pregnancy.

Occasionally, although a cardiac abnormality was noted, no attempt was made to obtain expert advice from a suitably experienced physician. Sometimes arrangements were made for these patients to be confined in their own homes—certainly a most unwise proceeding, for it is surely impossible accurately to give a prognosis about cardiac function in pregnancy or labour.

The advantage of a hospital booking for these women is clear. It ensures a hospital bed in the event of early symptoms of impending trouble; it ensures a hospital bed for a routine period of complete rest in the pregnancy; it facilitates the availability of expert advice and, lastly, in the event of heart failure, life-saving treatment is likely to be much more efficient and more readily provided.

CAESAREAN SECTION

The fact that death followed delivery by Caesarean section on no fewer than 183 occasions out of the total of 1,410 records received during the period under review indicated that a careful scrutiny of these cases was merited and was likely to be productive of information of importance.

In the first place, by a somewhat complicated, but probably accurate, method of calculation it was possible to estimate that the incidence of Caesarean section in England and Wales during the 3 years 1952-54 was approximately 28 per 1,000 of all deliveries; also that the mortality rate for these cases was at the rate of 4 per 1,000, which may be compared with the total maternal mortality rate (excluding abortion) of 0.6 per 1,000 cases. This agrees very well with figures given by Marshall and Cox² (1949). In a total of over 7,000 Caesarean operations performed between 1943 and 1947 a maternal mortality figure of 9.9 per 1,000 was discovered. If, however, an estimate was made in those cases in their series in which section was premeditated and the general state of the patient was good, for 850 upper-segment operations the mortality rate was 3.5 per 1,000 and for 2,276 lower-segment operations only 1.3 per 1,000.

The figure of 4 per 1,000, calculated in the Report, is of

interest as it indicates the risks, or safety, of the procedure in a series of cases on a national basis as distinct from a series presented by any one individual surgeon or occurring in any one obstetric centre.

Before the causes of death are considered it is necessary to state that although the deaths followed Caesarean section the fatality was by no means always directly related to the operation. Table IV shows the incidence of what was

TABLE IV. CAUSE OF DEATH IN DEATHS FOLLOWING CAESAREAN SECTION

<i>Immediate Cause of Death</i>	<i>No. of cases</i>	<i>%</i>
Haemorrhage	35	20.0
Pulmonary embolism	32	18.3
Shock or Collapse	30	17.1
Sepsis	14	8.0
Ileus	12	6.9
Asphyxia from inhalation of vomit during anaesthesia	12	6.9
Nephritis	7	4.0
Cardiac failure	6	3.4
Pneumonia	5	2.9
Eclampsia	5	2.9
Other causes	17	9.7
Total	175	100.0

believed to be the cause of death, and subsequent reference is made only to the 6 conditions that head the list. As the report states, it is surprising to see that haemorrhage was the chief cause of the loss of the mother's life. The true figure may well be considerably higher, for excessive loss of blood must influence the likelihood of pulmonary embolism and again from the clinical observations made in the records haemorrhage almost certainly preceded many of those included in the heading 'shock or collapse'. Marshall and Cox² in 1949 recorded an exactly similar observation. In their series of cases half the deaths following Caesarean section occurred within the first 3 days and the cause was noted to be haemorrhage and shock in the great majority.

The conditions of haemorrhage, pulmonary embolism and shock or collapse resolve themselves into one group, for in the majority—48 out of a total of 65 or 73.8%—the operation was premeditated and the patient was not in labour. In the second group, sepsis and ileus, out of 26 cases exactly the reverse was seen, for the patient had been in labour, sometimes many hours, in 18 cases or 69.2%. It is obvious, therefore, that a different set of circumstances were likely to be present in each group, and such indeed is what was found. In the smaller group, where death was certified as being due to sepsis and ileus following an operation performed usually after the patient had been in labour or the membranes had been ruptured for many hours, the sequence of events requires no clarification. It is to the first group, where death occurred directly or indirectly as the result of loss of blood that attention is directed, for surely in these days this occurrence must be regarded as unusual, if not unnecessary, in hospital practice. Arrangements for Caesarean section, when premeditated, should only be made in a suitable hospital and this was not always done. Many contributory factors were found to be responsible and often more than one was present. Thus it appeared that frequently insufficient attention was paid to the general condition of the patient immediately before or at the time of the operation. Extending over the preceding weeks a

state of anaemia had received inadequate treatment. Alternatively, there had been a lack of appreciation of the cumulative effect of repeated if apparently small losses of blood, or of the dangerous possibilities of a subsequent and more severe haemorrhage. Patients were despatched by ambulance whose condition was poor at the start of the journey and perhaps desperate on arrival at hospital or, in other words, inadequate consideration was given to the advisability of instituting steps directed towards resuscitation in the home by the emergency obstetric team. It is never possible at the time of operation to foretell the amount of blood that will be lost, but when Caesarean section is performed for placenta praevia, and if at the time there are found to be present in the lower segment of the uterus a collection of huge blood vessels, the wisdom of making the incision through the uterine wall for a lower-segment operation as a routine, and therefore through an obviously highly vascular and dangerous area, seems at least to merit some thought. In several instances in this series death occurred in just this manner from truly uncontrollable haemorrhage, which might have been avoided by the siting of the uterine incision at a slightly higher level and away from certain danger. Lastly, haemorrhage was seen to occur after completion of the operation, perhaps after the surgeon had left the hospital. Delay occurred in some cases in the initiation of rapid blood transfusion and this was due either to inadequate preparation in the preliminary estimation of the patient's blood-group and the provision before operation of suitable blood, should transfusion be necessary, or occasionally to the performance of the operation in most unsuitable maternity homes or small hospitals, both of which would lack the necessary expert and technical assistance.

DEATHS DUE TO THE COMPLICATIONS OF ANAESTHESIA

In the series under review death occurred from this cause in 49 cases and it is probable that in at least 20 others the anaesthetic was a contributory factor. The fact that in 32 instances death was caused by the inhalation of stomach contents appeared to merit attention, especially so as this complication must have occurred on very many other occasions when, while it was not fatal to the woman, the state of anoxia possibly killed the undelivered foetus. The indications for the anaesthetics in this series were varied, as also were the numerous anaesthetic agents used. Whenever an anaesthetic is required for a woman at the end of pregnancy, and especially toward the end of labour, the case is fraught with potential dangers. Both anaesthesia and childbirth in these days are such safe procedures that every consideration must be given to any preventable cause of disaster. The depth of anaesthesia needed is usually light, partly in order that at the subsequent delivery the living baby should respond quickly to the stimuli initiating respiration and partly to preserve the power of contraction and retraction of uterine muscle. The lightness of anaesthesia in itself increases the possibility of regurgitation of stomach contents and demands greater skill in its administration. The patient is not always in good condition, for she will be tired, may be exhausted, and may already have lost blood. In a praiseworthy attempt to prevent ketosis she will probably have been encouraged in labour to take frequent glucose drinks and the stomach is not likely to be empty. The presence of the large pregnant uterus itself tends to embarrass

normal respiration and heart action, and this is not lessened by the use of the dorsal position and still less by the lithotomy position now generally adopted respectively for natural and forceps delivery. The dangers of the inhalation of regurgitated stomach contents are considerably lessened when the delivery is conducted with the patient lying on her left side. In the event of regurgitation it is of great assistance immediately to be able to tip the labour-ward table head downwards and the value of an efficient suction apparatus is undisputed. Neither of these will be available except in the labour ward of a hospital. It is strange to think that, whereas tremendous and life-saving advances have been made in nearly every other branch of anaesthetics over the last two or three decades, our colleagues have so far directed little attention to, indeed it would not be unfair to state that they have shown little interest in, the problems and dangers of the administration of anaesthetics to women in late pregnancy or in labour.

CONCLUSION

Has it all been worth the trouble? This question might well be asked—indeed, to my certain knowledge, it has been asked. With a national maternal mortality rate as low as 0.6 per 1,000 registered births is much more likely to be achieved? Remarks are added to the effect that there must be an irreducible minimum and that assuredly that figure is being approached. I clearly remember, however, that exactly the same things were believed and stated 30 years ago, when the maternal mortality in Britain was 6 times as great as it is today; and the Report which is being considered has demonstrated that even today in approximately half the maternal deaths there exists an avoidable factor. Childbirth is becoming more and more safe and, if we are prepared to study lessons from material such as has just been provided, and to act upon them, a maternal mortality of 2, or even 1, per 10,000 births can be expected. Indeed, the number of maternal deaths registered in England and Wales fell by a further 11% in 1956 as compared with 1955.

Lest I be accused of placing before you an unreasonable and fanciful suggestion, I can at least claim that I am not alone in my belief. In his recent article on maternal mortality in Massachusetts, John Figgis Jewett¹ writes as follows: 'With this background of the past and present, one should consider now the thesis that, no matter how creditable the rate, it can always be reduced. There is a tendency to leave the proper fields of obstetrics and to dabble in others, deluded by the false assertion that an "irreducible minimum of maternal mortality has been achieved".' Jewett goes on to point out that foetal perinatal mortality is inevitably linked with maternal mortality and that as long as the perinatal foetal mortality rate is in the region of 30-40 per 1,000 live births it is, to use his own words, 'incredible that anyone would suggest such a threat to survival as all but ended'.

The immense amount of work that has been necessary for the completion of this report—work that has been contributed by midwives, general practitioners, medical officers of health, resident medical staff of all grades, anaesthetists, consultants and Ministry of Health personnel—has assuredly been fully justified. Of relatively minor importance are the possible faults and lapses shown to have occurred in the past, for they are undoubtedly eclipsed completely by the good that must inevitably follow in the future. Lessons

there are to be learnt and attention has been directed to some of the more important. Some will influence the individual—the practitioner of obstetrics—and others concern the administration of the midwifery service. The two are indeed complementary one to the other, but the former is by far the more important, for no amount of good administration can remedy poor obstetrics.

To all who practise obstetrics comes a dual message. In the first place, the truly remarkable fall in the maternal and perinatal mortality rates over the last 2 decades must be regarded as a genuine reward for care of the woman in the prenatal period and of increased skill in her supervision during labour and subsequent delivery. Admittedly the satisfactory results have been aided by what may be termed The General Advance in Medical Knowledge. In the second place, the report stresses the utmost importance and enormous value of prenatal care. No evidence was forthcoming that any part of this work is redundant, nor was there found a suggestion that we might possibly relax our efforts in one single direction. On the contrary, the Report has brought before us weak spots which deserve our attention and certainly merit repetition. To the individual doctor, be he in general or specialist practice, comes the warning that in antenatal care it is possible to pay insufficient attention to the insidious onset of anaemia or of the early symptoms and signs of pre-eclampsia, and that there is no place whatever in these conditions for a policy of *laissez faire*. Their detection indicates immediate and effective action. The same warning is justified in all pregnant women suffering from valvular disease of the heart. In all antenatal work, whereas regular observations made at accepted intervals are of value, non-attendance of the patient merits immediate investigation. In the conduct of the labour, and especially in the management of the third stage, there is no justification for delay in sending for additional help. There would appear to have been an occasional lack of appreciation of the value of blood transfusion in this respect and also of the services of the emergency obstetric team.

To all upon whom rests the responsibility for making a decision as to the necessity and performance of Caesarean section, this Report suggests that it is possible to give insufficient thought to the question whether the general state of the patient is as satisfactory as is possible before the operation is commenced. Also, during and following the operation, a warning is apparent that there are times when severe blood loss seems to have been looked on as inevitable and has not been followed by immediate replacement. Lastly, the Report suggests that our colleagues, the anaesthetists, might ask themselves whether they could not direct some of their skill and research towards increasing the safety and ease of administration of anaesthetics to women in labour.

In regard to administration, the first and most certain requirement surely is the absolute necessity for an organized service. In Britain this has been suggested by our Royal College twice during the last 10 years, and each yearly report has suggested a simple organization for the supervision and structure of such a service. It seems unlikely, however, that we shall put our house in order in any manner more rapid than the usual process of evolution. The availability and distribution of beds for obstetrics is also a matter for administration, and in this respect emphasis must be made on the fact that the number of beds available for ante-

natal cases must depend on the population to be served and not on the size of the obstetric unit existent in any locality. The organization and distribution of the Emergency Obstetric Units is now a matter of proved importance, whether their transport be by land, water or air.

How interesting it is, after the above paragraphs have been written, to read the recent article by Jewitt¹ to which reference has already been made, in which he states that the findings of his investigation, which differ very little from those in the Report we are considering, reveal 'five imperative demands upon the profession:

1. Doctors and public alike must be educated to better antenatal care.
2. Transfusions must be used early and copiously.
3. Caesarean section should be avoided at all reasonable cost.
4. A fanaticism of asepsis should be resumed to combat the rising proportion of septic deaths. (So far this is absent in Britain.)
5. Obstetricians must demand better anaesthesia.'

In the summary of the Report occur the following words: 'Reviewing the clinical and statistical information in the study of this series of maternal deaths it would seem justifiable to draw attention to the following points which should influence obstetric practice. (Only the headings will be given, in the order in which they are presented.):

- I. Nearly one-quarter of potential avoidability in maternal mortality lies in the patient's refusal or neglect to follow medical advice or to seek advice.
- II. The first step in the care of every pregnant woman should be careful consideration of the arrangements for confinement.
- III. The next step should be to plan the pattern of antenatal supervision at the onset.
- IV. In antenatal care the first consideration should be the assessment of the woman's general health.
- V. Refers again to unsuitable arrangements for confinement and lack of appreciation of the use of the emergency obstetric team.'

While all these are correct, it is possible to summarize in a different manner. Reference has already been made to the lowly position now taken by puerperal sepsis as a fatal illness, and all who are familiar with the thousand and more reports were equally impressed with the rarity of what may be termed disasters in labour such, for instance, as the case of failed forceps. In consequence, but little help would be obtained in an effort to discover causes for maternal death which possessed an avoidable factor in these two groups. Thirty years or more ago this would certainly not have been found to be so, and perhaps our greatest lesson is to be learned in a brief consideration of how this great change has been brought about. Puerperal sepsis is no longer the terror of midwifery, partly because the haemolytic streptococcus has decreased in virulence and partly owing to the discovery of antibiotics. The diminished risk of death from disasters occurring in late labour presents a more difficult problem. No doubt the advent of antenatal observation, the steady increase of hospital confinement, where skilled help and nursing is more readily available, the use of X-rays, and a fuller education of medical students, have all contributed to greatly better results. Viewed in another direction, throughout this series of cases, no matter whether pre-eclampsia, haemorrhage, heart disease, or whatever other

condition be taken to be the cause of death, the importance of the general health of the woman before and during pregnancy and labour stands out immediately as a factor of the utmost importance. Whereas this has been appreciated in some degree by a few, it has seldom received more than lip-service by doctors and midwives generally, whether they work independently or in clinics. Antenatal care in its early days, and to a great extent up to the present time, has interested itself for the most part in what may be termed the mechanistic aspect of obstetrics. By this is meant the detection of a contraction of the pelvis (and nowadays owing to the virtual disappearance of rickets the deformity is usually slight), the discovery of disproportion, or the finding and attempted correction of an unfavourable presentation or position of the foetus. All these efforts are praiseworthy and must continue, but their value is limited. In their detection it is as though the enthusiasm for them has been such as to lessen the observance of something else that is surely far more important, namely the patient herself and the state of her health.

It would almost be fair to say that, given a woman of normal stature and in a state of good physical health, the potential dangers of what has been called the mechanistic aspect of prenatal care almost vanishes into thin air. Such a patient will not have a contracted pelvis and, provided the foetus is of normal size, she will deliver herself safely and unaided no matter what is the foetal presentation or position. That this is true has been shown recently by the work of Dugald Baird^{3,4} and others. To ensure normal build and stature, and with it good physical health, the care of an individual must start in infancy or even before birth and must be continuous throughout childhood and adolescence. This indeed has been done in Britain and in many other parts of the world and has virtually abolished all but minor degrees of pelvic contraction. But it is not appreciated by what we may term 'the antenatalists'. To them the importance of the non-engaged foetal head is such as to mask a state of debility, gross dietetic errors, anaemia, early signs of heart failure, or indeed any deviation from normal good health.

The absolute necessity for a ceaseless, faultless and painstaking vigilance for the detection of the earliest symptoms and signs of pre-eclampsia has already been noted. Failure when it occurred seems to have been due to a lack of appreciation that the earliest symptoms and signs of pre-eclampsia indicates the necessity for action in arranging at once for the patient's admission to hospital, where continual observation and assessment presents no difficulties. In other words, the emphasis is on continuous and meticulous care in the preservation of good health.

This aspect of the case is just as important in the matter of loss of blood. A moderate haemorrhage in a woman in good health may not be dangerous, whereas if she is not in good health, and especially if she is anaemic, the same haemorrhage may be fatal. The risk of anaemia developing in pregnancy is very real. Far too often no serious attempt is made at any time to assess the blood state of the patient. Even if this is done, there seems to be little appreciation of the vital importance of treatment so active that it will ensure that the woman reaches the end of her pregnancy with a normal blood picture. In the series of cases of haemorrhage there were instances also of failure to replace blood lost,

or to be too slow, for varying reasons, in so doing. All these were especially noticeable in cases of Caesarean section. Once again the importance of the general physical state takes first place.

Valvular disease of the heart ranks high as a cause of maternal death and it is suggested that the condition may be presented as yet another that receives insufficient attention simply because it represents a deviation from what may be termed the general, rather than the obstetric, state of the patient. This theme could be continued almost indefinitely, but the picture would be the same. The examples that have been given are only examples of single items. The production and maintenance of that often ridiculed state of 'positive health' has only of late years received much attention. It may well be that exhaustive and exhausting research into the almost unexplored regions of dietetics will in the course of time provide a major, if not final, solution to the cause and abolition of many illnesses, and therefore dangers, peculiar to pregnancy and childbearing.

It is opportune at this point to direct attention to another and extremely important benefit that inevitably must accompany meticulously careful prenatal work. Whereas it will be somewhat grudgingly accepted that such measures may be expected to be followed by a small drop in an already exceedingly low rate of maternal mortality, it should never be forgotten that for every registered maternal death there are inevitably a far greater number of women who suffer but survive, and about whom nothing exact is known. They could be classed under the heading of maternal morbidity. Any reduction in maternal mortality, therefore, will result in a correspondingly larger reduction in maternal morbidity. Last, and by no means least, maternal mortality and maternal morbidity are equally certainly related to the perinatal mortality of the foetus. It may well be that every effort to reduce the maternal mortality rate will be productive of the heaviest dividend of all, namely, a truly significant diminution in stillbirth and neonatal death rates.

ENVOI

The closing note of this review, therefore, is to give emphasis to what (in my opinion) is the most important lesson to be learnt from the Report. The suggestion is made that as the result of many pointers, of which this recent Report on maternal deaths is one, consideration should be given to the advisability of an altered outlook towards prenatal care. While in no way diminishing the observance of and search for what may be termed purely obstetrical abnormalities, there should be a much wider appreciation of the relatively greater importance of the general health of the woman. Put in other, if rather unkind, words, we should regard our patients as patients, and not as travelling incubators whom we inspect at regular intervals for the detection, and if possible rectification, of some fault in function of relatively minor importance. Briefly stated, let the obstetricians tend to return toward the ranks of the general physicians and as such to practise Medicine with a capital 'M' rather than to wander, if not stray, into ever increasing specialization.

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