

PERINATAL MORTALITY

THE CAUSES OF STILLBIRTH AND EARLY NEONATAL DEATH  
AS OCCURRING IN THE OBSTETRICAL UNITS OF THE UNIVERSITY  
OF CAPE TOWN DURING THE YEARS 1952 to 1955 INCLUSIVE,  
WITH A STATISTICAL ANALYSIS OF 1933 PERINATAL DEATHS  
WITH SPECIAL REFERENCE TO THE PART PLAYED BY ANTENATAL  
SUPERVISION AND PREMATUREITY IN THE WHITE AND NON-WHITE  
PATIENT.

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PART I. THE CAUSES OF PERINATAL DEATHS WITH SPECIAL  
REFERENCE TO THE PART PLAYED BY ANTENATAL  
SUPERVISION IN THE WHITE AND NON-WHITE PATIENT.

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"It is as natural to die as to be born; and to a little infant, perhaps, the one is as painful as the other."

"Of Death" (Francis Bacon)

"The Destruction of the Poor is their Poverty."

Proverbs X: 15.

KEY TO ABBREVIATIONS.

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|--|--|
| <u>A.H.</u> Accidental haemorrhage.            | <u>P.</u> Primipara/primigravida.            |
| <u>A.P.H.</u> Antepartum haemorrhage           | <u>P.C.</u> Prolapse of cord.                |
| <u>A.R.M.</u> Artificial rupture of membranes. | <u>P.E.T.</u> Pre-eclamptic toxæmia.         |
| <u>B.</u> Booked.                              | <u>P.M.H.</u> Peninsula Maternity Hospital.  |
| <u>B.E.</u> Breech extraction.                 | <u>P.N.M.</u> Perinatal mortality            |
| <u>C.</u> Craniotomy(also Cr.and Cran.)        | <u>P.O.P.</u> Persistent occipito posterior. |
| <u>Cl.</u> Cleidotomy.                         |  |
| <u>Const.Ring.</u> Constriction ring.          | <u>P.P.</u> Placenta prævia.                 |
| <u>D.T.A.</u> Deep transverse arrest.          | <u>Prem.</u> Premature/s.                    |
| <u>D.</u> Decapitation                         | <u>Rh</u> Rhæsus.                            |
| <u>E.</u> Emergency(also "N.B.")               | <u>R.U.</u> Ruptured uterus                  |
| <u>Ecl.</u> Eclampsia(also eclamp.)            | <u>Rupt.cord.</u> Ruptured cord.             |
| <u>E.C.V.</u> External cephalic version.       | <u>S.B./s</u> Stillbirth/s.                  |
| <u>Ess.Hypert.</u> Essential hypertension.     | <u>St.M.H.</u> Saint Monica's Home.          |
| <u>EV.</u> Evisceration.                       | <u>Tr.lie.</u> Transverse lie.(also T.V)     |
| <u>F.F.</u> Failed forceps.                    | <u>T.B.</u> Tuberculosis.                    |
| <u>F.H.S.</u> Foetal heart sounds.             | <u>Trip./s.</u> Triplet/s.                   |
| <u>G.S.H.</u> Groote Schuur Hospital.          | <u>U.C.I.</u> University College, Ibadan.    |
| <u>I.U.D.</u> Intrauterine foetal death.       | <u>U.C.T.</u> University of Cape Town.       |
| <u>I.V.</u> Internal version(also int.version) | <u>W.R.</u> Wasserman reaction.              |
| <u>M.</u> Multipara/multigravida.              | <u>2nd T.</u> second twin.                   |
| <u>M.D.</u> Maternal death.                    | <u>1st T.</u> first twin.                    |
| <u>M.H.H.</u> Howbray Maternity Hospital.      |  |
| <u>M.P.</u> Mento-posterior.                   |  |
| <u>M.R.</u> Manual rotation.                   |  |
| <u>N.B.</u> Non-hooked.(also emergency)        |  |
| <u>N.N.D.</u> Neonatal death.                  |  |
| <u>No.(NO.)</u> Number/s.                      |  |
| <u>N.S.H.</u> New Somerset Hospital.           |  |

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Encircled number indicated total number of cases.



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KEY TO ABBREVIATIONS.

Cover

CALCULATION OF PROBABILITY RANGES.The  $X^2$  Distribution test.

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CALCULATION OF PROBABILITY RANGES

COMPARISON OF SAMPLES WITH THE AID OF THE  $\chi^2$  DISTRIBUTION TEST.

This distribution test(Pearson) is eminently suitable when it is desired to compare observations(samples) with hypothetical values(anticipated values). It permits simultaneous comparisons, class for class, of several distributions.

If the observed frequencies in each class amount to  $(x + n)$  and the hypothetical anticipated values to  $\underline{n}$ , then

$$\chi^2 = \sum \left( \frac{x^2}{n} \right) - \frac{(x+n)^2}{n}$$

From this general formula the value  $\chi^2$  with summation over all the classes is obtained. With this value the probability  $\underline{P}$  is taken from tables, with entry at the degree of freedom  $\underline{n}$ .

If  $\underline{P}$  is less than 0.05(or 0.01), then the difference between samples and anticipated values(expected distribution on the basis of the hypothesis) is significant.

With higher values for  $\underline{P}$ , from 10-90%, it is permissible to assume a certain agreement between the values compared, i.e. to regard the deviations between them as due to chance.

Very high values for  $\underline{P}$  however should be regarded with suspicion as being due to an error in calculation or a combination of extreme chances. Such a high degree of agreement is never as reliable as a more moderate one.

Comparison of 2 samples with 2 or more classes can be presented in tabular form, and these are known as 2 x 2 and 2 x n' tables.

A 2 x 2 table arises with the following problem, very often encountered in medical practice:

Example.

Of 108 babies delivered by forceps of women with adequate antenatal care, 20 were lost; of 237 babies born of women with inadequate care 74 were lost. Is there a significant difference in effect between patients delivered by forceps, and who had received adequate care and no antenatal care?

The appropriate 2 x 2 table is constructed

		<u>P.N.LOSS</u>		<u>ALIVE</u>		<u>TOTAL</u>
With A.N.C.	(a)	20	(c)	88	(e)	108
Without A.N.C.	(b)	74	(d)	163	(f)	237
<u>TOTAL</u>	(g)	94	(h)	251	(i)	345

The bottom line represents the required population in which there is no distinction between the presence and absence of antenatal care.

The anticipated values are now calculated, only one anticipated value being necessary because in the 2 x 2 table no further values need be investigated, e.g. (a) by multiplication and division :

$$a = \frac{g \times e}{i} = \frac{94 \cdot 108}{345} = 29.43 = m_a$$

All other values are then obtained by simple extraction from the totals. We can now obtain (anticipated values in brackets)

		<u>P.N.Loss</u>		<u>ALIVE</u>		<u>TOTAL</u>
With A.N.C.	(a)	20(29.43)	(c)	88(78.57)	(e)	108(108)
Without A.N.C.	(b)	74(64.57)	(d)	163(172.43)	(f)	237(237)
<u>TOTAL</u>	(g)	94(94)	(h)	251(251)	(i)	345(345)

$$x = (x + m) - m = 20 - 29.43 ; 88 - 78.57 ; 74 - 64.57 ; \text{etc.}$$

$$\chi^2 = \frac{(20 - 29.43)^2}{29.43} + \frac{(88 - 78.57)^2}{78.57} + \frac{(74 - 64.57)^2}{64.57} + \text{etc.}$$

$$\chi^2 = 6.0463.$$

Since there are 2 samples series each with 2 classes, in accordance with  $2 \times 2$  tables =  $(2 - 1)(2 - 1) = 1$ .

The degree of freedom  $n$  of any  $2 \times 2$  table is = 1.

In this example, for  $n = 1$  and  $\chi^2 = 6.046$ , a value of  $P$  between 0.02 and 0.01 is obtained, i.e. the difference between foetal losses in patients delivered by forceps, who had received antenatal care, and those without care is significant.

The following table formula for  $2 \times 2$  and also  $2 \times n'$  enables quicker calculations to be made (particularly with calculating machines):-

Sample 1 ( $a_1, 2, 3, \dots n'$ )	$a_1$	$a_2$	$a_3$	....	$S(a)$	= $n_a$
Sample 2 ( $b_1, 2, 3, \dots n'$ )	$b_1$	$b_2$	$b_3$	....	$S(b)$	= $n_b$
<b>TOTAL</b>	$a_1 + b_1$	$a_2 + b_2$	$a_3 + b_3$		$S(a + b)$	= $n_a + n_b$

whence the quotients  $P_1 = \frac{a_1}{a_1 + b_1}$   $P_2 = \frac{a_2}{a_2 + b_2}$   $P_3 = \frac{a_3}{a_3 + b_3}$  ....

which the products yields  $a_1 P_1$   $a_2 P_2$   $a_3 P_3$  ....  $\rightarrow NaP$

yield  $\chi^2 = \frac{1}{pq} (S(aP) - n_a \bar{p})$

Degree of freedom  $n = n' - 1$ .

$$\bar{p} = \frac{n_a}{n_a + n_b} ; \bar{q} = 1 - \bar{p}$$

In using this calculation 5 decimal places should be employed in order to obtain  $\chi^2$  exactly to 2 decimal places.

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All statistical calculations in tables produced in relation to perinatal mortality rates(stillbirths and neonatal deaths) in the thesis produced were based on the above distribution tests.

Indicative of a significant difference in rates there are red asterisks(\*) comparing not only differences in "booked" and "non-booked" cases, but also in the racial groups.

Incidence of various complications of pregnancy and labour are also similarly indicated.

Where there was only chance differences or no significant statistical differences a blue asterisk (\*) will be noted

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PREFACE.

PHYSICAL GEOGRAPHY.

Cape Town is situated at the northern end of the Cape Peninsula. The Peninsula lies off the west coast of the mainland of South Africa, extending from north to south a distance of about 33 miles and attaining a maximum width of about ten miles. Its average width east and west may be estimated at five miles. The northern half of its eastern side is connected with the mainland by a wide low-lying sandy isthmus, known as the Cape Flats, which separates Table Bay to the north-west from False Bay to the south-east. The narrowest part of the isthmus measures about twelve miles from sea to sea.

The backbone of the Peninsula is a mountain range which extends from Table Mountain (3,495 ft.) at its north end to Cape Point at the south. The land slopes from the mountains to the sea or where the isthmus joins the Peninsula, to the Cape Flats. While much of the Peninsula area lies at heights of over 1,000 ft., most of the isthmus does not reach 100 ft., and a rise of sea level would convert the Peninsula into two islands nearly equal in area.

At the northern end of the Peninsula mountain mass known as Signal Hill, Lion's Head and Devil's Peak, higher part of Table Mountain, almost the whole southern two-thirds of the Peninsula.

From the bottom of the slope below the face of Table Mountain extends down to Table Bay a bed of alluvial deposits, on which a good deal of old Cape Town is built. At the shore of the Bay

there is a considerable area of land that has been reclaimed from the sea by the deposit of town refuse.

### The Cape Flats.

The greater part of the municipality is built upon the Halmesbury slate or granite, the sandy Cape Flats, and alluvial deposits. On the coast of False Bay the town from Huizenberg to Kalk Bay is built on the Table Mountain sandstone or on the talus and sand dunes covering the sandstone slopes.

The City of Cape Town consists of a central portion, which before the City extension of 1913 constituted the whole Municipality and is sometimes known as Cape Town proper or central Cape Town (Wards 2-6) and a chain of suburbs on either hand. The Central portion lies in the amphitheatre which, extending down to Table Bay towards the north-east, is backed on the other sides by the precipitous face of Table Mountain and its outlying masses, Devil's Peak on the east and Lion's Head and Signal Hill on the west. It therefore lies between the mountain and the sea, and, unlike the centre of most cities, is not surrounded by its suburbs.

The suburbs extend beyond this amphitheatre on either hand. To the west, the marine suburbs, known as Green Point, Sea Point, Clifton, Camps Bay and Bakoven (Ward 1 and part of Wards 2 and 3) lie along the Atlantic Sea board for a distance of about six miles curving the coast in a southerly direction. They are on the seaward slopes of Signal Hill and Lion's Head.

To the east the "Southern Suburbs" (Wards 7-9 and 11-15) extend around Devil's Peak and are stretched for about sixteen miles along the road and suburban railway line which after rounding Devil's Peak along the eastern side of Table Mountain in a southerly direction to the shore of False Bay.

Woodstock and Salt River (Wards 6 and 7) next to Cape Town proper, slope down to Table Bay, and at the other end Muizenberg, St. James and Kalk Bay (Ward 15) lie on the False Bay coast. The string of suburbs between, known successively as Observatory, Mowbray, Rosebank, Rondebosch, Newlands, Claremont, Kenilworth, Wynberg, Plumstead, Diep River, Heathfield, Retreat and Lakeside, lie on the eastern slopes of the mountain range, and, to a greater extent, on the Cape Flats below them. The municipality extends over the Flats to a varying depth up to  $4\frac{1}{2}$  miles, and the parts on the Flats contain a number of scattered townships and estates, some of which are served by the Cape Flats railway, which forms a loop lying in a more easterly position than the suburban line.

There is an extension of the Municipality beyond Salt River in a north-easterly direction on the Flats bordering Table Bay. This (Ward 8) includes the suburbs of Whitland, Brooklyn, Rugby, Kensington and Windermere which, together with other townships lying outside the municipal area of the city and following the main road to the north, are known as the "Northern Suburbs".

Cape Town belongs definitely to the temperate zone, and tropical diseases, except in imported cases, are entirely absent. The state of health and the mortality statistics of the European part of the population are much the same as in a healthy European town.

#### SOCIAL AND ECONOMIC CONDITIONS.

Forty per cent of the total population of the Municipality of Cape Town (including Langa Native Township) of over 470,000 consists of Whites or "Europeans". The other 60 per cent is commonly designated as "non-Europeans", (non-whites) 82 per cent of these non-Europeans are of the mixed race known as Cape Coloured,

and the remainder consists of Natives and Indians, who are comparatively newcomers.

The Cape Coloured are largely the descendants of the slaves of earlier days, whose emancipation was completed in 1835. Their ancestors of the eighteenth century and earlier were mainly Europeans, Hottentots, blacks from Mozambique, Madagascar and other parts of Africa, and East Indians from the Dutch East Indies. In more recent years they have received additions from European, Bantu and other stocks.

There is one section of the Cape Coloured, Moslem in religion, known as "Malays", who are more immediately descended from the Dutch East Indians. Though they possess a larger infusion of this strain they are much mixed with the other elements present in the Cape Coloured generally.

The social and economic conditions of the Cape Coloured are on the whole unsatisfactory. A part of them have skilled trades and earn good wages but the majority are unskilled labourers and many of the men earn less than 70s. a week when in full work. The position is aggravated by the large size of the families, but the family income is eked out when possible by earnings brought in by the wife and children. The measures taken for the prevention and relief of distress are inadequate, and there is no compulsory insurance against sickness. There is much undernourishment, and housing accommodation is expensive and bad. The social and cultural level is low. The principle of compulsory education does not apply to non-Europeans, and, though there are some good Coloured schools, the general level of schooling is low, and there is a lack of discipline in adolescents and a serious problem caused by Coloured delinquency. The illegitimacy rate is high and venereal disease is rife. The social contrast between the Europeans and Cape Coloured can be expressed by the statement that whereas in the whites it is

only a small minority that belong to the depressed classes, in the Coloured it is in the majority. The same contrast is seen in the housing conditions; it is a small minority of Europeans who live in slum conditions, but a majority of the Coloured.

The Natives constitute only 16 per cent of the non-Europeans. They live in the Council's Native township (Langa) or as ordinary non-European residents in the city (where they are mostly slum dwellers) or in unsanitary shacks on the Cape Flats and Windermere, or on their employer's premises. The segregation prescribed by the Natives (Urban Areas) Act is by no means completely enforced, for the reason that the houses in the township are too few to accommodate the population to be housed. Many of the Natives are men from the Native territories who still retain their link with the territories and commonly return there eventually; but there is an increasing population of detribalized Natives who are permanently resident in Cape Town and live here with their families. Their social and economic conditions are on the whole worse than those of the Coloured people. Illegitimacy and venereal disease is common.

The Indians are 7,000 in number. They are nearly all traders and they are better off than the Cape Coloured. Some of them are making good progress in business and becoming well-to-do.

There are parts of the city where the inhabitants are mainly non-white and other parts that are exclusively occupied by whites and their non-white servants. The various sections of the community, however, are to a great extent intermingled, and there is nothing approaching complete segregation of the races. The geographical disposition of White and Coloured is very much the same as that of the well-to-do and poor in a European town. In the Operations under the Housing Act the estates for Europeans are separate from those for non-Europeans, and this will contribute to progressive residential separation. The provision of a Native township has the same effect.

## INTRODUCTION.

It is only within the last 2 decades that much attention has been focussed on foetal mortality, what with the spectacular fall in maternal morbidity consequent on the vast improvements in antenatal care, the consequences of the discovery of the antibiotics, and the liberal use of blood transfusions.

Although "far from good" results have accrued from these advances in our obstetrical units of the University of Cape Town, nevertheless striking improvements have been noted.

It is however sad to relate that because of the marked differences in the socio-economic status in our multiracial community, the benefits have not been equally shared by all races.

Hence although striking improvements in foetal mortality have occurred in the European race (whites), almost on a par with many overseas teaching centres, no similar marked advances have been shown in our non-whites (coloured and natives).

Despite the fact that the differences in socio-economics appears to be the main contributory factor in the higher foetal loss in the non-white, it is my opinion that a far greater improvement in existent antenatal services would still further strikingly lower the foetal mortality in these unfortunate and poor people.

It is with this object in view that this paper is presented in order to outline the main reasons for the higher foetal loss in the non-white, with particular reference to the benefits of antenatal care.

The presentation of this thesis was made possible only after the publication of first annual maternity reports from our units in 1952, under the guidance of Professor J. T. Louw. Since that time regular annual reports have followed, and it is for the 4

years 1952-55 inclusive that this paper was prepared.

In order to make this paper as readable as possible, I have divided it into 4 main chapters as follows:-

(1) Recent trends in foetal mortality ( stillbirths, neonatal deaths and perinatal loss ) in the obstetrical units of the University of Cape Town compared with those of other centres in the Union and overseas. Reports of the H.O.R. of other cities in South Africa are included, and my grateful thanks is extended for their kindness in personally forwarding this literature to me.

(2) Classification of the causes of stillbirths.

Pathological, clinico-pathological and almost purely clinical classification are outlined, and comparisons with other centres are presented. In our units in almost the majority of instances, clinical classification was followed because of the paucity of postmortem examination for reasons beyond our control.

In only about 18.5% of cases were autopsies performed, and in 4% permission was not granted for such investigation of the cause of death. It should however be emphasized that the causes of stillbirths were discussed fully at monthly obstetrical meetings of the teaching staff of the obstetrical units.

(3) Antenatal care.

The principles of antenatal supervision are discussed, with a brief history of antenatal care.

The pitfalls of inadequate antenatal care in our units, and of those of other centres are outlined, in relation to "booked" and "non-booked" cases.

The detailed effects of the relation of antenatal care to the individual causes of stillbirth in our units are outlined. Not unimportant in this aspect were neonatal and perinatal deaths, which were included in the majority of causes.

White (as depicted by the figures from the Mowbray Maternity

Hospital), and non-white (from the Somerset Hospital, St. Monica's Home, and almost entirely non-white unit from the Groote Schuur Hospital) statistics are compared as an index of the inadequacies of antenatal care in the 2 races.

(4) Prematurity.

Because of the close relationship of prematurity to foetal mortality (stillbirths, neonatal deaths and perinatal mortality), a comprehensive and detailed report on this subject as occurring in our obstetric units and those of other centres, with particular reference to antenatal care is outlined.

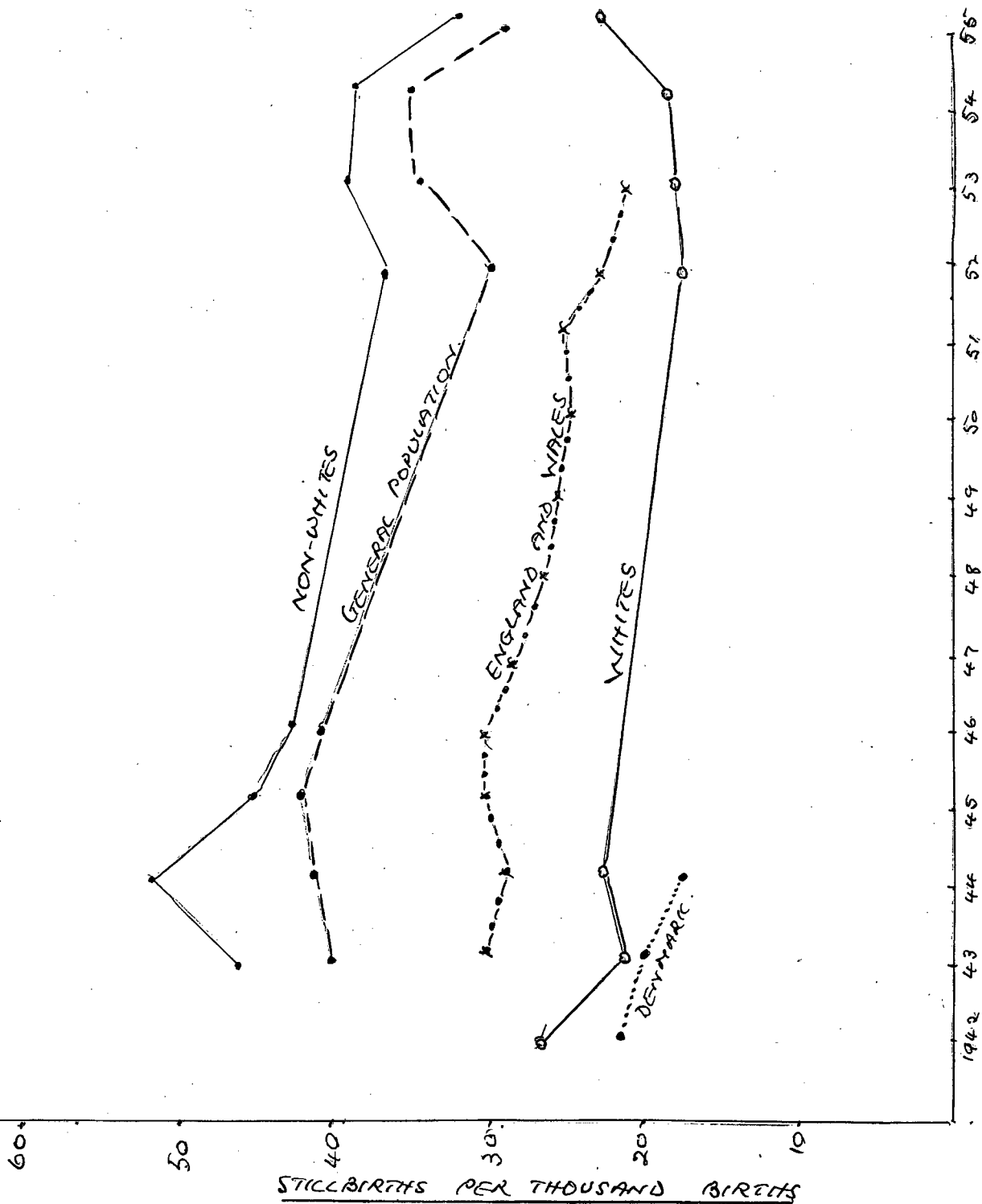
The incidence, causation, and foetal loss again with emphasis on antenatal care, is noted with much detail.

The influence of socio-economic status in relation to foetal loss is described in other centres and compared with our hospital population, nutritional and biologic conditions being particularly detailed.

References to world literature are included where possible under the many subheadings followed in this paper, and brief summaries on these subjects are outlined.

I wish to apologise for the many tables and graphs which I have found necessary to illustrate my points, which will make tiresome reading. This however was beyond my control.

My thanks are due to Professor J. T. Louw for his help and advice in the preparation of this thesis, and the encouragement he offered in the compilation of the subject material, and also to the Teaching Hospitals Board for their foresight in assisting with the compilation and publication of the hospital annual reports.



STILLBIRTHS (CITY OF CAPE TOWN) IN WHITES AND NON-WHITES (1942-55),

ENGLAND AND WALES (1943-53), AND DENMARK (1942-44) (GRAPH 1.)

RECENT TRENDS IN STILLBIRTH RATES.

The standard of obstetric service for any institution or country can nearly always be gauged by the number of stillbirths and neonatal deaths occurring in that community.

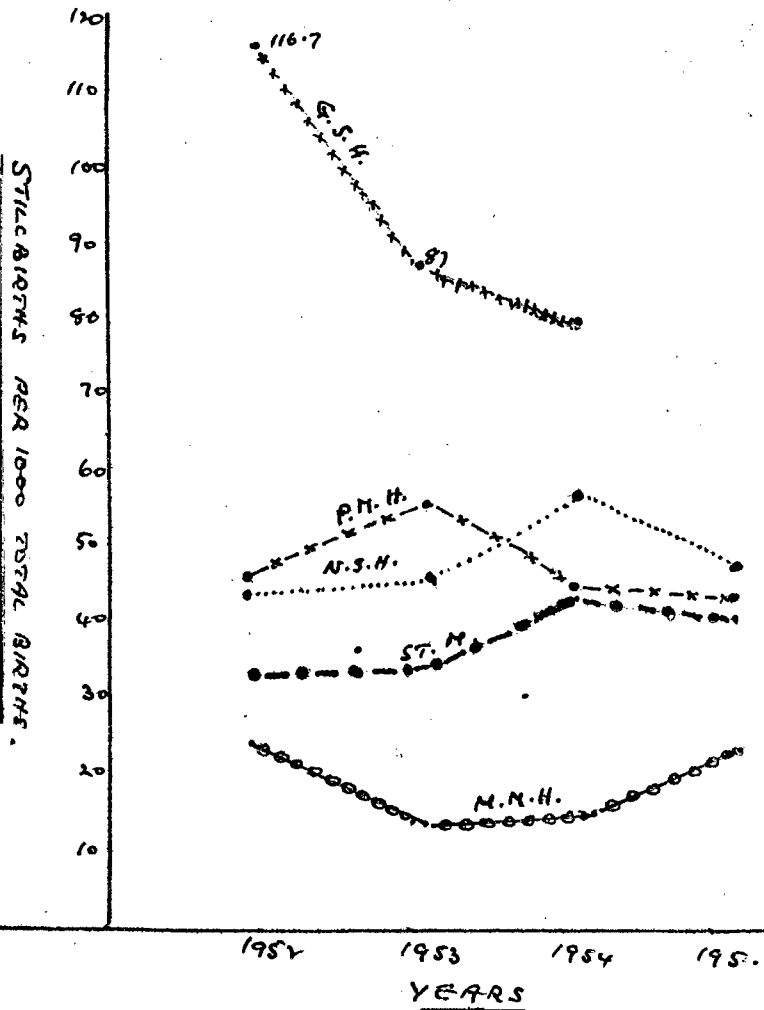
As a general rule a low obstetric death rate means a well organized maternity service and a high standard of obstetric skill and conversely. But a high standard of obstetrics may not produce a low obstetric death rate, if mothers are generally unhealthy, antenatal care unsatisfactory with a high proportion of "non-booked" patients, and a low percentage of hospital delivery.

The increased efficiency of the obstetric service as indicated by greatly increased numbers of patients confined in hospital which in itself is suitable and adequately staffed with adequate facilities, would increase the efficiency and lower the avoidable loss of infant life.

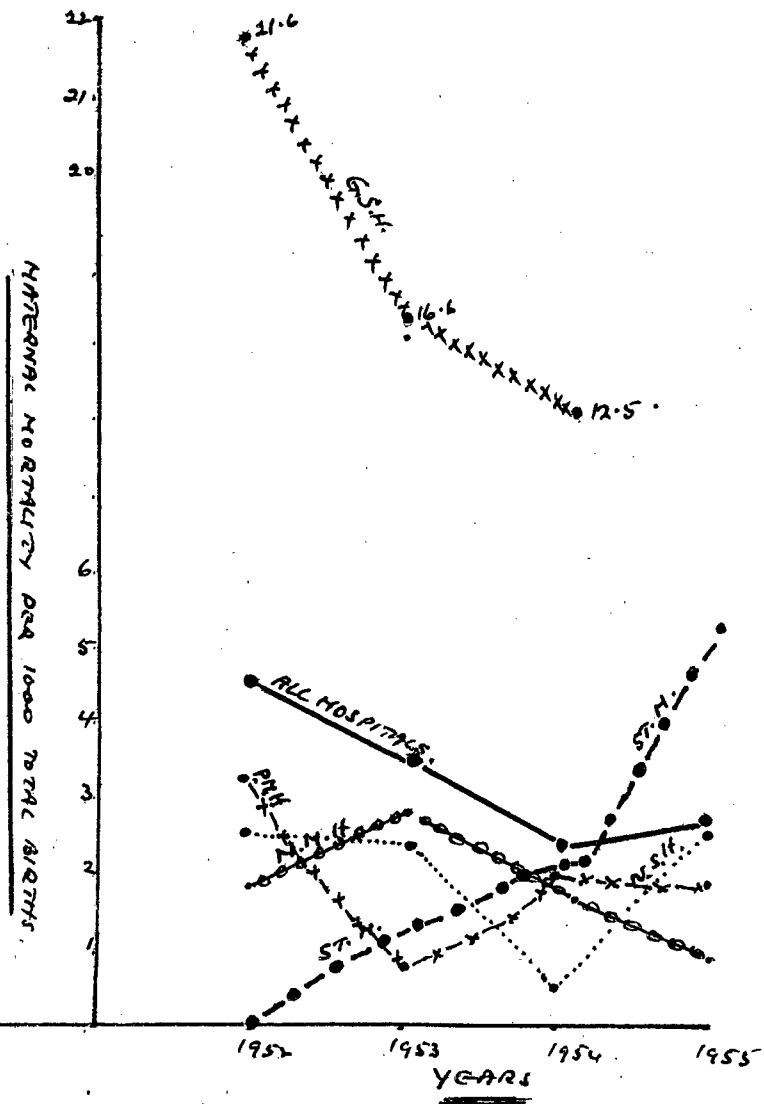
The part played by the obstetrician in preventing obstetrical deaths however depends to no small extent on the circumstances under which he works. The lower the existing standard of obstetrics and the higher the stillbirth rate, the greater must be his scope.

Apart from the above factors, it may be generally concluded that the social status of any community will largely influence the obstetric death rate, and that the differences in stillbirth rates between the social classes are probably the effects of inadequate nutrition and poor health in the poorer sections, both during and prior to pregnancy.

A faulty childhood environment resulting in contrasts in maternal physique and health with reproductive inefficiency, which high standards of antenatal care are unable to prevent, appears also to be a reasonable postulation in the causation of foetal mortality.



(a) STILLBIRTH RATE (per thousand) at  
Obstetric Units (1952-1955)



(b) MATERNAL MORTALITY (per thousand total births)  
at Obstetric Units (1952-55)

It is well known that there has been a dramatic reduction in stillbirth rates during the war years in Britain, and other European countries, because of well organized antenatal services, supplementation of diet, and improvements in obstetrical practice such as increased use of Caesarean section (in favour of more hazardous vaginal delivery), blood transfusions, and the use of antibiotics.

So similarly has there been a lowering of loss of foetal life in the City of Cape Town generally, and in the obstetric units of our university.

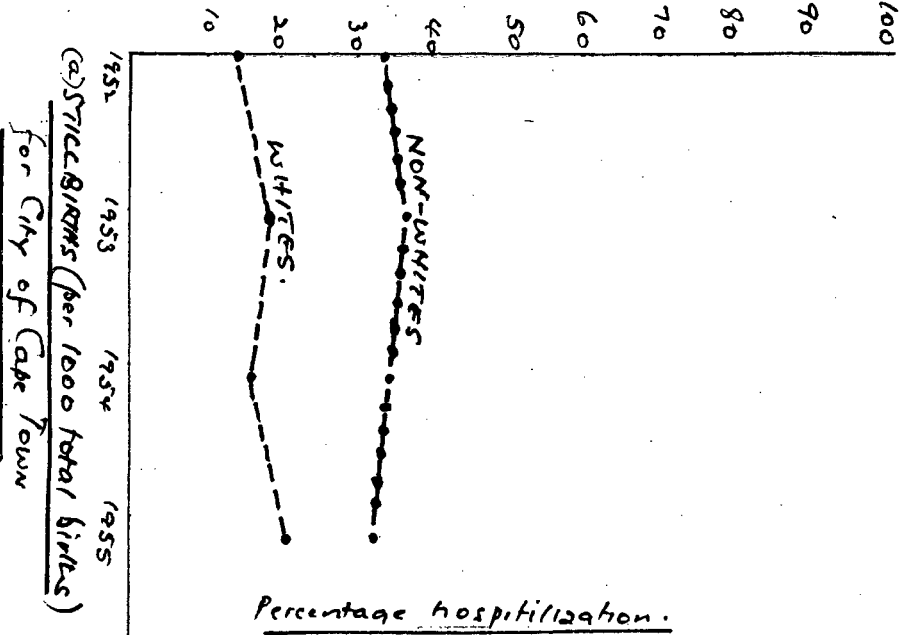
In graph 1. the reduction in stillbirth rates in Cape Town for whites and non-whites, is compared with those of England and Wales, and Denmark is clearly shown.

Graph 2a reveals the stillbirth rates in our obstetric units, in the 5 teaching centres of the University of Cape Town for the years 1952-55 (inclusive). Apart from the Groote Schuur Hospital, where the more severe complications of pregnancy were dealt with, viz. preeclampsia, hypertension in pregnancy, cardiac disease, diabetes in pregnancy, and the like, the comparatively low stillbirth incidence at the Howbray Maternity Hospital (all white women) is striking when compared with non-white institutions such as Somerset Hospital, St. Monica's Home, and Peninsula Maternity Home (mainly non-white).

The close relationship between stillbirth rates and maternal mortality can be assessed by noting graph 2b, particularly Groote Schuur Hospital. Again the lower maternal mortality in whites compared with non-whites will be obvious.

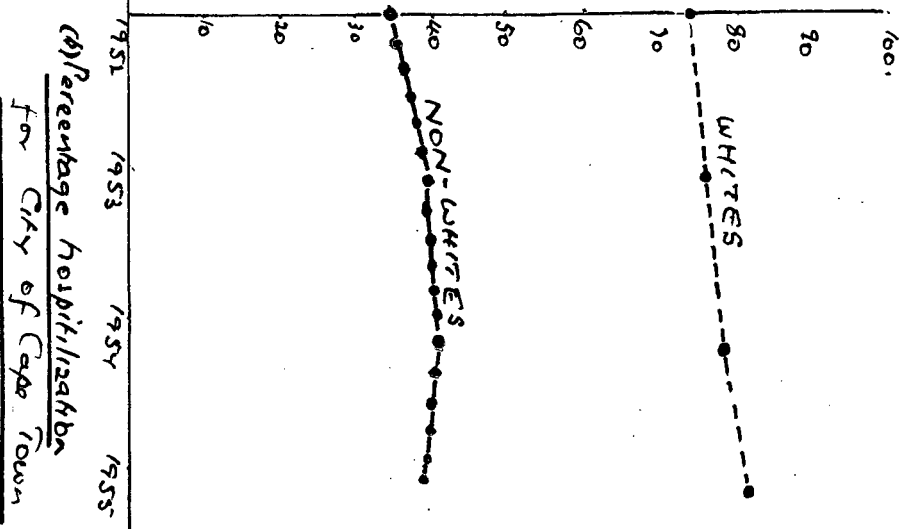
Graph 3a shows the striking difference in stillbirth rates for the City of Cape Town, for white and non-white patients, comparing the percentage hospitalization in the 2 races (graph 3b). As expected the maternal morbidity showed a similar trend (graph 3c).

STILLBIRTHS (per thousand total births)



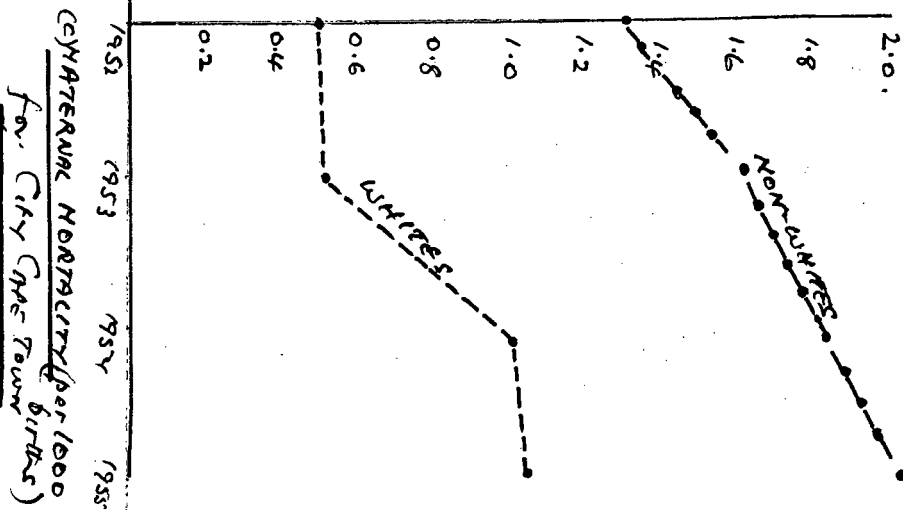
(a) STILLBIRTHS (per 1000 total births)  
for City of Cape Town

Percentage hospitalization.



(b) Percentage hospitalization  
for City of Cape Town

MATERNAL MORTALITY (per 1000 births)



(c) MATERNAL MORTALITY (per 1000 births)  
for City of Cape Town

## THE OBSTETRIC DEPARTMENT OF THE UNIVERSITY OF CAPE TOWN.

Scattered within a radius of 3 to 4 miles of each other, there were 5 obstetric units used mainly for teaching purposes of medical students and pupil midwives. In addition, because of shortage of obstetrical beds in our hospitals (mainly non-whites), a fairly large district midwife practice was employed.

Antenatal clinics served all the units, which restricted admission to hospital for only primigravidae, abnormal obstetric cases, and women who had had 4 or more previous confinements.

### The Peninsula Maternity Hospital.

This, the oldest teaching unit, was situated in the heart of the non-white area, and provided accommodation for 37 women originally, 22 being for non-whites (mainly coloured, and natives) and 15 for whites. Originally erected as the main teaching institution for training students, and pupil midwives, this centre catered for the majority of the abnormal cases, and primigravidae for the Cape Peninsula area and outlying districts as far afield as 200 miles from Cape Town.

Antenatal facilities which were far from adequate already as far back as 1946, have not been extended since for this institution. Already at that time when the first annual report for the Peninsula Maternity Home was published, as many as 7065 antenatal attendances were reported.

How "far behind the time" antenatal facilities were in 1955 can be judged from the fact that with no improvement in accommodation, no less than 19151 attendances occurred at this unit alone.

It was apparent that with such increase in antenatal

attendance that the available accommodation would be proportionately increased, to deal with the larger numbers of women seeking hospital confinement. No such increase has transpired, with the result that the average number of women at any one particular time as patients in this hospital during 1948 was 55-60. Every available space, including hospital corridors, and on rare occasions bath rooms, were being used to accommodate women sorely in need of institutional delivery.

A similar difficulty in providing room for babies delivered was encountered, as the hospital was not built originally for the unexpected larger influx.

Frequent refusal of admission to hospital of patients often in urgent need of accommodation was encountered, and "outpatient treatment" of sick antenatal patients (with preeclampsia, hypertension etc.) was a not uncommon routine.

Early discharge of "delivered" patients was therefore commonly practiced, much against our will, in order to make beds available for the more urgent cases. The sending home of a woman 24 hours after delivery, was the only solution in many cases, which were supervised later by district midwives.

It should be mentioned that the allowance of nursing staff and medical men serving this hospital was based on the number of beds originally provided, and not on the actual number of patients dealt with at any one particular time. The effect of the type of work turned out must hence necessarily be adversely affected(Louw), which was reflected in the too common outbreaks of infection in the nurseries and wards.

There were no X ray facilities, or bacteriological laboratories in this institution. All investigations of such nature were referred to the Groote Schuur Hospital, or medical

school which were some 2 miles away. The long delay in obtaining reports was obviously a snag in such arrangements. Of course in many instances, the average non-white patient could ill afford to spend an extra few pence, or the time for such investigations.

It is obvious that this hospital, although carrying a tremendous burden, with often remarkable results, is antiquated, and requiring either vast improvements in structure, or relegated to a great reduction in obstetrical status.

#### THE SOMERSET HOSPITAL.

This institution admitted only non-white women, the majority of whom were natives (Bantu) and coloureds.

Accommodation in this obstetrical unit consisted of 40 beds and an equivalent number of infant cots.

Antenatal clinics are supervised daily usually by medical staff specially trained in obstetrics, and a fairly large district midwife practice is supervised from the staff of this unit.

Facilities for adequate antenatal care in this unit as at the Peninsula Maternity Home are not up to standard, because this hospital was not originally built for maternity work. Again the problem of inadequate accommodation for the numbers of patients attending the antenatal clinics was a serious one, "outpatient treatment" being a necessary evil particularly for preeclampsia and hypertension of pregnancy, to quote merely one example.

It need merely be mentioned that in 1953, no fewer than 5463 attendances took place in these clinics, and in 1955 had increased to 7000 without increased facilities for antenatal supervision.

As at the P.M.H. the type of patient admitted to this unit was of the lowest socio-economically, and in very poor state of health.

The only advantage this hospital had over the P.W.H. was the fact that facilities for antenatal X rays were available, otherwise no laboratories for pathological and bacteriological investigations were on the premises.

It is to be concluded that this obstetrical unit needs improvement, especially in the need for lying-in beds for the supervision of antenatal medical complications.

#### ST. MONICA'S HOME.

This obstetric unit was only for non-white patients, mainly coloureds and fewer natives. Accommodation for 32 patients was available.

As with the 2 previous institutions the work of this unit was supervised by medical staff specially trained in midwifery with daily antenatal clinics and a district midwife practice.

Again no laboratory facilities were available here.

On the whole the numbers of cases dealt with in this unit were far less than at the other non-white hospitals, particularly in relation to the amount of "emergency" work, the brunt of which was borne by the other non-white units.

#### GROOTE-SCHUUR HOSPITAL.

The majority of women admitted for confinement to this hospital (Ward A10) were non-whites, with the more serious complications of pregnancy, viz. preeclampsia, hypertension in pregnancy, diabetes, cardiacs, and the like. Patients with accidental haemorrhage and placenta praevia were never refused admission.

It was not surprising to note that the foetal and maternal mortality therefore was extremely high, for the above reasons.

It was merely to relieve the severe strain in the work at the other non-white institutions, that this "special ward" was opened up for midwifery, in a general surgical hospital.

Of course the burden of complications of pregnancy was taken here, but so great was the "overflow" that the other units were still strained to the limit.

Since 1955 this ward ceased to be in operation for midwifery and again the stresses of overcrowding and overwork was put on the Peninsula Maternity Home, and Somerset Hospitals.

#### THE NOWDRAY MATERNITY HOSPITAL.

Only white patients were admitted for confinement in this completely white hospital, with 32 bed accommodation.

This hospital was originally built not for maternity work, and had been converted from a private general hospital.

Facilities for adequate maternity work were not ideal, again the absence of laboratory investigations, X rays and similar necessities bein non-existent.

Antenatal clinics were managed under great difficulties, because of the lack of adequate space, and accommodation.

Medical staffing occurred through specially trained doctors, and midwives.

However it was never a feature that such gross inadequacies as occurred in the non-white units allowed to occur here, because of the presence of several private white maternity hospitals elsewhere.

#### CONCLUSIONS.

There were reasonably adequate facilities for maternity work in the white population of Cape Town.

However among the non-whites a gross deficiency in maternity accommodation, and facilities for satisfactory antenatal care in our units of the University of Cape Town, is present.

Taken by and large, it is to be "marvelled" that among our non-white maternity population, such good results have been obtained with the lack of facilities.

DEFINITIONS.

STILLBIRTHS.

There is some confusion today in the interpretation which exists for a stillbirth, and despite the accepted definitions, there are many schools which do not follow such an interpretation.

From a scientific point of view it is suggested that any child which shows signs of life be regarded as a live birth.

The accepted legal definition as clearly stated in the Births, Deaths, and Registration Act of 1926 for England and Wales is as follows:

" The terms "S.B." and "stillborn" shall apply to any child which has issued forth from the mother after the 28th week of pregnancy and which did not at any time after being completely expelled from its mother, breathe or show any other signs of life. "

The child must be completely outside the body of the mother (i.e. head, trunk, and limbs) but the cord may be uncut and the placenta still inside the uterus.

Munro Kerr et al (1954) and the Manual of International List of the causes of death (1950) similarly quote the above definition.

Other authorities however vary in their definitions and some of their opinions are quoted.

In Scotland (1939) the Registrations of Stillbirths Act regards a stillbirth in the same light as that of England and Wales.

There is little doubt that some attendants will make little effort to observe pulsation of the umbilical cord or any other evidence of the beating heart.

Respiration by the lungs is however not the only adaption the

newborn must make to its new environment.

Of course strict adherence to the period of gestation of after the 28th week imparts another complication, because not infrequently there is misinterpretation of duration of pregnancy, especially if maternity benefits are dependent on the estimation of 28 weeks. Unfortunately one cannot control such factors.

In the United States of America the definition of stillbirth varies from state to state. For example in New York City an attempt is made to register all products of conception whatever the duration of gestation.

In other areas the line is drawn as late as 7 calendar months.

Some regions require certain criteria of weight, length to be stated in addition to the specified minimum duration of pregnancy.

It will be recognized by obstetricians that the duration of gestation cannot always be ascertained reliably or with certainty and this fact must introduce some error, whatever the specified duration.

In attempting to institute comparisons between different countries the most reliable approach possible is to consider only those regions, which lay down the same minimum period of gestation as in Britain (and South Africa) and have no weight or length requirements, which make a serious attempt to exclude early neonatal death, and which are believed to have reasonably complete registration.

There is only a small group of countries which satisfy these requirements (apart from the Union of South Africa) such as Scotland, Denmark, New Zealand, Holland, England and Wales.

In Scotland (*vide supra*) the registration of stillbirths act was passed in 1938 and came into operation in 1939. Essentially

it extended the operations of the existing legislation for England and Wales, but with one important additional provision namely that a statement of the supposed medical cause of stillbirth was required from the doctor or midwife when registering such a death.

Holland and Lane-Clayton (1926) accepted only respirations as evidence of livebirth.

Browne (1939) states that " stillbirth means a state in which the infant is born with the heart beating, but never establishes respiration. Dead birth on the other hand presents no heart sounds or respirations. "

Johnstone (1937) accepts " only an absence of respirations " as being a stillbirth, even although the heart sounds are present.

Queen Charlott's Textbook of Obstetrics (1939) states - " only the absence of pulmonary circulation or respiration " even with a positive heart beat.

Drews (1948) defines a live birth as a viable foetus which " exhibits pulmonary respiration. " Pulmonary respirations are the only signs of live birth. A dead birth is a viable foetus with no respiration.

Comyns Berkely, Fairbairn, and Clifford White (1931) state " A stillbirth is the birth of a stillborn child: a child which exhibits no signs of life, i.e. when the heart beat has ceased to function. Crying and breathing only occurs when the heart is acting, and can be taken as signs of life. But the absence of either or both is not to be held proof of absence of life of the child. "

In Denmark, stillbirths have been recorded since 1801. These figures are regarded as reliable throughout this whole period until present day. The definition here is similar to that of Britain.

New Zealand has registered stillbirths since March 1913, according to the following definitions:- " A stillbirth is one in which a stillborn child has issued forth from the mother after the expiration of the 28th week of pregnancy, and which was not alive at the time of issue. "

In Holland since 1924 stillbirths have been registered, and these statistics are comparable to those of Great Britain.

Of recent years the World Health Organization (W.H.O.) in 1956 defined a live birth as the complete expulsion or extraction from its mother of a product conception, irrespective of the duration of pregnancy which after such separation breathes or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live born.

Foetal death was defined as death prior to the complete expulsion or extraction from its mother of products of conception irrespective of the duration of pregnancy: the death is indicated by the fact that after such separation the foetus does not breathe or show evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles.

#### CONCLUSIONS.

Generally speaking, and taken for granted by the majority of teaching centres, the definition of a stillbirth is as follows:-

" A.S.B. or stillborn child is one which manifests only absence of pulmonary ventilation. "

Despite the legally propounded criteria that there should be no

signs of life, i.e. absence of foetal heart beat and respirations, most schools follow the former definition.

In our units of the obstetrical department of the University of Cape Town, the mere absence of respirations is all that is needed to register a stillbirth.

To overcome the legal definition, nearly all centres include the term "dead birth", in which both heart and respirations are not present at the time of expulsion of the child.

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#### NEONATAL DEATHS.

Generally speaking these include death of a child during the first month of its extrauterine existence. An "early neonatal death" is one in which the child dies within the first 7 days of its birth.

#### PERINATAL MORTALITY.

This term is of recent origin, and is defined as deaths due to stillbirths and early neonatal deaths combined. Obstetrically speaking, this term is of significance because the majority of these infants have lost their lives due to an obstetrical cause (apart from malformations.)

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### CAUSES OF STILLBIRTHS.

The first requirement of any classification is that it should not allow the same condition to be classified under more than one heading. (Morison).

It is unsatisfactory if in the same classification a condition can be grouped either according to the anatomical lesions produced or according to its etiologic basis. It is especially undesirable if the etiologic basis is undefined and can produce more than one type of lesion. If foetal death can be attributed to difficult or prolonged labour it is obvious that some of the deaths attributed to this are likely to be due to birth trauma, others to infection of the foetus in utero, and yet others to anoxia arising from conditions outside the foetus. Deaths which should be properly attributed to these latter conditions will appear under the heading of difficult and prolonged labour, but even this category will be incomplete, since an unknown number of foetal deaths due to prolonged labour will be certified as deaths due to trauma and other causes.

The assessment of the true incidence of foetal anomalies, birth trauma and infection can only be complete in a small and often selected group submitted to detailed autopsy.

An assessment not based on precise information may have some value, if it serves as an index of the standard of midwifery and admits honestly what is known and what is not.

If the quest for a suitable designation is mistaken for the study of the real cause of death then classification is worse than useless.

Classification is only a means of dividing up many factual observations so that they can be selected for study in further detail. (Morison).

CLASSIFICATIONS OF THE CAUSES OF FOETAL DEATH.

(A) Classification by the time of foetal death.

(i) Antenatal or antepartum stillbirths, i.e. before the onset of labour.

Almost all macerated foetuses belong to this group, but not all of this group are macerated. The cause of the foetal death in this group can be rarely determined. (Morison). In some cases for example when accidental haemorrhage coincides with the onset of premature labour it is difficult to decide if foetal death occurred before or after the onset of labour. In fact it is often impossible under such circumstances.

(ii) Intranatal or intrapartum stillbirths.

Labour has already started in these cases, and usually while the foetus is being born, foetal death may occur, when the most perilous period of intrauterine existence is present.

(iii) Postnatal stillbirths.

This term is used in a classification of the League of Nations to describe death in the brief period after expulsion of the foetus when respiration was not established though the foetus gave such evidence of life as cord pulsation or foetal heart beats. Probably less than 1% of foetal deaths would be recognized as belonging to such a group. Taken by and large these infants are being registered as stillbirths in the majority of U.K. and Commonwealth University Teaching hospitals.

About half of the stillbirths occur before the onset of labour (Eden).

According to Dunham et al 58 per cent of 6750 cases collected by them intrauterine death occurred before the onset of labour.

Campbell and McKinley reported that 110 (29%) of 383 stillbirths occurred prior to the beginning of labour.

Again Dunham et al report on intrauterine death in relation to the duration of the gestation as follows:-

<u>Duration of Gestation.</u>	<u>No. of Stillbirths.</u>	<u>%age dead before.</u>
20 - 27 weeks	1087	77%
28 - 35 weeks	1756	74%
36 weeks and over.	3478	44%

The decreasing percentages with the approach of term gestation seem to suggest that foetal death may predispose to delivery before term. Since such delivery will frequently result in a baby premature by weight, the implication is that prematurity in a stillbirth may often be the effect rather than the cause of foetal death. Whilst data does not definitely establish this interesting point, they serve to emphasize the closeness of the association between prematurity and stillbirths.

Studies such as these indicate that the main causes predisposing to stillbirth should be sought in the antenatal period and not during labour. It also emphasizes the point that greater obstetrical skill can only hope to prevent a proportion of stillbirths. On the other hand it is possible that too great a willingness to interfere with normal labour may cause a number of stillborn infants.

Digressing slightly from the above, Yerushalmy in the United States of America demonstrated a definite variation in stillbirth and neonatal mortality according to the hour of the day at which birth occurred. The rates were considerably higher for infants born between the hours of 3 and 6 a.m. The author calculated that the percentages of deliveries which were operative at various times of the day, and found that this percentage followed the same trend as the stillbirth rate. He is however careful to point out that

there is not necessarily any causative connection.

Following this point further, 279 stillbirths were investigated from the records of the Somerset Hospital (non-whites) from June 1955 until December 1957, according to the times of day when these stillbirths occurred as follows:-

<u>Time of Stillbirths</u>	<u>6p.m.-midnight.</u>	<u>Midnight-6a.m.</u>	<u>6a.m.-midday-6p.m.</u>	
Number of S.B.'s.	92	72	67	48
Percentage	32.9%	25.8%	24%	17.2%
	58.7%		41.3%	

Although the majority of stillbirths occurred during the hours 6p.m.-midnight, no definite conclusions were reached with so few babies analysed.

In the units of the University of Cape Town, no fewer than 53.4% of stillbirths delivered showed no evidence of foetal heart sounds when patients were admitted to hospital, whether in labour or not.

**(B) Classification according to the hazards of birth or pre-existing at birth.**

This classification was employed in the report "Infant Mortality in Scotland" issued by the Department of Health, Scotland in 1943.

Thirty-five to 40 per cent of stillbirths are represented in this classification which includes malpresentations, cord complications, pelvic deformities, uterine inertia and prolonged labour with birth injury. In our units this category resulted in a 37.5% stillbirth total. These can be regarded as hazards of birth and the term is useful if it stimulates an inquiry as to how this should have been avoided or overcome in each case.

Of course these stillbirths may be reduced in number by proper

supervision of pregnancy and labour.

Foetal deformity, rhesus incompatibility, antepartum haemorrhage due to accidental haemorrhage or placenta praevia or ill defined deaths due to toxæmia and chronic diseases represent conditions which are already present and preexisting in the child or mother at the time of birth.

(C) Classification according to whether stillbirth was avoidable or unavoidable.

Except for syphilis and some cases of maternal toxæmia most cases of antepartum stillbirths are unavoidable with the existing state of our knowledge. It is also conceivable that with a few cases of prolonged labour, and postmaturity, avoidable stillbirths may be prevented.

Deaths of the more seriously malformed foetuses should probably not be prevented. In other conditions a decision on which deaths are avoidable is difficult. Some of the stillbirths due to the hazards of labour can be overcome; others cannot. As will be discussed more fully under the heading "Antenatal care" striking evidence will be produced of the dangers of inadequate supervision of pregnancy.

CLASSIFICATION OF THE REGISTRAR GENERAL.

This classification is predominantly clinical with emphasis on maternal complications. This groups together the numerous conditions thought to be the cause of stillbirth by many different practitioners and may serve some useful purpose.

(i) Disease in or accident to the mother. Included under this heading are maternal diseases not associated with pregnancy or child-birth.

- (ii) Anomalies of the foetus, placenta and cord. This category is represented by congenital abnormalities.
- (iii) Death of the foetus by injury or other cause, viz. forceps extraction, preeclamptic toxæmia, accidental hæmorrhage, placenta prævia and the like.
- (iv) Unknown or ill-defined group. No definite cause for the loss of the foetus can be given.

#### CLASSIFICATION ON A PATHOLOGICAL BASIS. (Morison)

The pathologist will probably wish to classify stillbirths by what can be found on examination of the foetus and placenta. But this examination will have to be supplemented by what can be learned of the clinical course of pregnancy and labour.

Of course the competency of the pathologist is of the utmost importance to be able to recognize significant foetal malformation, birth trauma, acute infection, syphilis and rhesus incompatibility including hydrops. Also to be interpreted are conditions associated with anoxia, gross congestion of the viscera and especially in premature babies petichial hæmorrhages in loose tissue.

Anoxia is a common finding but it is not a specific lesion arising from circulation or other defects within the foetus, and these may be excluded by autopsy.

Extrinsic anoxia. In this condition the fault may lie in the umbilical vessels, the placenta or the mother. It is often attributable to some disaster such as antepartum hæmorrhage or intrapartum hæmorrhage or some special hazard of labour such as prolapse of the umbilical cord.

Usually the conditions producing anoxia can be recognized more on the clinical history than on positive findings. Accidents

such as prolapse of the cord can usually be accepted if the labour records are properly kept. Knots in the umbilical cord or a tight cord round the foetal neck or body may often be secondary to foetal death.

Various complications of labour such as impacted breech so disturb the foetal or maternal circulation and the change of metabolites that the foetus dies of anoxia. (Morison).

Anoxia is a real danger in prolonged labour and often, early rupture of the membranes particularly in foetuses who have retained in utero well beyond the expected time of delivery, i.e. postmature infants.

Autopsy findings are of little value, unless they are received in association with details of the gestation and labour. It is also a waste of time and effort to conduct an autopsy unless it includes the whole body and the placenta.

In macerated births autopsies on the whole are of little value. Little can be learnt from it except to exclude syphilis and rhesus incompatibility.

In over 40 per cent of the stillbirths examined by Morison no definite conclusion was arrived at as to the cause of the loss of life.

#### CLASSIFICATION ACCORDING TO CLINICAL FINDINGS. (Baird et al)

Baird, Walker and Thomson(1954) classify stillbirths according to clinical findings, and maintain that it is more meaningful in terms of causation than classification based purely on pathological findings. Where there has been a well defined abnormality of pregnancy or labour it is reasonable to consider that this may be the cause of death, at least if the abnormality is sufficiently severe and in the absence of any obvious inconsistency in such reasoning.

Eight main groups were differentiated as follows:-

- |                               |   |
|-------------------------------|---|
| (i) Premature, cause unknown. | (v) Antepartum haemorrhage.                               |
| (ii) Mature, cause unknown.   | (vi) Maternal disease.                                    |
| (iii) Trauma.                 | (vii) Foetal deformity.                                   |
| (iv) Preclamptic toxæmia.     | (viii) Other causes viz. acute infections, Rh factor etc. |

(i) Premature.                      Unknown cause of stillbirth.

Prematurity is defined solely in terms of birth weight, without regard to length of the gestation, i.e. any infant weighing 5½ pounds (2500 G) or less. This definition is now recognized internationally and accepted by all U.K. and Commonwealth countries.

This interpretation would naturally and logically exclude intrauterine death which has occurred some time before delivery and hence exclude the period of gestation as an indication of maturity. (Vide infra under prematurity)

(ii) Mature.                              Unknown cause.

Included in this category are those infants weighing over 5½ pounds having suffered no more mechanical stress than that associated with normal labour.

(iii) Trauma.

Mechanical stress has been the deciding factor in this group in killing the infant during the process of labour. The decision to classify as traumatic depends not only on postmortem evidence but also on the clinical character of the labour and delivery and on the degree of moulding of the foetal head.

With detailed clinical notes, reasonably accurate classification

is possible even without autopsy. Morison agrees with this because he reported that investigation of stillbirth deaths by autopsy failed to reveal the cause of death in about 40 per cent of stillbirths, and few pathologists will disagree with this.

(iv) Toxaemia.

Deaths under this heading occur from eclampsia and less severe forms of preeclamptic toxæmia, and prematurity. Anoxia is the prominent lesion in the majority of instances when the labour is induced or spontaneous.

(v) Antepartum haemorrhage.

All deaths from accidental haemorrhage (apart from preeclamptic toxæmia) and placenta praevia, as well as bleeding of undetermined causes are included in this group.

(vi) Maternal disease.

Diabetes, pneumonia, syphilis and appendicitis etc. which apparently leads to intrauterine foetal death or expulsion of a feeble toxic infant, usually premature, fall into this category.

(vii) Foetal deformity.

Any foetus which is unable to survive extrauterine existence because of malformation or to the prime factor in death can be included here, e.g. anencephaly.

(viii) Other causes.

Rhesus incompatibility, acute infections, placental rarities and so on fill the group.

Causes of death in Baird et al's cases. (Table 1)  
Total (%)

Premature.	Cause unknown	19.7
Mature	Cause unknown	13.7
Trauma		18.8
Toxaemia		10.0
Antepartum haemorrhage		10.9
Foetal deformity		15.6
Maternal disease		6.0
Other causes		5.3

CLASSIFICATION OF CAUSES OF PERINATAL MORTALITY. (Bound et al)

Perinatal mortality is the term used for both stillbirths and neonatal deaths during the first week of life.

A pathological classification is put forward by these authors based on routine morbid anatomical and histological study of 185 autopsies performed on babies born at University College Hospital between 1948 and 1955, out of a total of 10028 births.

Their classification is summed up under 5 main headings as follows:-

(i)	Antepartum deaths with maceration only.	61 cases (32.9%)
(ii)	Obstetric deaths occurring during labour.	52 cases (28.1%)
(iii)	Antepartum asphyxia.	36 cases (19.4%)
(iv)	Congenital malformations.	24 cases (12.9%)
(v)	Miscellaneous (including rhesus factor)	12 cases (6.5%)

Antepartum deaths with maceration only.

The only naked eye appearances were those of maceration. In order of occurrence after intrauterine death first softening

and peeling of the skin occurs with separation of the dura from the skull and bloodstained effusions into the serious cavities, followed by separation of cranial bones and mummification. Asphyxial haemorrhages were absent, and the placenta was normal.

The differential diagnosis of conditions causing maceration which come to mind are erythroblastosis, intrauterine asphyxia, syphilis, and congenital malformations, and the characteristic lesions associated with them.

Clinically such maceration is most often seen commonly in women over 35 years of age (in 30% of Bound's series), with a high incidence of preeclampsia and hypertension (44% according to Bound); antepartum haemorrhage (15%); diabetes in 6.6% and multiple pregnancy in 11%.

In this group particularly the placenta on an average was smaller than usual, and often weigh less than 100G at 32 weeks gestation, being much less than the placentae where stillbirths or neonatal deaths have occurred as result of obstetric hazards.

The cause of death in this group according to Bound is most probably due to placental insufficiency, a fact supported by the low placental weights. This means inadequate oxygen and nutriment to the foetus and an inadequate removal of metabolites, too gradual in its effects to cause sudden death with asphyxial haemorrhages, but sufficient to lead to impairment of growth as the foetal needs increase, to cause death. If the hypothesis of placental insufficiency is valid it would seem that preeclampsia is related to it in some way, at present obscure, since preeclamptic toxæmia and small placentae often coexist.

#### Antepartum asphyxia.

Stillbirths from asphyxia are common before the onset of labour, the most important and commonest cause being antepartum

haemorrhage, which accounted for 50% of the cases encountered by Bound et al.

External cephalic version under general anaesthesia, in 5.5% of cases accounted for intrauterine asphyxial stillbirths.

The cause of death in the latter instances was the sudden separation of the placenta prematurely. Umbilical cord obstruction in the antepartum period was most common, with resultant fine ecchymoses in the foetal tissues.

#### Intrapartum asphyxia.

During the process of labour or shortly after the birth the foetus dies in this category, and this fact can be recorded by checking of the foetal heart sounds.

Premature babies suffered most severely and commonly in Bound's series (in 33%), and there was a raised rate of stillbirths in post-maturity with asphyxial deaths in 27% of cases.

During labour lasting longer than 24 hours, asphyxia accounted for as many as 38% of loss of life, and in multiple pregnancy 11%.

Complications involving pressure on the umbilical cord no doubt exert an important influence on the rate of intrauterine death during labour, due to asphyxia.

There is no doubt that abnormal prolongation of the normal state of asphyxia present during labour, or interference with the supply of oxygen, removal of carbon dioxide and metabolites during parturition, are common denominators in the cause of death of the foetus.

#### Birth trauma.

As in the previous category, premature babies are most

commonly affected by haemorrhages in the cranial cavity and evidence of damage or similar evidence elsewhere in the body. Bound et al found such a state of affairs in 50% of premature foetuses.

In 45% of this trauma group asphyxia was found usually in the form of surface haemorrhages on the lungs. Massive inhalation of meconium was seldom discovered. Every stillbirth with trauma showed asphyxia.

Clinically, trauma was most likely in women of high maternal age, and multiple pregnancy, both in premature and mature groups. Labour lasting 24 hours or more in mature babies, and complications in vaginal delivery predisposed the infant to such accidents.

#### Congenital malformations.

As many as 24 babies out of 185 stillbirths were malformed. This high figure is not uncommon in Commonwealth countries, unlike the low figure in the Obstetric units of the University of Cape Town. (Vide infra).

#### Miscellaneous causes of death.

Rhesus incompatibility was responsible for 4% of stillbirths in Bound's series. Other unusual causes of death were of minor importance in his series.

TABLE 3.CAUSES OF STILLBIRTHS AND INCIDENCE ACCORDING TO TIME OF DEATH.

(Chicago and Belfast)

(per thousand)

Antepartum (208)Intrapartum (322)

<u>Cause.</u>	<u>Belfast</u>	<u>Chicago</u>	<u>Belfast</u>	<u>Chicago</u>
Congenital anomalies	6	7	10	16
Trauma	0	0	11	11
Infection (non-specific)	1	1	15	3
Syphilis	4	1	1	0
Rh incompatibility	6	5	4	1
Diabetes and prediabetes	3	0	1	0
Miscellaneous	0	1	0	1
<u>Extrinsic.</u>				
(i) Accidents of cord	1)	8)	10)	15)
(ii) Placenta praevia	1)	3)	1)	7)
	26	32	34	48
(iii) Bleeding uncertain	23	0	8	0
(iv) Accidental haemorrhage	0	15	0	15
(v) Complicated mechanisms of pregnancy	0	0	13	0
(vi) Miscellaneous	1	6	2	11
<u>Cause not ascertained.</u>				
Evidence of extrinsic anoxia	0)	0)	21)	0)
No evidence available	54)	53)	4)	21)
	54	53	25	20
Belfast series (Morison)				
Chicago series (Potter and Adair, and Potter and Dieckman)				

The high incidence of unknown causes of stillbirth is clearly shown in the above table. Similarly Cross(1945) found 11% of undetermined cause of stillbirth in her series; Baird(1945) found 33% ; Grundy(1944),22% ; and Drillien(1947) 14%.

**COMPARISON OF CAUSES OF STILLBIRTH IN DIFFERENT SERIES OF CASES(%)**

(TABLE 4)

	BELFAST.	EDINBURGH.		CHICAGO.	U.S.A.	SCOTLAND.		
		(i)	(ii)			(1)	(2)	(3)
<u>FOETAL MALFORMATIONS.</u>	8	19	19	10	8	8	21	16
<u>BIRTH TRAUMA.</u>	6	23	3	4	6	3	-	19
<u>FOETAL ANOXIA.</u>	31	36	23	38	-	3	-	-
(i) <u>Cord complications.</u>	-	-	-	-	-	11	-	-
(ii) <u>Antepartum</u> <u>haemorrhage.</u>	-	-	-	-	13	11	8	16
(iii) <u>Difficult labour.</u>	-	-	-	-	16	18	20	-
<u>ACUTE INFECTIONS.</u>	9	)		2	-	-	-	-
		3)						
<u>SYPHILIS.</u>	2	)	0.6	0.2	7	1	-	-
<u>RHESUS FACTOR.</u>	5	) 5	2.0	3	-	0.2	4	-
<u>MISCELLANEOUS.</u>	2	)	1.4	1	-	2.8	8	-
<u>NOT ASCERTAINED.</u>	37	14	53	41	31	25	11	-
<u>TOXAEMIAS OF PREGNANCY.</u>					21	8	15	1

Belfast series. Morison(1952). 539 autopsies.

Edinburgh series. (i) Macgregor(1946). 453 autopsies.

(ii) Drillien(1947). 373 stillbirths.

Chicago series. Potter and Adair(1943),and Potter and Dieckman(1948)  
2250 autopsies.

Scotland series. (i) Annual report of Registrar General(1946)

(ii) Crossesand MacIntosh(1954)

(iii) Baird,Walker and Thomson(1954)

U.S.A. Dunham et al. 3483 stillbirths.

Two outstanding features emerge from the above tables and figures:-

- (i) The importance of ill-defined and unknown causes of stillbirth, as high as 30%. (in our units nearly 1/5th)
- (ii) The high incidence of stillbirth due to foetal malformation, 13% in oversea centres, compared with no more than 3.25% in our units.

It should be emphasized that it would be difficult, nay even impossible, to compare the incidence of stillbirth due to specified causes and confirmed by autopsy examination, with causes unconfirmed by such investigation. Hence the incidences of the cause of stillbirth as occurring in our units could not be compared with other centres with any degree of accuracy, except on clinical grounds.

The common occurrence of overlapping of causes of death in stillbirth, as noted earlier, would also tend to complicate matters. Unless death can be investigated by postmortem examination therefore, accuracy in diagnosis must of necessity suffer.

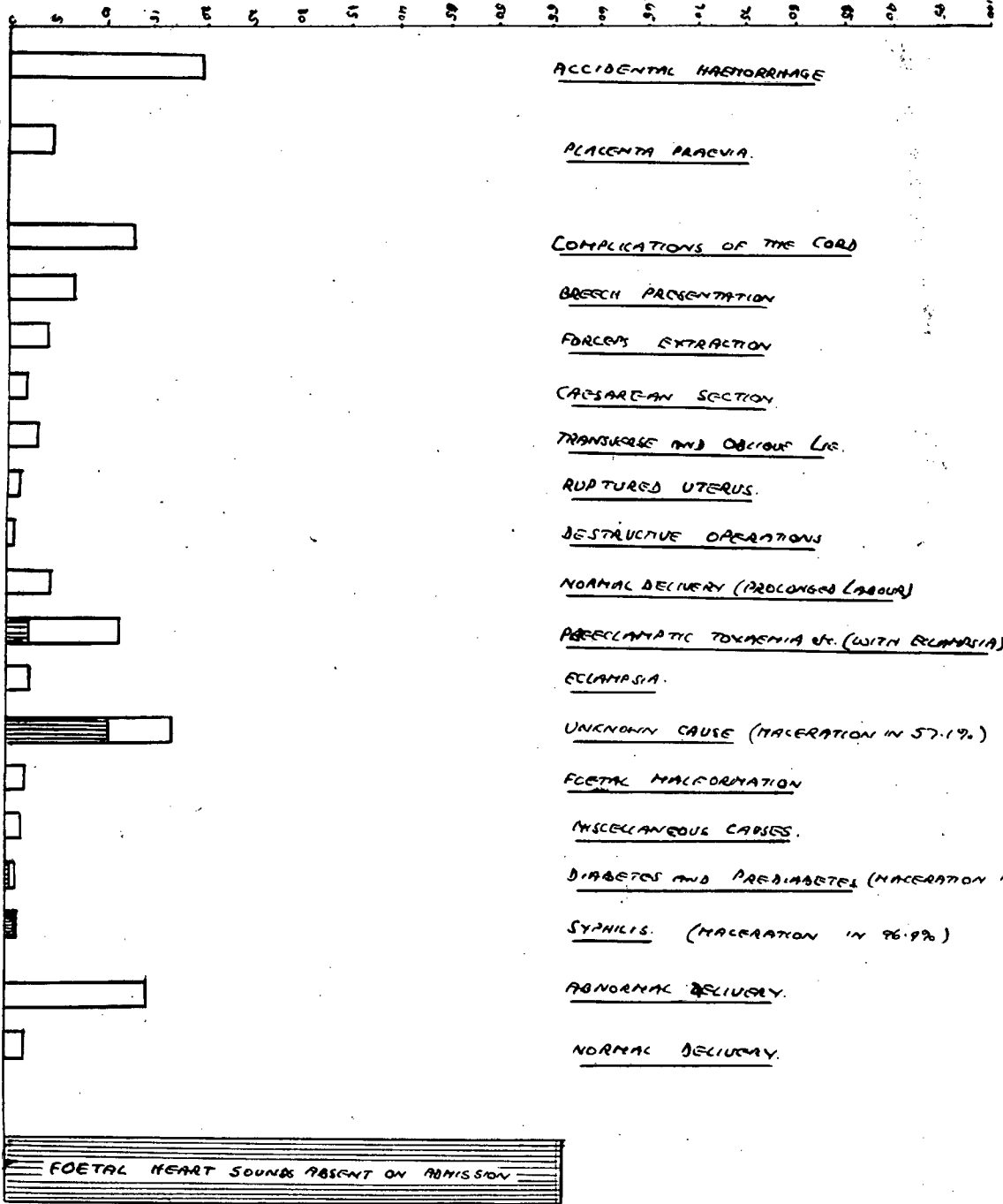
The very large numbers of stillbirths in premature babies as occurred in our units during 1952-55, and the common high incidence of preeclamptic toxæmia were factors which were difficult to assess in relation to the cause of death.

PERCENTAGE OF TOTAL STILLBIRTHS

STILLBIRTHS

Incidence out of 1231 infant lost in relation to cause (clinical classification), with 78.9% loss (S.A.) occurring in normal and abnormal delivery and absence of foetal heart sounds.

GRAPH 4.



Legend:  
 MACEATION (hatched bar)  
 NON-MACEATION (solid bar)

CAUSES OF FOETAL DEATH.

(Table 5)

During the years 1952-1955(inclusive) 1933 babies were lost in our units of the obstetrical department of the University of Cape Town. Of these 1231 were stillborn, and 702 neonatal deaths.

Very briefly summarized the causes of loss of life under the various conditions associated with stillbirths and neonatal deaths were as follows:-

	<u>S.B.'s.</u>	<u>N.N.D's.</u>	<u>% age.</u> <u>total loss.</u>
<b>(A) <u>MATERNAL CONDITIONS DURING PREGNANCY.</u></b>			
(1) <u>Antepartum haemorrhage.</u>	330(26.8)	111(15.8)	441(22.8)
(a) Accidental haemorrhage and unexplained bleeding.	271(22.0)	77(10.9)	348(18.0)
(b) Placenta praevia.	59( 4.8)	34( 4.8)	93( 4.8)
(2) Toxaemias of pregnancy.	367(18.9)	168(23.9)	535(27.6)
(3) Diabetes and prediabetes.	16( 1.3)	6( 0.8)	22( 1.1)
(4) Syphilis.	32( 2.8)		
<b>(B) <u>HAZARDS OF LABOUR.</u></b>			
(1) Umbilical cord complications.	125(10.1)	11(1.5)	136( 7.0)
(2) Breech presentation.	258(20.9)	114(16.2)	372(19.2)
(3) Forceps extraction.	93( 7.5)	44( 6.2)	137( 7.0)
(4) Caesarean section.	82( 6.7)	95( 7.7)	177( 9.1)
(5) Transverse and oblique lies.	102( 8.2)	15( 2.1)	117( 6.0)
(6) Ruptured uterus.	28( 2.2)	1( 0.1)	29( 1.5)
(7) Version in labour.	107( 8.7)	15( 2.1)	122( 6.3)
(8) Destructive operations.	49( 3.5)	0	49( 2.5)
(9) Face presentation.	11( 0.9)	7( 0.9)	18( 0.9)
(10) Brow presentation.	2( 0.1)	4( 0.5)	6( 0.3)

S.B.'s.    N.N.D.'s.    Page total loss.

(C) <u>FOETAL ABNORMALITY.</u>	53(4.3)	54(7.7)	107(5.0)
(1) Anencephaly.	6(0.4)	5(0.7)	11(0.5)
(2) Hydrocephaly.	22(1.8)	4(0.5)	26(1.3)
(3) Meningocele.	5(0.4)	0	5(0.2)
(4) Mongols(all in whites)	2(0.1)	1(0.1)	3(0.1)
(5) Other abnormalities.	15(1.2)	47(6.8)	62(3.2)
(D) <u>MISCELLANEOUS CAUSES.</u>			
(1) Erythroblastosis.			
(a) Rhesus incompatibility.	12(0.9)	10(1.4)	22(1.1)
(b) ABO incompatibility.	0	1(0.1)	1(0.05)
(2) Extrauterine pregnancy.	4(0.3)	0	4(0.2)
(3) Acute infections.	0	6(0.8)	6(0.3)
(4) Tuberculosis.	0	1(0.1)	1(0.05)
(5) Short umbilical cord.	1(0.08)	0	1(0.05)
(6) Angioma placentae.	1(0.08)	0	1(0.05)
(7) Ruptured spleen	1(0.08)	0	1(0.05)
(8) Hydrops foetalis.	1(0.08)	0	1(0.05)
(9) Asthma.	0	1(0.1)	1(0.05)
(10) Disseminated lupus.	1(0.08)	0	1(0.05)
(11) Other causes.	1(0.08)	2(0.2)	3(1.5)
(E) <u>UNKNOWN CAUSES.</u>	211(17.06)		211(17.06)
<u>TOTAL LOSS.</u>	<u>1231</u>	<u>702</u>	<u>1933</u>

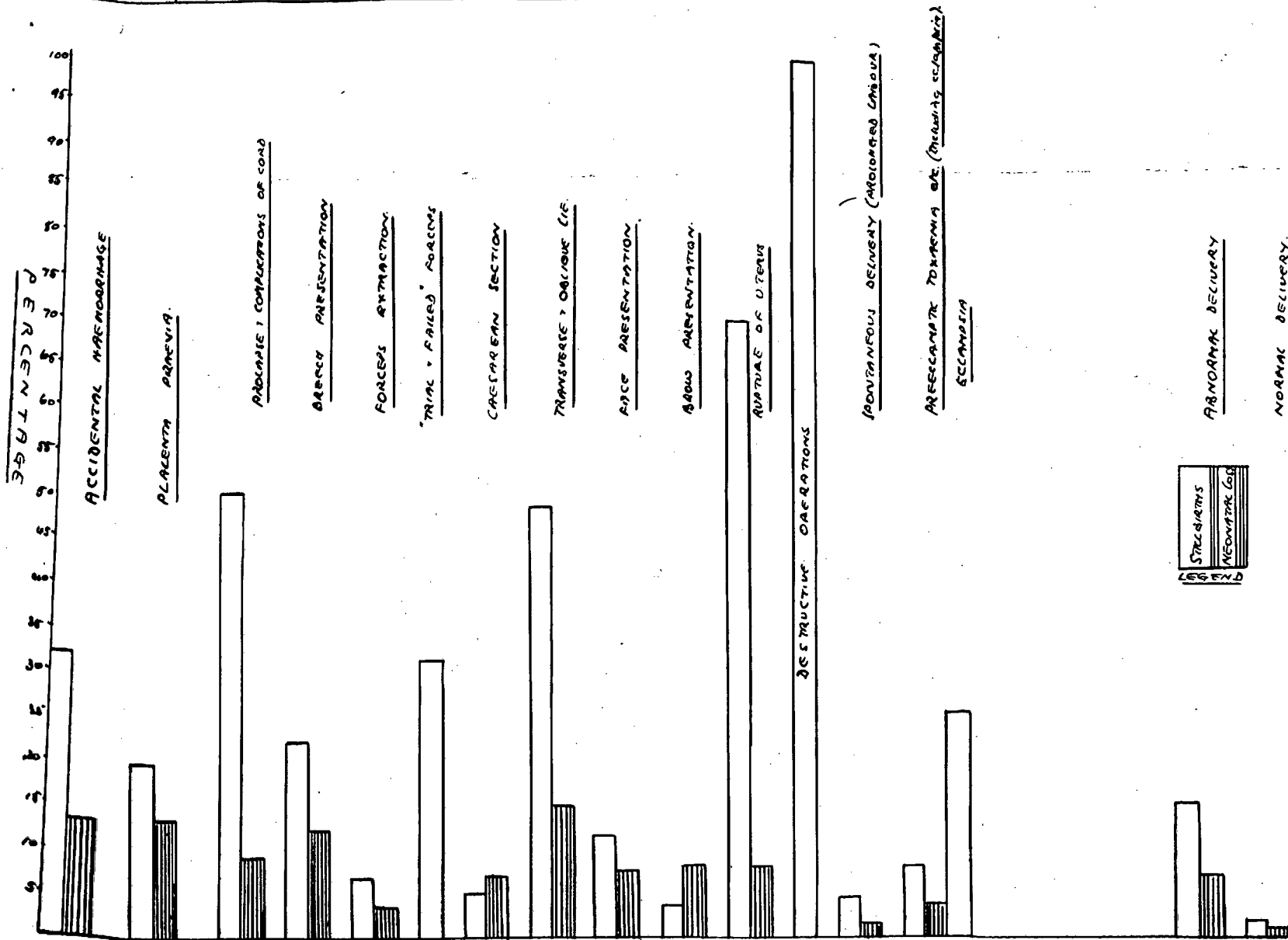
It should be stressed that the above classification is outlined merely to assess the many factors involved in the causation of loss of foetal life. It can therefore be of some value in the assessment of the multiplicity of factors in causation of foetal death in the units of our obstetrical department. Overlapping of causes was

frequent, and therefore a more concise and accurate classification is offered later (vide supra) of the actual causes of stillbirth as determined on clinical grounds mainly, and by autopsy in approximately 18.5% of cases.

It will be noted that the "toxæmias of pregnancy" (preeclampsia, hypertension and chronic nephritis) figure prominently in the causation of foetal death (27.6%), followed by antepartum hæmorrhage (22.8%). The extraordinary high loss associated with breech presentation (19.2%) in the hazards of labour was unexpected, but due consideration must be given to the fact that the factors associated with breech presentation are included under this heading viz. prematurity (with multiple pregnancy and without), antepartum hæmorrhage etc., and also "toxæmias" of pregnancy.

Unknown factors as a cause of stillbirth totalled 17.66% of all the stillbirths encountered in our units, and of these 173 or over 80% occurred in premature babies.

41.3%	30.4%	54.8%	32.6%	10.7%	58.3%	12.6%	56.0%	20%	13%	74.3%	100%	8.09%	12.6%	26%	PERINATAL LOSS (%)	21.7%	4.7%
3.2%	1.15%	0.95%	4.4%	4.93%	0.17%	5.39%	0.7%	0.3%	0.1%	0.15%	0.15%	1.7%	16.8%	0%	INCIDENCE (%)	15.8%	8.4%



CAUSES OF FETAL DEATH. STILLBIRTHS, NEONATAL DEATHS AND PERINATAL LOSS (9.9%) WITH INCIDENCE OF CONDITIONS ASSOCIATED WITH FETAL LOSS COMPARED WITH ABNORMAL AND NORMAL DELIVERY (GRAPH 5.)

CAUSES OF STILLBIRTHS. (1952-1955) (Table 6. Graph 4,5,6)

The causes of stillbirths confirmed by postmortem and decided at monthly staff meetings for the years 1952 to 1955 (inclusive) in the teaching units of the Obstetrical Department of the University of Cape Town are classified in the following table.

TOTAL STILLBIRTHS. 1231.A. MATERNAL CONDITIONS OCCURRING DURING PREGNANCY.

(1) Antepartum haemorrhage.	304(24.61%)
(i) <u>Accidental haemorrhage.</u>	245(19.90%)
With toxæmia or hypertension	139(56.73%)
Without toxæmia or hypertension	106(43.27%)
(ii) <u>Placenta prævia.</u>	59( 4.86%)
(2) Preeclamptic toxæmia, essential hypertension and chronic nephritis(maceration in 29 cases)	94(7.63%)
(3) Eclampsia(forceps in 15 cases)	44(3.57%)
(4) Syphilis(maceration in 31 cases)	32(2.59%)
(5) Diabetes and prediabetes(maceration in 7)	<u>17(1.38%)</u>
Total A	<u>39.89%</u>

B. HAZARDS OF LABOUR.

(1) <u>Cord complications.</u>	145(11.7%)
(a) Prolapse of cord	126(10.23%)
(b) Cord round neck	9(0.66%)
(c) Cord presentation	8(0.65%)
(d) Knot of cord	2(0.16%)
(e) Stenosis of cord(macerated)	1(0.08%)
(2) Primary breech delivery and extraction.	82(6.66%)
(3) Precipitate labour.	5(0.04%)
(4) Prolonged and normal labour.	49(3.99%)

(5) Forceps extraction(not including eclampsia)	55(4.46%)
(6) Transverse lie(vaginal delivery)	51(4.14%)
(7) Ruptured uterus.	28(2.27%)
(8) Caesarean section.	18(1.46%)
(9) Destructive operations.	11(0.89%)
(10) Impacted shoulders(vertex presentation)	6(0.48%)
(11) Compound presentation.	2(0.16%)
<b>Total B</b>	<b><u>457(37.12%)</u></b>

**C. UNKNOWN CAUSES.**

(1) Lacerated stillbirths.	120(9.74%)
(2) Fresh stillbirths.	91(7.31%)
<b>Total C</b>	<b><u>211(17.06%)</u></b>

**D. FOETAL MALFORMATIONS.**

(1) Hydrocephalus.	22(1.78%)
(2) Anencephalus.	9(0.73%)
(3) Meningocele.	5(0.40%)
(4) Other causes.	4(0.32%)
<b>Total D</b>	<b><u>40(3.25%)</u></b>

**E. Miscellaneous Causes.**

(1) Rhesus incompatibility.	22(1.78%)
(2) Extrauterine pregnancy.	4(0.32%)
(3) Short umbilical cord.	)
(4) Angioma placentae.	)
(5) Ruptured spleen.	) All 1 each
(6) Hydrops foetalis. (Not Rhesus)	) (0.08%)
(7) Disseminated lupus erythematosus	)
(caesarean section)	)
(8) Maternal asthma.	)
<b>Total E</b>	<b><u>32(2.68%)</u></b>

A careful investigation of the causes of the death of the foetus revealed that there was considerable overlapping of causes, so that the figures appearing above do not tally with the detailed causes of stillbirths appearing earlier. The most probable cause of stillbirth has been set out in the above classification, where confirmed with or without autopsy. Hence prematurity in a diabetic patient with toxæmia of pregnancy associated with accidental hæmorrhage is difficult to classify under one heading. The most probable cause of foetal death (wherever possible confirmed by post-mortem) was therefore noted. Similarly in a patient with placenta prævia with a transverse lie delivered by the vaginal route, the most probable primary cause of death might be a difficult delivery, associated with abnormal insertion of the placenta, and anoxia or trauma to the infant.

It was therefore decided to tabulate all the causes of stillbirth in detail in order to give one an idea of the difficulties of classification particularly in relation to the multiplicity of causes involved in stillbirth causation.

In the following pages a more accurate classification according to clinical and pathological detail is presented.

It should be emphasized that only in 18.4% of cases was post-mortem performed in our cases for reasons beyond our control. Mainly because of difficulties in transport from the various obstetrical units to the laboratory, postmortems were not performed. In approximately 4% of these cases permission was not granted for autopsy because of religious beliefs in certain racial groups. This percentage was in addition to the above.

Again I would like to stress the fact that at monthly obstetrical meetings, attended by all members of the staff, stillbirths were discussed in detail, and in the majority of instances clinical cause of foetal death was assessed.

**CAUSES OF STILLBIRTHS AT THE UNITS OF UNIVERSITY OF CAPE TOWN.**

(Table 7)

A comparison of the figures from the obstetrical units of the University of Cape Town with other centres or countries would be difficult or even impossible with any degree of accuracy for the following reasons:-

- (i) Insufficient autopsy investigation at our units because of the lack of facilities adequate enough to investigate all stillbirths. Only about 18.4% of stillbirths was thus investigated.
- (ii) As a result, a clinical classification of the causation of stillbirth was followed in our units to a large extent. It should be mentioned that all stillbirths were fully discussed at monthly staff meetings, and the causation of death thus determined even when inadequate postmortem examination was carried out.

Briefly summarized, the following were the causes of death:-

<u>Hazards of labour.</u>		37.12%
(i) Cord complications	12.83%	
(ii) Difficult labour	24.29%	
<u>Antepartum haemorrhage.</u>		24.61%
(i) Accidental haemorrhage	19.9%	
(ii) Placenta praevia	4.86%	
<u>Toxaemia of pregnancy. (maceration in 29)</u>		11.21%
<u>No definite cause.</u>		17.06%
	Maceration	9.74%
	Fresh stillbirths	7.31%
<u>Syphilis. (maceration in 31 cases)</u>	2.5%	2.59%
<u>Diabetes and prediabetes.</u>		1.38%
	(maceration in 7)	
<u>Miscellaneous.</u>		2.68%
	Rhesus incompatibility	1.78%

A more detailed evaluation of the causes of stillbirths will be given later.

A striking feature in comparing the figures of the stillbirths of the Obstetrical units of the University of Cape Town and other countries was the high foetal loss in the hazards of labour group, including complications of the umbilical cord. A simple explanation of this catastrophic figure (37.43%) can be found in the fact that the majority of stillbirths due to this factor occurred in patients who had received inadequate or no antenatal care.

Of similar significance was the foetal loss associated with antepartum haemorrhage, of which accidental haemorrhage was a most prominent feature. The toxæmia of pregnancy and hypertension (P.E.T.) played no insignificant part in producing this alarmingly high mortality (56.73%), although a large proportion of these were unassociated with P.E.T. This factor will be evaluated in more detail later.

The low stillbirth loss, particularly in the non-white in the "malformed foetus" category, is difficult to explain except in the first trimester.

Other factors in the causation of the abnormally high stillbirth and neonatal losses in our units, especially in relation to the racial groups, will also be discussed later.

A major factor in the high perinatal mortality rate in the non-white not evident from the above classification was the high incidence of premature birth in this race compared with whites.

**CONCLUSIONS.** It was not possible with our present state of knowledge to classify with any degree of accuracy a series of stillbirths

and 1st week neonatal deaths according to the true underlying cause, the avoidance of which would be our principal aim, because of the multiplicity of factors involved in the causation of still-birth. A satisfactory classification to satisfy both obstetrician and pathologist is still lacking. A clinical classification is therefore largely followed in our units, combined in a small percentage of cases with pathological confirmation, for reasons beyond our immediate control.

NEONATAL DEATHS

Of 702 early neonatal deaths occurring in our units during the period 1952-55 the following causes were noted:-

<u>CAUSE OF DEATH</u>	<u>PREMATURE BABIES (%)</u>	<u>MATURE BABIES (%)</u>	<u>TOTAL (%)</u>
Antepartum haemorrhage	74(10.5%)	37(5.3%)	111(15.75%)
Hazards of labour	128(21.0%)	83(11.8%)	211(32.8%)
"Unknown causes"	173(24.6%)	75(11.9%)	248(36.5%)
Malformation of foetus	76(10.8%)	35(4.9%)	111(15.75%)
Other causes	15(2.1%)	6(0.8%)	21( 2.9%)
<b>TOTAL</b>	<b>466(66.3%)</b>	<b>236(33.7%)</b>	<b>702(100%)</b>

Included in the above causes of neonatal death and not mentioned, was preeclamptic toxæmia and essential hypertension, which was a contributory factor in the causation of death in 168 babies, the majority of which were premature.

Syphilis which was a factor in the causation of loss of life was also recorded in 31 babies, the majority of which were treated in our venereal disease clinics.

Under the heading "other causes" were cases of blood incompatibility such as Rhesus immunization, ABO incompatibility and haemorrhagic diseases.

It will be noted that a large number of babies were lost as a result of the hazards of labour, and the majority of these were in premature babies, mainly following multiple pregnancy and P.E.T., with and without spontaneous vaginal delivery.

The dangers to the infant of premature delivery, even under the most favourable circumstances, as compared with the confinement of a mature baby will be discussed more fully later. However it should be

noted that twice as many babies were lost as "mature" as early neonatal deaths.

A brief summary therefore of the causes of perinatal mortality in babies delivered in our units during 1952-55 shows as follows:-

<u>CAUSE OF DEATH</u>	<u>STILLBIRTHS</u>	<u>NEONATAL DEATHS</u>	<u>TOTAL (%)</u>
<u>MATERNAL FACTORS</u>			(31.0%)
(1) A.P.H.	304(15.7%)	111(5.7%)	415(21.4%)
(2) Other causes (viz.P.E.T. etc.)	187( 9.6%)		187( 9.6%)
<u>UNKNOWN CAUSES</u>	211	248	459(23.7%)
<u>HAZARDS OF LABOUR</u>	457	211	668(34.5%)
<u>MALFORMATIONS</u>	40	111	151( 7.8%)
<u>OTHER CAUSES</u>	32	21	53( 2.7%)
<b>TOTAL</b>	<b>1231</b>	<b>702</b>	<b>1933(100%)</b>

It is apparent from the above table that the hazards of labour contributed almost 1/3 of the total perinatal mortality, followed closely by maternal chronic ill health, with unknown causes in third place.

However, because of the overlapping of causes of death, it should be mentioned again that preeclampsia and essential hypertension was an important contributory factor in the causation of such loss of life in 535 babies or 27.6%, mainly as the result of prematurity.

Unlike other teaching centres, foetal malformation caused only 7.8% of the total perinatal mortality, which was only  $\frac{1}{2}$  that usually recorded.

Again it should be emphasized that almost  $\frac{1}{2}$  of the perinatal losses

were recorded in premature babies, many of which occurred in those under 4 lbs. in weight.

The subject of prematurity, so closely linked with foetal loss will be discussed more fully in BOOK 2.

#### NEONATAL MORTALITY IN RELATION TO ANTENATAL CARE.

Again the ill effects of inadequate prenatal supervision is reflected in the higher neonatal losses sustained as compared with those infants delivered of patients with adequate care.

#### NEONATAL MORTALITY IN "BOOKED" PATIENTS.

Total babies delivered	20970
Neonatal deaths	406
<u>Neonatal death rate/1000 livebirths</u>	19.3

#### NEONATAL MORTALITY IN "NON-BOOKED" PATIENTS.

Total babies delivered	3729
Neonatal deaths	296
<u>Neonatal death rate/1000 livebirths</u>	92.2

As in stillbirth losses there was a much higher loss in "non-booked" patients than in "booked", almost 5 times a greater death rate occurring in the former.

Perinatal mortality in our units was therefore almost 5 times higher in "non-booked" as "booked" cases.

AN ANALYSIS OF THE CAUSES OF STILLBIRTHS AT THE UNIVERSITY  
COLLEGE, IBADAN, NIGERIA. (APRIL 1953-DECEMBER 1954)

A comparison of the causes of stillbirths occurring in our units (1952-1955) and that of University College, Ibadan, Nigeria, (all non-white) for a period of 18 months, is revealing in that the types of patient admitted to these institutions lived under similar poor socio-economic status.

<u>MATERNAL CONDITIONS IN PREGNANCY.</u>	<u>U.C.I.</u>	<u>U.C.T.</u>
<u>ANTEPARTUM HAEMORRHAGE</u>	51(12.5%)	304(24.6%)
<u>Accidental haemorrhage</u>	26( 6.3%)	245(19.9%)
(i) With P.E.T.	5(10.2%)	139(56.7%)
(ii) Without P.E.T.	21(80.8%)	106(43.3%)
<u>Placenta praevia</u>	25( 6.1%)	59(4.86%)
<u>P.E.T. (including eclampsia)</u>	9( 2.2%)	138(10.2%)
<u>Syphilis</u>	0	32(2.59%)
<u>Diabetes</u>	0	17(1.38%)
<u>Acute febrile illness</u>	11( 2.7%)	0

Despite the very poor socio-economic status of the non-white at U.C.I. it will be noted that P.E.T. is rare compared with the obstetric population of Cape Town(1.6% compared with 16.8%). Almost as a direct result, the incidence of accidental haemorrhage was much less frequent in Nigeria, only 19.2% being associated with P.E.T. compared with our units of 56.7%.

Because autopsy examination was almost non-existent at U.C.I. and the failure of diagnosis because lack of pathological facilities, syphilis, diabetes and rhesus incompatibility was noted as being non-existent.

<u>UNKNOWN CAUSES</u>	<u>U.C.I. (27.8%)</u>	<u>U.C.F. (17.06%)</u>
Lacerated stillbirths	54 (13.1%)	120 (9.74%)
Fresh stillbirths	60 (14.8%)	91 (7.31%)
<u>FOETAL MALFORMATIONS</u>	19 ( 4.6%)	40 (3.25%)
<u>MISCELLANEOUS CAUSES</u>		
Rhesus incompatibility	0	22 (1.78%)
Other causes	0	32 (2.58%)

It was noted that almost exactly 50% of stillbirths at U.C.I. was associated with the hazards of labour, nearly 80% of which occurred in "patients" who had had little or no antenatal care. Prolonged labour, with frequent intrauterine foetal death, necessitating craniotomy for delivery, was a conspicuous factor, indicating the poor prenatal supervision provided. Not much less frequent was prolapse of the umbilical cord, again occurring in the majority of instances in patients without supervision. Breech delivery too held a prominent position in the high foetal losses sustained at U.C.I.

The low incidence of forceps extraction in both U.C.I. and our non-white units was evident, and the high loss of stillbirths at both units associated with the hazards of labour suggests inadequacy of antenatal care especially in "non-booked" patients.

The ravages of poor antenatal care again was shown in the high incidence of rupture of the uterus, especially in "non-booked" patients at both U.C.I. and in our non-white units. This evidence too was found at U.C.I. with the greater number of stillbirths occurring with impaction of the shoulders in cases of transverse lie.

Anaemia of pregnancy and general ill health was extremely rife in Nigeria, and the majority of maternal deaths were noted as being attributable to this factor. Not an insignificant number of the

stillbirths and neonatal deaths were also associated with anaemia in the mother, premature labour being a consequence in many instances.

As a result of primitive antenatal obstetric service, many of the patients with poor general health rarely attended for supervision, and owing to the lack of antenatal accommodation due to the restricted number of maternity beds (only 45), antenatal services were of a low standard.

Stillbirth losses under these circumstances were much higher in patients with inadequate supervision, compared with the patients who were able to obtain hospital care. It was no wonder therefore that in direct relation to the high maternal mortality (13 per thousand) the perinatal mortality was proportionately high (124.2 per thousand) stillbirths being 70.4 and neonatal deaths 61.8 per thousand, respectively.

<u>HAZARDS OF LABOUR</u>	<u>U.C.I. (50.1%)</u>	<u>U.C.T. (37.12%)</u>
<u>Cord complications</u>	45(11.0%)	145(11.7%)
<u>Breech delivery</u>	44(10.7%)	82(6.66%)
<u>Precipitate labour</u>	1( 0.2%)	5(0.04%)
<u>Prolonged labour</u>	58(14.1%)	49(3.99%)
<u>Forceps extraction</u>	11( 2.3%)	55(4.46%)
<u>Transverse lie</u>	7( 1.7%)	61(4.14%)
<u>Caesarean section</u>	1( 0.2%)	18(1.46%)
<u>Destructive operations</u>	49(40 for obstructed labour)	11(0.89%)
<u>Transverse lie with impacted shoulders</u>	12( 2.4%)	6(0.48%)
<u>Compound presentation</u>	1( 0.2%)	2(0.16%)
<u>Ruptured uterus</u>	25 (6.1%)	28(2.27%)

The large number of babies lost because of "unknown causes" attributable often to maternal ill health at both U.C.I. and U.C.T. was significant. More frequent autopsy examination may have elicited "hidden causes". The numbers of macerated babies was striking. Again it should be noted that autopsy examination might have detected cases of rhesus incompatibility, syphilis, malformation, not excluding the patients who have had abnormal prolongation of pregnancy (postmaturity) in which infants had died in utero for no apparent or obvious cause.

Of similar significance in our units was the low percentage of stillbirths in non-whites associated with foetal malformation. (see later).

It is evident from the above analysis and comparison with our non-white units that, apart from poor social conditions, a high still-birth rate is being maintained to a large extent by inadequate ante-natal care (i.e. a large number of "non-booked" cases) especially in the hazards of labour.

Maternal ill health in both U.C.T. and U.C.I. series accounts for a large proportion of stillbirths, mainly due to poor education and low economic status. In the "non-booked" patient the loss was greater than in the "booked", because corrective measures which might have been applied to the former with adequate hospital supervision were either lacking or used too late.

There is a distinct lack of facilities for pathological investigation in both U.C.I. and U.C.T. units, probably accounting for the large percentages of unknown causes of stillbirth.

Foetal malformation in both Universities accounts for a much smaller percentage of stillbirths than other white teaching centres.

Prematurity in both universities was very common and offered an important contributory factor in the causation of loss of foetal life. As much as 45.4% of stillbirths at U.C.I. were in premature babies, and 42.6% at U.C.T.

### SUMMARY

A series of stillbirths from the University College, Ibadan, is compared with those occurring in our units at the University of Cape Town. Non-whites, exclusively confined at the former college, show a similar socio-economic status to the patients delivered in Cape Town.

The ravages of maternal ill-health in both groups of patients were noted, anaemia being an important contributory factor at Ibadan, and rarely preeclampsia, which was the main contributory factor in the high stillbirth rate encountered in Cape Town.

The hazards of labour in the non-white particularly at U.C.I. as a factor in sustaining a high stillbirth rate of almost 50% of all the stillbirths in Ibadan, compares to some degree with the high proportion of stillbirths occurring at U.C.T. for the same reason. As will be demonstrated later, inadequate or entire absence of antenatal supervision plays a leading role in the maintenance of this high loss due to this factor.

As in the units of U.C.T. "Unknown Causes" account for a large number of fresh and macerated stillbirths, largely because of the lack of facilities for the performance of postmortem examination, and chronic ill health and infection. A large number of these stillbirths occurred in premature babies, in which no cause of death could be found.

Stillbirth due to foetal malformation was uncommon in both Universities, unlike other teaching centres which report as many as 15% loss.

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**STATISTICS FROM THE OBSTETRIC UNITS OF THE UNIVERSITY OF  
CAPE TOWN FOR THE YEARS 1952-55 (INCLUSIVE).**

From the records of our annual reports from the 5 obstetric units the following statistics were available:-

Total number of deliveries.	25383.
Total number of babies delivered.	25930
Total babies delivered in hospital and district.	30698
Total number of stillbirths.	1231
Stillbirth rate/1000 total births.	47.4
Stillbirth rate/1000 total births including district.	40.10
Total number of neonatal deaths.	702
Neonatal mortality/1000 livebirths.	28.44
Neonatal mortality/1000 livebirths including district.	23.8
<b><u>PERINATAL MORTALITY RATE (HOSPITAL)</u></b>	<b>74.54</b>
<b><u>(+ DISTRICT)</u></b>	<b>62.96</b>

**STILLBIRTH RATES ACCORDING TO RACIAL GROUPS.**

**WHITES ( INCLUSIVE OF MOWBRAY MATERNITY HOSPITAL, P.M.H., and G.S.H. )**

Total number of babies delivered	5678
Number of stillbirths	133
Stillbirth rate/1000 total births.	24.3

**NON-WHITES ( SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. MONICA'S. )  
AND P.M.H. )**

Total number of babies delivered	19255.
Number of stillbirths	1093.
Stillbirth rate/1000 total births.	51.5

It is of interest to note that during the same period of time (1952-55) the stillbirths occurring in private maternity hospitals in Cape Town revealed the following statistics:-

WHITES (Doth Memorial Home, Leighwood N.H., Gilmore N.H., Kingsbury N.H., Delherbe N.H., St. Joseph's Sanatorium)

Total number of babies born	9774
Number of stillbirths	128
Stillbirth rate/1000	13.1

An investigation of the causes of stillbirths in private practice undertaken for the Doth M.H. to compare with those of hospital practice, revealed that in 50% of cases maceration was present at the time of birth, for which there was no known cause in 70%. In 30% hypertension and preclampsia was probably responsible for maceration. Hazards of labour accounted for 22.9% of stillbirths (complications of cord 4%; breech delivery 4%; caesarean section 4%; forceps extraction 6.2%; postaturity 2% and ruptured 2%). In 14.6% there was antepartum haemorrhage. In this white institution (as at Nowbray M.H.) the incidence of stillbirths due to foetal abnormality was higher than in non-whites, being 12.5%.

#### A COMPARISON OF STILLBIRTH RATES IN OTHER CENTRES

PRETORIA. (Pretoria General Hospital and Holy Cross N.H.) NON-WHITES.

Number of babies born (1955 and 1956)	10734
Number of stillbirths	444
Stillbirth rate/1000	41.78

( Statistics for stillbirths in whites at Pretoria teaching units were not available )

UNIVERSITY OF THE WITWATERSRAND (Bridgman Memorial Hospital)NON-WHITES (Mainly Bantu)

(1952-55)	Stillbirth rate	42.9
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WHITES (Queen Victoria Hospital, Johannesburg)

(1952-55)	Stillbirth rate	18.1
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CITY OF DURBANNON-WHITES

(1952-55)	Stillbirth rate	38.1
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WHITES

(1952-55)	Stillbirth rate	14.1
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UNIVERSITY COLLEGE, IBADAN, NIGERIA

(April 1953-December 1954)	Stillbirth rate	70.4
	Neonatal mortality	61.8
	Perinatal mortality	126.0

"BOOKED" CASES

STILLBIRTH RATE	40.3
NEONATAL MORTALITY	49.6
PERINATAL MORTALITY	94.1

"NON-BOOKED" CASES

STILLBIRTH RATE	207.0
NEONATAL MORTALITY	126.5
PERINATAL MORTALITY	306.6

The stillbirth rate in "non-booked" cases was therefore almost 5 times that of "booked"; the neonatal mortality was almost 3 times higher in "non-booked"; and the perinatal mortality was more than 3 times higher in "non-booked" cases.

The maternity population of University College, Ibadan, was of similar social status to those patients attending our non-white

units in Cape Town. The percentage of "non-booked" patients was 17.9 and the majority of women failed to utilise the facilities of antenatal clinics fully. Attendance, as in our antenatal clinics was irregular, the average number of visits for a "booked" patient being 3 times.

It should be emphasized again that premature birth was common in the U.C.I. unit, as in our units at Cape Town (18.6% and 12.6% respectively).

#### ENGLAND AND WALES(1953)

Stillbirth rate	22 per thousand
Neonatal mortality	18 per thousand

#### UNITED STATES OF AMERICA(1950)

According to Potter(1954) the perinatal mortality in the U.S.A. was 66.7/1000 among non-whites, compared with 39.7 in whites in hospital practice.

At the Chicago Lying-In Hospital for the years 1954 and 1955 the stillbirth rate was 1.5% in whites according to the same author.

Similarly at the Charity Hospital, Louisiana, New Orleans as noted by Allen and Wegman(1951); John Hopkins Hospital, Baltimore (Eastman); and Freedmen's Hospital, Washington(Scott, Jenkins and Crawford)(1939-47) found the stillbirth rates to be much higher in non-whites than in whites. A large percentage of non-whites(negroes) are admitted to the above hospitals.

Puerto Ricans, whose socio-economic status is even worse than in negroes, had an even greater perinatal mortality than in the negro according to Steer and Kasor(1952).

COMMENT

Stillbirth rates from the obstetric units of the University of Cape Town reveal that on the whole an abnormally high number of foetuses are lost compared with other centres.

This can be attributed largely to the fact that among our non-whites the stillbirth rate is very high. In our white patients in hospital practice, although stillbirth rates are on a par with many other teaching centres, there is still room for improvement.

A comparison of non-white stillbirth rates in other non-white areas in the Union of South Africa shows that the rates are almost twice as high as in white hospital practice. Other teaching hospitals and institutions in the U.S.A. and at the University College, Ibadan, Nigeria, show a similar high foetal loss to our own.

In private white practice in Cape Town, the stillbirth rate is almost  $\frac{1}{2}$  that of white hospital practice.

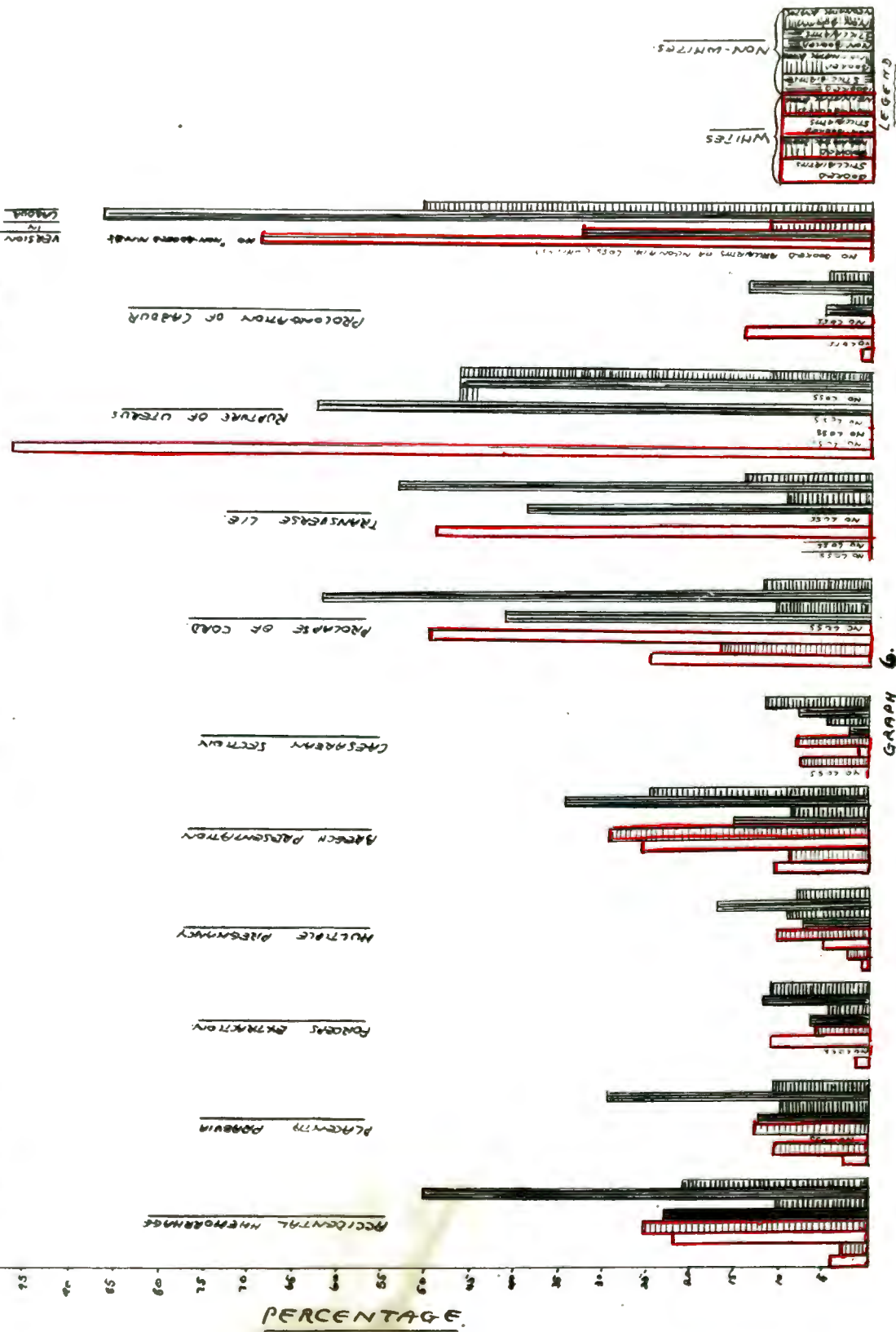
The reasons for variation in stillbirth rates will be outlined in more detail later.

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Age	White	Black	Hispanic	Asian	Other	Male	Female	Total	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate	Rate
76	13.3	1.7	3.7	20.8	8.0	37.5	0	1000	1.5											
62-2	13.3	6.2	15.0	47.1	10.8	50.0	50.0	0	14.2											
	21.2	20.5	11.1	16.9	22.1	67.9	67.4	64.4	8.5											
59.9	59.9	39.4	29.6	50.9	19.4	67.4	50.3	50.3	21.5											

BOOKED FETAL MORTALITY (2)  
 NON-BOOKED FETAL MORTALITY (2)  
 BOOKED FETAL MORTALITY (2)  
 NON-BOOKED FETAL MORTALITY (2)



GRAPH 6

FETAL MORTALITY (WHITES AND NON-WHITES) IN BOOKED AND NON-BOOKED PATIENTS SHOWING STEADY AND ABYSSIC LOSS WITH PERINATAL LOSS IN EACH RACE, IN STATISTICAL COMPLICATIONS

## ANTENATAL CARE

### ITS INFLUENCE IN FOETAL MORTALITY

#### Historical Survey.

Antenatal care in its widest sense is no modern conception. Very few of the earlier writers fail to make mention of the care of the health of the pregnant woman or the treatment of the diseases and disorders of pregnancy.

The first book devoted solely to antenatal care was "Hints to Mothers for the Management of Health during the Period of Pregnancy and in the Lying-in Room, with Exposure of the Common Errors in Connection with These Subjects" by Thomas Bull in 1877.

Pinard (1878) made an important contribution to the significance of antenatal care and stressed the dangers of malpresentation of the shoulder, and again in 1895 when he emphasized antenatal care as a prevention of eclampsia and of malpresentations.

Haig Ferguson (1899) in Edinburgh gave regular antenatal care to inmates of the Lauriston Prematurity Home for pregnant unmarried girls. It was from this that emerged the hospital outpatient department or antenatal clinic in Edinburgh in 1915.

However, the preventative aspect of antenatal care was not stressed until the work of Pinard was published when an era in midwifery was heralded. Routine supervision of all pregnant women was not attempted until Ballantyne in 1901 of Edinburgh canvassed for the great need for routine antenatal supervision.

In his last address in 1923, Ballantyne mentioned the following benefits which might be derived from regular antenatal care.

- (1) The removal of anxiety and dread from the minds of expectant, parturient and puerperal patients.
- (2) The removal of such discomfort amounting to suffering in many cases.

- (3) Early antenatal care and treatment of dangerous complications of pregnancy such as syphilis, toxæmia, heart disease etc.
- (4) The increase of the number of normal labours and pregnancies, i.e. the prevention of abnormality of labour such as transverse lies, obstructed labours and the like.
- (5) The stillbirth rate will at once be lessened, as well as of course maternal and foetal mortality.

Despite the remarkable lessening of maternal and foetal mortality in the United Kingdom, U.S.A., Holland, Denmark and other white centres during the past 10-15 years, no such striking similarity in the lowering of loss of infant life has taken place in our non-whites, despite a marked improvement in the white race, in our units of the University of Cape Town. ( see graph )

#### REASONS FOR THE HIGHER FOETAL LOSS IN THE NON-WHITE.

- (i) Much antenatal care is inadequate and inefficient.

Munro Kerr stressed that in no department of medicine is one more liable to drift into careless ways and thus miss the occasional abnormality or the occasional sign of impending danger, than in obstetrics.

Sutherland(1949) showed that in Great Britain the stillbirth rate was lower in those patients who had had antenatal care in varying degrees, than in those who did not at all. He emphasized the quality of intelligent antenatal supervision as a more important requirement than the number of visits to the antenatal clinic; visits which were often merely perfunctory and time consuming.

As Munro Kerr further puts it - "Examinations are not only too infrequent but cursory and the success of the antenatal visit

must be judged not by the numbers passing through booking clinics, and not by the number of attendances registered by each patient, but only on its effect in securing normal or as near to normal as possible delivery, and reducing both maternal and foetal mortality."

Sutherland too emphasized the immeasurable advantages of antenatal supervision on the incidence of prematurity and neonatal mortality.

A report on Maternity in Great Britain for 1945 showed that antenatal care received by individual mothers was associated with a decreased incidence in both prematurity and neonatal deaths.

In every case a clinic group returns a lower stillbirth rate than for other residences.

Jewitt(1956) stressed that foetal mortality and perinatal mortality rates are inevitably related to maternal mortality rates, and as long as the perinatal mortality rate is in the region of 30-40, it is incredible that anyone would suggest that such a threat to survival has all but ended.

The emphasis must also be placed on well qualified men in attendance in the antenatal clinics, especially in the field of obstetrics. Special qualifications in obstetrics is not enough. Experience in that field is essential.

Regular attendance at the antenatal clinic and the reasons for non-attendance should be ascertained, not until the reason for non-attendance is discovered too late.

The value of accurate attendance card systems and rigid adherence to the rule of non-attendance demands timely enquiry, and this not by letter post.(Wrigley). Often no accurate records are kept in hospitals or by the midwife of the days on which patients were next due to be seen, or even if such record were kept and the patient did not attend, no efficient steps were taken to discover why. The necessity for health visitors must thus be part

and parcel of all antenatal services.

The part played by diet, socio-economic status and ill health in antenatal care will be discussed later under the heading of prematurity, which to no small extent contributes to stillbirth neonatal deaths and perinatal mortality.

(ii) Lack of provision of facilities for adequate antenatal care.

Scrutiny of the factors in the causation of stillbirths, and in most instances neonatal and perinatal deaths, will often disclose the loopholes in inadequacies of an obstetric service, and from this attempts will be made "to plug the holes" in a leaking ship. (Wrigley)

The primary considerations in the failure of antenatal care is a failure in the accepted standard. Antenatal care may be unsatisfactory in not an inconsiderable number of aspects due to faults in branches of the obstetrical service.

Absolutely necessary for a good standard of obstetric service is a healthy administration for a well organized service.

The availability and distribution of beds in obstetrics is also a matter of administration.

Emphasis must be laid on the fact that the number of beds available for antenatal cases must depend on the population to be served, and not on the size of the obstetric unit or units in any locality, or number of beds provided for parturient women.

No matter the standard of obstetrics, the excellence of antenatal clinic attendance, the lack of adequate bed accommodation for "complete" antenatal supervision must necessarily neutralize all efforts to secure perfection.

If a patient under hospital care, and suffering from preeclampsia should be refused admission because of the unavailability of beds, then this indicates (if there was genuine difficulty) for an immediate survey of bed allocation.

Under no circumstances should it be necessary to treat as "outpatients" women suffering from a medical or obstetrical complication which would be deemed, under normal hospital conditions, as cases of "urgency". Preeclamptic toxemia and essential hypertension of pregnancy is one example.

The shortage of bed allocation in any institution in relation to the obstetric population must also necessarily lead to overcrowding of such a hospital in times of stress and urgency. Overcrowding means a more rapid "turnover" (Lour), a disproportionate number of patients in any given unit to the number of beds available, with an obvious lowering of the standards of nursing and postnatal supervision. This is particularly so when an increase of staff has not been provided for. As a corollary the deficiency of adequate infant accommodation must surely affect neonatal mortality in some degree. Outbreaks of neonatal infection in the nursery has not infrequently been attributed to this shortcoming.

It is also not unwise to conclude that obstetrical management must surely suffer to no uncertain degree, when "your hospital is being strained to the seams".

Sutherland maintains that there is a definite "negative correlation" between the stillbirth rate and percentage of births occurring in institutions, suggesting a contributory value of the obstetrical facilities available in hospitals and maternity homes.

Geggie (1957) recommended the provision of 2000 beds per 5000,000 population as a minimal requirement for adequate supervision. He demonstrated (table 11) the very definite advantages of increased hospital confinement in Canada over the years 1940-55, in relation not only to stillbirth rates but also neonatal and infantile mortality. The mortalities were almost halved when about twice the number of women were delivered in hospital. The similarity in reduction of maternal deaths in several countries in relation to

TOTAL BIRTHS. (INCLUDING STILLBIRTHS ) OCCURRING  
IN INSTITUTIONS IN THE CITY OF CAPE TOWN.

	1951 - 2.	1952 - 3.	1953 - 4	1954 - 5
<u>WHITES.</u>	76.9 %	78.4 %	78.7 %	81.1 %
<u>NON - WHITES.</u>	38.9 %	39.6 %	41.0 %	39.2 %

TABLE 10

FOETAL LOSS. (IN CANADA ). in relation to total births  
in hospital. (J.H.S. GEGGIE (1957.))

<u>YEAR.</u>	<u>LIVEBIRTHS.</u>	<u>BIRTHS IN HOSPITAL ( % )</u>	<u>STILLBIRTHS per THOUSAND</u>	<u>NEONATAL DEATHS per THOUSAND</u>	<u>INFANT MORTALITY per THOUSAND LIVEBIRTHS.</u>
1940	244136	45.3	27.2	30	56
1945	288730	63.2	23.1	29	51
1950	371071	76.0	19.3	24	41
1955	441681	86.6	15.6	19	31

TABLE 11 -

<u>DELIVERY IN INSTITUTIONS.</u>		<u>MATERNAL MORTALITY.</u>
UNITED STATES OF AMERICA ( % )	977 ( % )	0.3
SWEDEN.	87	0.5
ENGLAND AND WALES.	64	0.7
ITALY.	22	1.3
JAPAN	14	1.8
PORTUGAL	11	1.5
CAPE TOWN. (1949 - 1953) (WHITES)	79%	1.08
(NON - WHITES)	40%	2.49

TABLE 12

the percentage hospitalization is shown in table 12.

Similarly in the obstetric population of the City of Cape Town. ( table 1 )

Graph 3 similarly shows the relation between foetal mortality, maternal mortality and percentage hospitalization in Cape Town.

In non-whites where hospitalization was almost twice less frequent as in white patients (table 10) the foetal mortality (stillbirths) and maternal mortality was correspondingly higher.

### FACILITIES IN THE OBSTETRIC UNITS OF THE UNIVERSITY OF CAPE TOWN.

For a description of the 5 obstetrical units see previous note on pages

It has long been realized that our obstetric service has failed in 2 important respects. Firstly there has been a lack of expansion of antenatal facilities in our clinics to meet the demands of an increasing "cry" for antenatal care. As noted previously, attendances at these clinics have increased almost threefold since the first obstetrical report was published in 1948, and the arrangements at the clinics have not altered since.

Secondly, and of more importance, there has been no corresponding or "near to it" increase of the number of maternity beds available for the obstetric population attending our antenatal clinics. Apart from a temporary relief, when a ward in A 10 at Groote Schuur Hospital was opened in 1952, mainly for the admission of the medical complications of pregnancy (vide supra) and which was discontinued in 1955, the other obstetric units took the brunt of the midwifery in Cape Town and outlying areas.

Overcrowding of the units at the Peninsula Maternity Home, Somerset Hospital, in both the antenatal clinic and in the hospital, remains a "sore point". Refusal of admission to our non-white units because of lack of beds, even for serious cases of toxemia, antepartum

haemorrhage of a minor degree and the like, was practically a daily occurrence. "Outpatient" treatment of preeclampsia and hypertension, until bed accommodation became available, is a common occurrence in our non-white units. The later admission of such patients often in a more serious state was therefore not totally unexpected, with frequently the loss of the infant, as an intrauterine death, or neonatally because of extreme prematurity. And there were many of these patients.

Table 10 indicates the greater number of white patients than non-whites gaining admission to hospital for confinement, because of the relative adequacy of accommodation.

In the non-white, the majority of whom suffered from chronic ill health, and in whom diseases were rife, without facilities for home confinement, the picture was "not so rosy", and who needed to be delivered in hospital, only about 40% were able to do so.

Apart from lack of facilities in hospital accommodation, as already mentioned, the ancillary services such as laboratory (including postmortem) and for radiological work, were too far away from the "centres of industry" to be of immediate aid. The reports from these departments were "often too late" to be of adequate use.

#### THE EFFECTS OF ATTENDANCE AT THE ANTENATAL CLINICS.

There is no doubt that particularly among our non-white women (especially the Bantu) antenatal attendances were not satisfactory, with visits being too seldom, because of either language difficulty or inability to afford the expense of travelling to and from the hospitals. Although many of our women were asked to attend at clinics nearing their homes, there was no possible means of keeping touch with them. Health visiting in the true sense of the word is

non-existent among our pregnant non-white women. Despite the fact that many non-white women book at their first visits and do not attend again until in labour, we are unable to remedy this state of affairs, because there is no system by which this might be checked. Unless such a patient was found to have an abnormality requiring her immediate admission to hospital, such as pre-eclampsia, diabetes, breech presentation and the like, no attempt might be made to ascertain her whereabouts until admission is again sought.

<u>UNIT.</u>	<u>YEAR.</u>	<u>ATTENDANCE.</u> (rate/patient)	<u>S.B's.</u> (%)	<u>N.N.D's.</u> (%)	<u>P.N.M.</u> (%)
<u>WHITES.</u>					
<u>M.M.H.</u>	1953	6.0	1.4	2.0	3.4
	1954	6.8	1.2	1.6	2.8
	1955	5.8	2.1	1.2	3.3
<u>NON-</u>					
<u>WHITES.</u>					
<u>N.S.H.</u>	1953	2.8	4.2	2.6	6.8
	1954	3.0	5.9	2.7	8.6
	1955	3.0	4.9	2.5	7.4
<u>St. M.</u>	1953	4.3	2.7	2.4	5.1
	1954	4.4	3.9	2.7	6.6
	1955	4.3	4.4	2.6	7.0
<u>G.S.H.</u>	1953	1.7	8.2	5.9	14.1
	1954	2.3	7.9	7.4	15.3

SUMMARY OF ATTENDANCE RATES AT THE OBSTETRIC UNITS  
WITH CORRESPONDING FOETAL MORTALITY RATES. (1953-55)

TABLE 13

Table 13 shows the close relationship between stillbirths, perinatal deaths and attendance rates at our units for the years 1953-55. Not included in this table was the Peninsula Maternity Home, where both whites and non-whites were admitted, the majority being non-whites.

As will be particularly noted, perinatal stillbirth rates and mortality rates were markedly apparent in relation to the attendance rate at the Groote Schuur Hospital unit. This might be explained by the fact that the majority of admissions to this hospital were "non-booked", and nearly all patients were suffering from a complication of pregnancy, medical or obstetrical.

The low foetal loss in the white patient was apparent in relation to the greater rate of attendance at the antenatal clinic, as opposed to the non-white who did not attend as often or regularly with a higher foetal mortality. Many of our non-whites were admitted as "non-booked" patients, without adequate antenatal supervision. It was also the policy of our antenatal attendants to "book" a patient with preeclampsia or essential hypertension; a patient who was seen for the first time, and admitted immediately to the antenatal ward for observation. She was not classified as an "emergency" or "non-booked" patient, although she should have been.

#### THE PART PLAYED BY ANTENATAL CARE IN THE PREVENTION OF STILLBIRTHS.

Holland(1929) investigated the average mortality in 409 labours where contracted pelvis existed. As many as 37% of the infants were lost. Where no antenatal care was existent in 56 of these cases, 29 infants were lost, i.e. 52%. However, with supervision of pregnancy in 353 patients, 45 infants were lost, i.e. 12%.

Nørregaard(1953) in Copenhagen reported on 1000 full time pregnancies and 1125 premature deliveries. He found that where antenatal care was absent in 19% of unmarried mothers the stillbirth

rate was higher because of the prematurity rate of 20%. In a controlled series of unmarried mothers with antenatal care the premature rate was 15%.

Eastman(1947) from the U.S.A. noted that where hospital care was taken as the degree of poverty of patients, the incidence of prematurity in white ward patients was greater than in private patients. Similarly the incidence of prematurity in Negro ward patients was greater than in white ward patients. The stillbirth rates were higher, the greater the incidence of prematurity, and hence the highest stillbirth rate was found in Negro ward patients. The incidence of prematurity in relation to adequacy of prenatal care, Eastman classified as follows:-

- (i) None — No visits to the antenatal clinic.
- (ii) Poor — Only 1-2 visits to the clinic.
- (iii) Adequate— 3 or more visits to the antenatal clinic.

Although the standard of "adequate" antenatal care" is low, the incidence of premature birth in 2276 cases (where the quantity of antenatal care was known) of single pregnancies, with spontaneous onset of labour, was 7-8% with good care. With poor or no supervision the incidence of prematurity was 24.9%, the stillbirth rate being correspondingly high.

Many authors such as Crosse, Browne, Baird, Dunham and others found the stillbirth rates to be approximately 10 times higher in premature babies as "mature" ones, particularly in the absence of adequate antenatal care.

Sutherland(1949) noted that in every case, clinic group patients returned a stillbirth rate lower than for other residences.

A Report of Maternity in Great Britain(1945) showed that adequate antenatal supervision received by individual mothers was associated with decreased evidence of prematurity, and therefore

a lower stillbirth and neonatal loss. The educational importance of this work was not its least valuable aspect. It was stressed that the stillbirth rate was low in areas where a high proportion of confinements took place in hospitals or private nursing homes. This showed that where medical and obstetrical facilities were available in these institutions prevention of stillbirths and neonatal deaths was necessarily easier. The stillbirth rates were higher in institutions than outside because hospital and maternity homes often admitted more difficult cases, such as a higher proportion of primigravidae and more abnormalities of a pregnancy and labour.

Rodway(1957) reported on the undoubted educational value of programmes of relaxation techniques for women having infants, not only on the benefits derived, but also the advantages of regular attendance at the antenatal clinic. There was a significant doubling of the prematurity and perinatal mortality rates in patients with inadequate antenatal care compared with those who attended regularly at the clinic.

Rodway however concluded that their practical advantages in terms of consequent reductions in obstetrical complications had been advertised with more enthusiasm than accuracy. She had reported findings on an enquiry into the question whether antenatal education and exercises had any effect on the various complications of pregnancy and labour.

A total of 2700 primigravidae was divided into 3 groups watched for age as follows:-

- (a) Exercise group. 1000 pregnant women were trained for childbirth by special exercises and relaxation techniques, as well as by talks on pregnancy, physiology, labour, and on diet, health and hygiene.

- (b) Lecture group. 750 women who attended talks, but received no training in the physical preparation of labour.
- (c) Control group. 250 women who received no lectures or exercises.

The results showed statistically that there was an insignificant diminution in the incidence of toxæmia for group (a) although the only 2 cases of eclampsia which occurred were in this group.

In antepartum hæmorrhage (placenta prævia excluded).

This occurred only once in groups (a) and (b). There were 10 cases in group (c) with 5 stillbirths. Rodway maintained that the women in the trained groups saw their doctors more often than in group (c) and would find it easier to complain of minor symptoms to receptive care, especially as had been instructed in what was normal and abnormal. In the light of what was found in our units of the University of Cape Town, the stillbirth and neonatal mortality was definitely higher in patients with antepartum hæmorrhage (including placenta prævia) in the absence of antenatal care.

In labour.

Antenatal training for childbirth did not lessen the need and call for pain killing drugs in labour. The average length of labour was the same in all three groups.

The incidence of postpartum hæmorrhage was not reduced by physical training for childbirth, and the forceps delivery rate was similar in the 3 groups. If patients of over 30 years of age were considered, then the incidence in group (a) was significantly lower than in the untrained.

The main but weighty favourable result was that the premature birth rate and perinatal mortality rate in the controls (group c) were double those of the other 2 groups.

The main result of this investigation was that it was difficult

to draw conclusions from this detailed report, because no consistent physical advantages seemed to accrue from antenatal education, except loss of infant life being greater in those without adequate supervision in the antenatal clinic. Other investigators on the same subject found different results from Rodway, but again found a higher foetal loss without adequate prenatal care.

Baird and Vypor(1941) from the Aberdeen Maternity Hospital for the years 1938 to 1940 divided patients into 3 groups:-

- (i) Booked cases, of which there were 3427 women.
- (ii) Private patients in specialist practice, 250 patients.
- (iii) The remainder were births in Aberdeen domiciliary and emergency practice.

The combined stillbirth and neonatal death rates(perinatal loss) were 54.5 per thousand, 12 and 78.5 per thousand respectively.

The authors concluded that in the 3 groups, the variation in results in foetal loss were due to good nursing and good economics in group(i); favourable nursing and medical factors in group(ii); and in group(iii) there was a definite need for medical and nursing care as well as better economics and social conditions.

Daird(1945) published figures on the differences in stillbirth and neonatal rates in a larger series of women for the years 1936-1944. Again he divided his patients into 3 groups:-

- (i) 1419 patients delivered in nursing homes and looked after by private doctors and a few specialists. The stillbirth loss in this group was 25.1 per thousand births.
- (ii) 8608 patients delivered at the Aberdeen Maternity Hospital all of whom were booked cases, and all under supervision of the specialist.

The stillbirth rate in group(ii) was 30.1 per thousand.

- (iii) 591 patients from private practice of one specialist with a stillbirth rate of 9.8 per thousand.

Neonatal death rates showed a similar trend.

An explanation of the above diversity of foetal losses was offered as follows:-

Groups (i) and (iii) were of the same social class. The difference in mortality was due to the standard of obstetrical care. In groups (ii) and (iii) the differences in losses was probably dependent on the social status with differences in socio-economics such as nutrition, inadequate rest, and the necessity to work during pregnancy, and poorer planning of families etc.

Daird concluded that the differences in the stillbirth rates between the social classes were probably the effects of inadequate nutrition in the poorer sections of the community, both prior and during pregnancy. From a study of specialist and hospital cases he demonstrated the marked effects of obstetrical skill upon the stillbirth rate of the upper income groups and a much slighter effect among women on the poorer strata of society.

A survey of the causes of stillbirths suggests that the contrast must be due to the great differences in physique, wealth and diet of the mother. Tall physically fit women with better diets, give better results than in small statured physically, lower state of health and worse diets.

Hayes(1949) analysed the stillbirth rates as occurring in the Women's Hospital, Melbourne, Australia for the years 1943-48 and found the following:-

	<u>No. of births</u>	<u>S.B's.</u>	<u>N.N.D's.</u>	<u>Total/100</u>
Booked patients.	18477	24.1	15.3	39.4
Non-booked patients.	3553	104.1	68.7	172.8
<b>Total</b>	<b>22030</b>	<b>37.0</b>	<b>23.9</b>	<b>60.9</b>

It was obvious that patients without adequate care showed a higher foetal loss than those who were satisfactorily supervised.

Thompson(1952) showed a vast difference between the perinatal mortality rates of "booked" and "non-booked" patients in a maternity hospital. At the Simpson Maternity Pavilion for 4 years(1948-51) 11484 infants were delivered of "booked" mothers with a perinatal loss of 49.6 per thousand.

In 1601 infants of "non-booked" mothers the rate was 233.0 per thousand births.

Immaturity at birth according to Thompson as measured by birth weight was the only factor which exerts a profound influence upon the differences between "booked" and "non-booked" perinatal mortality rates. He did not, however, compare the differences in mortality rates in "booked" and "non-booked" patients due to obstetrical factors such as antepartum haemorrhage, maternal ill health and maternal hazards of labour.

Lawson and Lister(1956) in a clinical report from the department of Obstetrics of the University College, Nigeria, from the 1st April, 1953, until 31st December, 1954, discussed a unit similar to ours of the University of Cape Town. Only non-whites were admitted to their unit, the majority of patients being afflicted by such diseases as malaria, dysentery, bilharzia, profound anaemia(usually dietetic). Hospital facilities were primitive, with the scantiest of obstetric instruments in 1953. In such a department with only 45 lying-in beds, 5582 patients were confined in a period of 18 months. Of these patients 1004(17.8%) were "emergencies". The stillbirth rate was 40.3 per thousand in "booked" cases and 207 per thousand in "emergencies". The perinatal mortality was 73.0 or 409 babies lost. Neonatal losses were 49.6 per thousand for "booked" cases, and 126.5 for "emergency". As was to be expected, the maternal mortality under those conditions was high, 24 dying in "booked" and 52 in "non-booked" cases. Prematurity again played the most important part in maintaining a high perinatal loss.

Van Dongen(1957) revealed that for the years 1952-54 at the Bridgman Hospital, Johannesburg, out of a total of 9310 births, 400 stillbirths occurred(42.9 per thousand).

Of 8023 "booked" deliveries 256 babies were stillborn, giving a rate of 31.7 per thousand. In 1287 "emergency" deliveries 144 babies were born dead, with a stillbirth rate of 111.9/1000.

### SUMMARY AND CONCLUSIONS.

Statistics from the obstetric units of the University of Cape Town are summarized.

The stillbirth rate per thousand births was 47.4, and the neonatal mortality 28.44. The rate for hospital and district practice was lower. The perinatal mortality in hospital practice was 74.5 per thousand.

In whites the stillbirth rate was slightly less than  $\frac{1}{2}$  that of non-whites. (24.3: 51.5). In private practice in several nursing homes in Cape Town, the stillbirth rate was 13.1/thousand, i.e. almost  $\frac{1}{2}$  that of white hospital practice.

Other teaching hospitals in the Union of South Africa show a similarity in stillbirth rates in whites and non-whites, as do non-white institutions elsewhere.

The influence of antenatal care on foetal mortality is briefly discussed, a short bibliography being presented.

Reasons for a higher foetal loss in the non-white in relation to antenatal care are given, and discussed. Particular emphasis is laid on the effects of shortage of hospital accommodation.

The close relationship between attendance at the antenatal clinic and foetal loss is presented, in our units and of several authors.

Antenatal care is essential in the lowering of not only maternal mortality, but also in foetal mortality, apart from socio-economic

reasons. The lowering of prematurity rate is also mentioned, but will be discussed more fully later. ( see "PREMATURITY")

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THE INFLUENCE OF ANTENATAL CARE IN OUR UNITS OF THE UNIVERSITY  
OF CAPE TOWN(1952-55)

As in cases previously noted by other authors, babies born from "booked" patients show a lower stillbirth rate than those from "non-booked" cases. The perinatal mortality rates follow the same trend.

IN "BOOKED" CASES.

Total babies delivered in hospital	21531
Number of stillbirths	561
Stillbirth rate/1000 total births	26.5

Of the 561 stillbirths the foetal heart sounds were heard on admission to hospital in 304 instances, or 54.1%. No foetal heart sounds were heard on admission therefore in 45.9% of cases, especially in patients with antepartum haemorrhage.

IN "NON-BOOKED" CASES.

Total babies delivered in hospital	4399
Number of stillbirths	670
Stillbirth rate/1000 total births	152.3

In 354 instances(52.8%) foetal heart sounds were heard when the patient was admitted to hospital. No foetal heart sounds were therefore heard in 47.2% of cases. It should be emphasized that both in "booked" and "non-booked" cases, especially in patients with accidental haemorrhage, foetal heart sounds were extremely poor or ceased suddenly soon after admission to hospital. Frequently too in cases of prolonged labour especially in "non-booked" patients the foetal heart sounds had been "very poor" on admission so that when delivery occurred(by caesarean section or forceps)a stillborn child

was produced.

From the above figures it was noted therefore that stillbirth rates in "non-booked" cases were almost 6 times higher than in "booked" cases.

In white patients there were 520 babies born from "emergency" cases out of 4261 delivered at the Mowbray Maternity Hospital, i.e. an incidence of 12.1%, whereas in non-whites the incidence of "emergency" cases was 20.4%, or 2697 babies from "non-booked" patients out of 13193 babies born in hospital during 1952-55.

It should be noted that the definition of "booked" patients admitted to our units could be criticised on the grounds that from a point of view of "antenatal clinic attendance" many women with preeclampsia or hypertension in pregnancy were seen only once at the clinic, and admitted immediately because of severe illness at the same time. In many other instances, there have been patients who had not attended the antenatal clinic from the time of "booking" until readmitted in labour almost 2-3 months later. From a strictly academic point of view these patients were really "non-booked" cases.

If one were therefore to strictly classify these patients according to antenatal attendance, particularly among our non-whites, the incidence of "emergency" patients would be in the vicinity of 30 or more per cent.

As was pointed out by Sutherland(1949) a greater incidence of prematurity occurred in "non-booked" patients. So it was in our units during 1952-55.

Total number of premature babies(i.e. 5½lbs. and less)	3341
Stillbirths	534
Premature stillbirth rate/1000 total births	159.8
Total number of neonatal deaths	466
Premature neonatal death rate/1000 total live births	166.0
Perinatal premature loss/1000 births	298.2

A comparison of the losses of premature babies and those weighing more than  $5\frac{1}{2}$  lbs. revealed the following figures:-

MORTALITY OF BABIES WEIGHING MORE THAN  $5\frac{1}{2}$  lbs. ("MATURE")

Total number of "mature" babies	22589
Total number of stillbirths	697
Stillbirth rate/1000 total births	30.8
Total number of neonatal deaths	236
Neonatal mortality/1000 livebirths	10.8
Perinatal mortality	41.2

Premature stillbirth was therefore more than 5 times higher than in "mature" babies. Neonatal mortality was more than 16 times higher. Perinatal mortality was more than 7 times higher in premature babies as in "mature".

COMMENTS.

Antenatal care in our units in the true sense of the word shows that stillbirth losses were almost 6 times higher in women who did not avail themselves of supervision than those who had.

Similarly because prematurity is more often seen in patients who did not attend the antenatal clinic, the stillbirth rate, neonatal mortality and perinatal mortality were much higher in these patients.

Hence in white patients in private practice, where antenatal care was of a high degree, medical attention excellent, and nursing care the best possible, the stillbirth rate was only 13.1/1000.

In white hospital patients, where antenatal care was good, medical attention excellent, and nursing care highly satisfactory, but diets and physique "below par", the stillbirth rate was 24.3/1000.

In non-white patients of our units where antenatal care was inadequate according to the required standards, mainly because of

circumstances beyond our control, with medical care on the whole highly satisfactory and nursing attention good, but diet and physique unsatisfactory and chronic ill health prominent, the stillbirth rate was 51.5/1000.

One must therefore conclude that the basic causes to a large extent in the variation in stillbirth rates in our institutions, was inadequate care in the antenatal period in our non-whites associated with poor health of this race due to socio-economic conditions. In white patients, again the only factor which appears to affect the stillbirth rates in private practice and hospital practice, was a poorer health of the white patient in the hospital.

In the following pages antenatal care in relation to the individual causes of stillbirth (and in many instances neonatal deaths) will be discussed. The factors underlying infant loss in the 2 races will also be mentioned, as a basis for adequacy or inadequacy of antenatal supervision.

## THE INFLUENCE OF ANTENATAL CARE IN THE PREVENTION OF FOETAL MORTALITY.

A detailed analysis of the various conditions involved in the causation of stillbirths in our units at the University of Cape Town is presented to indicate the effects of antenatal supervision (apart from socio-economic causes) in the prevention of such losses.

In addition the incidence of each condition as occurring in our units and elsewhere is noted.

Comparisons are made in foetal losses in the racial groups, in order to show how inadequate antenatal care (especially in the non-white) promotes higher foetal losses, not only as stillbirths but also early neonatal mortality.

Table 4 briefly summarizes the various conditions to be discussed, showing the effects of antenatal care on foetal mortality in whites and non-whites. It will be obvious that patients who have had antenatal care lose fewer babies, even if the care is not completely satisfactory. The greater numbers of "non-booked" patients among non-whites will be noted in almost all the conditions to be discussed, with a consequent higher mortality in this racial group. Again it should be emphasized that socio-economic causes of foetal loss are not detailed here but in the chapter on prematurity to be discussed later.

UNIT and YEAR	NO (BABIES)	B.	E.	TOX-AEMIA etc	TOTAL LOSS		M.	P.	A.R.M.			CAESAREAN SECTION			EXPECTANT			PREMS	A.H. with TOX-AEMIA (SB's)	A.H. without TOX-AEMIA (SB's)	BOOKED		NON-BOOKED		REMARKS
					SB	NND			NO.	SB.	NND	NO	SB	NND	NO	SB	NND				LOSS	LOSS			
P.M.H. 1952	22	4	18	4	8	2	19	3	13	2	1	0	0	0	9	6	1	10			4 SB	1 NND	4 SB	1 NND	
1953	126	51	25	65	30	13	113	13	4	0	2	5	1	2	117	29	9	36			4 SB	3 NND	26 SB	10 nnd	
1954	29	12	17	23	22	2	21	8	5	5	0	2	1	0	22	16	2	14			9 SB	2 NND	13 SB	-	
1955	92	40	52	39	27	7	78	14	27	4	1	8	4	1	57	19	5	60			5 SB	5 NND	19 SB	2 NND	
M.S.H. 1952	34	6	28	16	16	6	24	10	6	4	1	3	1	2	25	11	3	24			3 SB	4 NND	13 SB	2 NND	F.H.S. absent in 161 cases (H.e. 19.1%)
1953	56	18	38	25	25	6	41	15	2	1	0	2	0	1	52	24	5	16			5 SB	3 NND	20 SB	3 NND	
1954	64	25	39	29	29	2	46	18	28	18	0	0	0	0	36	11	2	27			7 SB	2 NND	22 SB	-	
1955	77	42	35	25	25	8	49	28	24	13	5	0	0	0	53	12	1	23			8 SB	3 NND	17 SB	5 NND	
M.M.H. 1952	25	10	15	5	5	3	16	9	1	1	0	1	0	0	23	4	3	6			1 SB	-	4 SB	3 NND	F.H.S. absent in 161 cases (H.e. 19.1%)
1953	38	30	8	3	3	2	21	17	3	1	0	4	0	0	31	2	2	6			1 SB	1 NND	2 SB	1 NND	
1954	32	27	5	1	1	3	18	14	6	0	1	3	0	0	23	1	2	7			-	1 NND	1 SB	2 NND	
1955	42	25	17	5	5	4	27	15	4	0	1	0	0	0	38	5	3	26			2 SB	1 NND	3 SB	3 NND	
ST. M. 1952	10	7	3	3	8	0	8	2	2	2	0	0	0	0	8	6	0	4			2 SB	-	6 SB	-	F.H.S. absent in 161 cases (H.e. 19.1%)
1953	32	17	15	11	11	5	29	3	0	0	0	1	0	1	31	11	4	12			5 SB	1 NND	6 SB	4 NND	
1954	31	15	16	11	11	0	26	5	14	7	0	0	0	0	17	4	0	8			5 SB	-	6 SB	-	
1955	54	26	28	14	14	6	46	8	15	6	0	3	0	1	36	8	5	16			3 SB	1 NND	11 SB	5 NND	
G.S.H. 1952	24	3	21	10	15	1	16	8	15	10	1	0	0	0	9	6	1	14			1 SB	-	14 SB	1 NND	
1953	22	5	17	6	6	4	20	2	1	0	0	5	1	1	16	5	3	9			1 SB	-	5 SB	4 NND	
1954	32	9	23	10	10	3	27	5	10	1	0	1	1	0	21	8	3	15			-	-	10 SB	3 NND	
TOTAL	842	384	458	305	271	77	625	217	180	75	13	38	9	9	624	187	55	333			69 SB	28 NND	202 SB	49 NND	
% AGE	3.24	45.6	54.4	36.2	32.1	13.5	74.4	25.6	21.3	41.12	12.6	4.3	23.1	31.2	74.2	29.9	12.5	38.5			17.9	8.9	44.1	19.1	
					41.3%					48.8%				47.3%			38.4%				25.2%		64.8%		

ACCIDENTAL HAEMORRHAGE. FETAL loss according to method of delivery; in booked and non - booked cases; and in cases with and without toxæmia.

**(I) ACCIDENTAL HAEMORRHAGE.****(TABLES 15, and 66.)****(GRAPHS 5,6,10 and 11)****INCIDENCE.**

The high toll of foetal lives taken by this condition is well known, the frequency of which varies considerably in all obstetrical units.

De Villiers(1955) reported an incidence of 2.1% of accidental haemorrhage from our obstetrical units for the years 1949-53 inclusive.

Sexton, Hertig, Reid et al(1950) from the United States of America recorded an incidence of 1.1% .

Dieckman(1950) noted an incidence of accidental haemorrhage of 1 in 111 cases or 0.9%.

Page, King and Merril(1954) found an incidence of abruptio placentae of 0.5%.

Eddie and Randall(1954) reported a similar incidence of 0.5% or 1 in 200 cases.

The majority of British authors report an incidence of about 1% in the majority of teaching hospitals.

A clinical report from the obstetric unit of the University College, Ibadan, Nigeria (all non-whites) Lawson and Lister(1954) recorded an incidence of 1.5% accidental haemorrhage. In spite of socio-economic factors similar to those occurring in our patients, associated with nutritional deficiencies and chronic ill health, the incidence of P.E.T. at Ibadan was only 1.1%. In only 4.9% of cases of accidental haemorrhage occurring at this hospital was there an associated P.E.T. In 86 babies born of mothers without P.E.T. in the presence of accidental haemorrhage, as many as 37 or 43% were lost, of which 30 or 40.7% were stillborn and 7 neonatal deaths (12.4%). The majority of these babies were premature.

INCIDENCE OF ACCIDENTAL HAEMORRHAGE IN OUR UNITS.

During the years 1952-55 inclusive the incidence of accidental haemorrhage was 3.24%. Compared with other centres therefore the frequency of occurrence of this very serious condition in our units was very high.

In white patients delivered at the Howbray Maternity Hospital (all whites) the incidence was 3.21% compared with an incidence of 3.27% in non-whites, at the Somerset and Groote Schuur Hospitals and St. Monica's Home.

(1) In "booked" cases the incidence of accidental haemorrhage was 1.7%. With adequate antenatal care therefore the frequency of this condition was similar to many other white teaching centres.

(a) In white patients.

The incidence of accidental haemorrhage was 2.46% in "booked" cases.

(b) In non-whites the incidence was 1.59%

(2) In "non-booked" cases, the incidence of accidental haemorrhage was 10.4%.

(a) In white patients the incidence was 8.65%.

(b) In non-whites the incidence was 11.2%.

Of the 842 babies born of mothers with accidental haemorrhage 458 were from patients without adequate antenatal care, or in 54.4%. In white patients this percentage was 32% whereas in non-whites this was 57.6%

PERINATAL MORTALITY IN ACCIDENTAL HAEMORRHAGE ASSOCIATED WITH  
PREECLAMPTIC TOXAEMIA.

Dieckman(1952) noted that there was a higher foetal mortality in the presence of P.E.T. and accidental haemorrhage, when 50% of babies were lost.

O'Donnell Browne(1952) reported a 77.5% foetal loss in accidental haemorrhage with toxemia.

Crichton(1950) recorded 120 cases of concealed accidental haemorrhage at the Peninsula Maternity Home and Groota Schuur Hospital. Of these patients 90.9% were multiparous, and toxemia occurred in 95%. The foetus was invariably dead in these patients.

Posner, Anderson and Posner(1956) reported a 75% foetal loss in patients with Couvelaire uteri.

Feeney(1935) in an analysis of 3310 fetuses born of patients with accidental haemorrhage, recorded a 50% loss, and a 100% mortality in patients with severe toxemia.

De Villiers(1955) analysed 657 cases of abruptio placentae in the obstetrical units of the University of Cape Town during the years 1949-53 inclusive. From these cases the greatest loss occurred in patients with concealed haemorrhage(98.1%). Where massive external haemorrhage had occurred with marked shock, abdominal pain and rigidity the loss was 60%. In minor degrees of haemorrhage and no shock only 20.1% of babies were lost.

In the present series of cases delivered during 1952-55 there were 139 stillbirths or 45.5% in 305 cases with P.E.T.

In 537 babies delivered of mothers without P.E.T. or hypertension with accidental haemorrhage the stillbirth loss was 24.6%

Page, King and Merril(1954), Poliakoff and McCain(1949) and Daro, Gollin and Primiano(1956) Record high losses.

The twice greater stillbirth loss in accidental haemorrhage with P.E.T. compared with patients without P.E.T. was hence apparent in our units.

Similarly in white patients with P.E.T. the stillbirth rate was higher than when P.E.T. was not present (35.6%;6.8%).

In non-whites with P.E.T. also there was a greater stillbirth loss than when P.E.T. was absent, although the difference was not so marked. This smaller difference in loss was due to the inferior antenatal care in the non-white, in whom "outpatient" treatment of P.E.T. was carried out, and in whom poorer health was existent.

A glance at tables 19b and c reveals that accidental haemorrhage tended to occur most frequently in the presence of hypertension rather than when P.E.T. was present, and that maceration of the foetus was most frequent in the former.

**THE INFLUENCE OF THE METHOD OF DELIVERY ON PERINATAL MORTALITY**  
**IN ACCIDENTAL HAEMORRHAGE.** (TABLES 19)

Perinatal losses were high in all methods of treatment because of the lethal effects of separation of the normally situated placenta. Stillbirth rates were particularly high, and neonatal deaths were many because so many of the babies delivered were premature (38.5%).

Foetal heart beats were not heard in 19.1% of cases on admission to hospital, and in many others there was extreme foetal distress for which very little could be done.

There was statistically no significant difference in perinatal mortality in the different methods of delivery; by caesarean section; following surgical rupture of the membranes or expectant treatment.

TABLE 15a ACCIDENTAL HAEMORRHAGE. (WHITES AND NON - WHITES.) FOETAL LOSS IN  
RELATION TO METHOD OF DELIVERY, BOOKED AND NON - BOOKED, WITH AND  
WITHOUT TOXAEMIA AND HYPERTENSION (1952-1955)

RACE	NO. BABIES	B.	E.	M.	P.	TOXAEMIA	TOTAL LOSS		A. R. M.			CAESAREAN SECTION			EXPECTANT		BOOKED	NON -	A.H.	A.H.	PREMS BABIES.			
							SB.	NND	NO.	SB.	NND	NO.	SB.	NND	NO.	SB.	NND	LO	Booked - SS.	WITH TOXAEMIA		WITH-OUT TOXAEMIA		
WHITES.	137	92	45	82	55	14	14	12	14	2	2	8	0	0	115	12	10	4SB 3NND	10 SB 9NND	14 5SB	123 9SB	45		
% AGE.	3.21	67	32	59.9	40 .1	10.2	10 .2	9.7	10 .2	14 .2	16 .6	5. .8	0	0	83. .9	10 .4	9.7	4.3% 3.4%	22.2% 25.7%	35.6 Loss *	6.8 Loss *	32.1		
TOTAL LOSS %							18.9%*			28.5%*			0%				19.1%*			7.6%*		42.2%*		
NON - WHITES.	436	185	251	354	82	160	180	41	117	71	7	15	3	6	304	106	27	40SB 14NND	120SB 27NND	160 79SB	276 101SB	149		
% AGE.	3.27	42. .4	57 .6	81.2	18 .8	36. .7	41. .2	16. .0	26. .8	60 .6	15 .2	3. .4	20 .0	50 .0	67. .4	34 .8	13. .6	21.6% 9.6%	47.8% 11.6%	49.3 Loss	36.6 Loss	35.1		
TOTAL LOSS %							50.6%*			66.6%*			60%				43.9%*			23.8%*		58.5%*		

TABLE 16 PLACENTA PRAEVI. (WHITES AND NON - WHITES). FOETAL LOSS ACCORDING TO  
METHOD OF DELIVERY. (1952-1955)

RACE	NO.	M.	P.	B.	E.	PREMS	TOTAL LOSS		CAESAREAN SECTION			A. R. M.			EXPECTANT.			BIPOLAR VERSION			
							SB.	NND	NO.	SB.	NND.	NO.	SB.	NND	NO.	SB.	NND	NO.	SB.	NND	
WHITES.	37	29	8	17	20	15	2	6	30	1	6	3	1	0	2	0	0	2	0	0	
% AGE	0.8%	78.4	21.6	46. .0	54. .0	40.5	3.3	19.3	81	3.3	20.6	9.1	33.3	0	5.4	0	0	5.4	0	0	
							21.5%			23.3%			33.3%			0%			0%		
NON - WHITES.	145	132	13	46	99	46	33	14	81	8	10	28	9	2	30	7	3	5	5	0	
% AGE	1.09%	91.7 68	8.2% 67	51.7 53	68.7 51.7	31.9	22.2	9.6	55.4 68	9.8	13.7	19. 1.3%	32.1	10. 6.2	39. 6.2	23. 3	13. 0	3. 0	100 0	0	
							32.4%			22.2%			39.2%*			33.3%*			100%		

PERINATAL MORTALITY IN ACCIDENTAL HAEMORRHAGE.IN OUR UNITS.

(TABLES 15,60)

During the years 1952-55 inclusive of 842 babies delivered of mothers with accidental haemorrhage, no fewer than 343 or 41.3% were lost, of which 271 or 32.1% were stillborn, and 77 or 13.5% neonatal deaths.

IN "BOOKED" CASES.

Of 372 babies delivered in "booked" cases as many as 97 babies or 25.2% were lost, of which 69 babies or 17.9% were stillborn, and 28 babies or 8.9% neonatal deaths.

(i) IN WHITES (MOUBRAY H.H.)

The perinatal mortality in these patients was 7.6% of which 4.2% were stillborn, and 3.4% neonatal deaths.

(ii) IN NON-WHITES (SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. MONICA'S HOME)

The perinatal loss in these patients was 23.8%, of which 21.6% were stillborn and 9.6% neonatal deaths. Many of the stillbirths in this race were from women with accidental haemorrhage associated with P.E.T. and who were treated as "outpatients" because of the shortage of bed accommodation. Antenatal care was deficient in these women, despite the fact that they were "booked" in our clinics.

The adverse effects of unsatisfactory antenatal care in even our so-called "booked" patients with hypertension was apparent.

IN "NON-BOOKED" CASES.

Of 470 such patients who had received no care in our clinics, as many as 251 babies were lost, or 54.8%.

There were 202 stillbirths or 44.1%, and 49 neonatal deaths or 19.1% lost as result of accidental haemorrhage in "non-booked" patients delivered in our units.

There was therefore a significant more than twice a greater perinatal mortality in "non-booked" as "booked" patients.

(i) IN WHITES. ("NON-BOOKED")

Almost 6 times a greater perinatal mortality occurred in these women as in those "booked" in our clinics (42.4% : 7.6%).

The stillbirth rate was 5 times greater (22.2% : 4.3%) and the neonatal death rate almost 8 times larger (25.7% : 3.4%) than in "booked" cases.

(ii) IN NON-WHITES (NON-BOOKED)

Because of the inferior antenatal care in this race because of inadequate accommodation for antenatal supervision, the difference in perinatal mortality between "booked" and "non-booked" cases was not so marked as in whites.

The perinatal mortality in these patients was 53.5% which was almost 2½ times greater than in "booked" patients. Stillbirth losses were more than twice more than in "booked" cases, and neonatal deaths almost similar.

Statistically therefore it was obvious from the above evidence that women with accidental haemorrhage "booked" in our clinics have a better chance of survival of their babies as in "non-booked" cases.

So similarly in non-whites, there was a much greater perinatal mortality in women with accidental haemorrhage who had not had adequate antenatal care, even although they had been patients attending our antenatal clinics. The shortage of accommodation for hospitalization of patients with P.E.U. who subsequently developed accidental bleeding

was no small factor in increasing the incidence of haemorrhage but also perinatal mortality.

**THE EFFECTS OF INADEQUATE ANTENATAL CARE AT THE UNIVERSITY COLLEGE, IRADAN, NIGERIA, IN PATIENTS WITH ACCIDENTAL HAEMORRHAGE.**

This institution similar to our non-white units but with even "worse off" accommodation, revealed the results of inadequate care even in those women with so-called prenatal supervision. Here, as in Cape Town units, so-called "booked" patients attended antenatal clinics only on odd occasions, and hence also showed high perinatal mortality rates, as in "non-booked" patients.

**"Booked" Patients with Accidental Haemorrhage.**

65 babies were delivered during 1953-54 and of these 24 or 36.9% were lost. Of these 19 or 29.2% were stillborn, and 5 or 10.8% neonatal deaths.

**"Non-booked" Patients with Accidental Haemorrhage.**

27 babies were delivered, of which 19 or 62.9% were lost, 15 or 55.5% being stillborn and 4 or 33.3% neonatal deaths.

The large losses in both "booked" and "non-booked" patients were indicative of the inadequacy of antenatal care, apart from poor socio-economic conditions at this hospital.

However with "some" antenatal care better results were obtained than when no care was administered.

It was therefore obvious that antenatal care apart from socio-economic influences played no unimportant part in improving perinatal losses in accidental haemorrhage; losses which in the main were stillbirths. So similarly in our racial groups, where white patients showed better results because of better supervision.

SUMMARY AND CONCLUSIONS"ACCIDENTAL HAEMORRHAGE".

As in other parts of the world accidental haemorrhage takes a high toll of foetal life in our units.

The high incidence of this lethal complication of pregnancy in our units of 3.24%, which was considerably more frequent in our patients, was mainly due to P.E.T. as a contributory cause as well as the poor general health inherent in our non-whites.

In our units antenatal supervision certainly played an important part in reducing the perinatal mortality rates when comparing "booked" and "non-booked" cases. Similarly in non-whites in whom antenatal care was inadequate because of inadequate hospital facilities, perinatal losses were higher than in whites with better care.

Accidental haemorrhage with P.E.T. resulted in a higher perinatal mortality rate than when P.E.T. was absent.

Maceration of the foetus was more frequent when essential hypertension was present than with a coexistent hypertension with albumenuria.

Prematurity was a frequent complication of abruptio placentae, resulting in a high neonatal death rate, although stillbirth rates accounted for the greater percentage of foetal losses.

As high a perinatal loss as 41.3% was noted in our units during 1952-55 inclusive, stillbirths accounting for 32.1% and neonatal losses 13.5%.

Perinatal losses were nearly 3 times higher in non-whites as whites, stillbirth rates being 4 times greater, and neonatal deaths twice more.

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(2) PLACENTA PRAEVIA.

(TABLES 16,17 and 67. )

( GRAPHS 5,6,10 and 11)INCIDENCE.

During the years 1952-55 inclusive the incidence of placenta praevia in our units of the University of Cape Town was 1.15%. During this time 305 babies were delivered.

IN WHITE PATIENTS.

The incidence of placenta praevia was 0.8% in the Mowbray Maternity unit, when only 35 babies were born.

IN NON-WHITES.

Placenta praevia occurred with a frequency of 1.09% in the units at Somerset and Groote Schuur Hospitals and St. Monica's Home.

INCIDENCE IN OTHER CENTRES.

Neilson and Neilson(1953) reported 220 cases of low implantation of the placenta in 51,119 patients delivered or in 0.4%.

Schmitz, O'Dea, and Isaacs(1954) recorded an incidence of 0.6% placenta praevia.

Westgren(1954) noted that out of 132,107 confinements there were 2.62 per thousand cases of placenta praevia.

Most British authors including Droune(1944), Connyns Berkeley(1936), Macafee(1945), and Stallworthy(1951) reported an incidence of placenta praevia similar to other units.

From University College, Ibadan(1954) of 5809 deliveries the incidence of placenta praevia was 1.1%. Of these 41 or 67.1% were lost, 31 or 48.4% being stillborn and 10 or 33.3% neonatal deaths. In "booked" cases 50% of babies were lost, whereas in "non-booked" 81.8% were lost.

UNIT and YEAR	NO	PARITY		B.	E.	PREMS	TOTAL LOSS		CAESAREAN SECTION			A.R.M.			EXPECTANT			BIPOLAR VERSION			REMARKS		
		M.	P.				SB.	NND	NO.	SB.	NND.	NO	SB	NND	NO	SB	NND	NO	SB	NND			
<u>P.M.H.</u>																							
1952	15	15	0	7	8	5	2	2	6	0	0	5	1	1	2	0	1	2	1	0			
1953	30	25	5	9	21	27	8	4	20	3	3	3*	2	0	3	0	1	4	2	1	0	* WILLETS' FORCEPS-I	
1954	23	19	4	8	15	5	5	2	12	1	1	3	2	0	6	1	1	2	2	1	0		
1955	55	50	5	55	20	19	9	7	34*	4	4	8	1	1	7	1	1	6	3	1	0	*1 Accidental Haemorrhage.	
<u>N.S.H.</u>																							
1952	11	10	1	2	9	5	2	1	8	1	1	2	0	0	1	1	0	0	0	0	0	0	
1953	13	11	2	5	8	7	3	2	9	0	1	2	1	0	2	2	0	0	0	0	0	0	
1954	21	19	2	4	17	4	7	3	10	4	1	2	1	0	8	1	2	1	1	0	0	0	
1955	15	13	2	4	11	3	3	0	8	1	0	4	2	1	3	0	0	0	0	0	0	0	
<u>M.M.H.</u>																							
1952	6	6	0	1	5	4	1	1	5	1	1	1	0	0	0	0	0	0	0	0	0	0	
1953	15	9	6	7	8	7	1	4	14	0	4	1	1	0	0	0	0	0	0	0	0	0	
1954	7	6	1	6	1	2	0	0	5	0	0	1	0	0	1	0	0	0	0	0	0	0	
1955	9	8	1	3	6	2	0	1	6	0	1	0	0	0	1	0	0	2	0	0	0	0	
<u>ST. M.</u>																							
1952	8	8	0	1	7	2	3	0	3	3	0	5	0	0	0	0	0	0	0	0	0	0	
1953	7	7	0	3	4	2	2	2	4	0	2	2	1	0	0	0	0	1	1	0	0	0	
1954	23	20	3	9	14	6	2	3	8	0	2	2	1	0	11	0	1	2	1	0	0	0	
1955	13	12	1	5	8	1	1*	0	8	0	0	4	1	0	1	0	0	0	0	0	0	0	*1 MATERNAL DEATH Undelivered (NOT ENTERED)
<u>G.S.H.</u>																							
1952	12	11	1	3	9	5	2	1	9*	0	0	2	1	1	1	1	0	0	0	0	0	0	*1 Diabetes and Toxaemia, with prolapse of cord.
1953	6	6	0	4	2	3	4	0	2	0	0	2	2	0	0	0	0	2	2	0	0	0	
1954	16	15	1	6	10	8	4	1	12*	1	1	1	1	0	3	2	0	0	0	0	0	0	
<u>TOTAL</u>	305	270	35	122	183	117	59	34	183	19	22	50	18	4	50	10	6	22	12	2			
<u>% AGE</u>	1.15	88.9	11.1	40%	60%	38.3	19.3	13.8	60%	10.3	13.4	16.4	36.0	12.5	16.4	20.0	15.0	7.2	54.4	20%			
							30.4%			*22.4%		*44%		*32%					*63.6%				

PLACENTA PRAEVIA. FOETAL LOSS ACCORDING TO METHOD OF DELIVERY.

TABLE 17.

The high perinatal losses sustained at Ibadan could be ascribed to the rarity with which conservative treatment was performed, the frequent recourse to vaginal delivery with internal version, "breech traction", and scalp traction being frequently performed. Antenatal care in these women was a very rare phenomenon because of the infrequency of attendance.

PERINATAL MORTALITY IN PLACENTA PRAEVIA. (TABLES 16, 17, and 67)

IN OUR UNITS.

During the years 1952-55 the perinatal loss was 30.4%, of which stillbirths accounted for 19.3% and neonatal deaths 13.8%.

IN WHITES. As much as 21.5% of babies were lost, of which 3.3% were stillborn and 19.3% neonatal deaths.

IN NON-WHITES. Perinatal losses totalled 32.4% of which there was a stillbirth rate of 22.7% and neonatal deaths 9.6%.

The very much higher stillbirth rate in non-whites with placenta praevia as compared with whites (22.7% : 3.3%) could be accounted for by the fact that in the former many patients were in extremis when admitted, with intrauterine death or foetal heart beats barely audible. Conservatism in treatment in the non-white was practiced with less frequency than whites. In whites, with superior antenatal supervision, conservative treatment was more common, and patients were not so ill on admission in the majority of instances.

PERINATAL MORTALITY IN RELATION TO ANTENATAL CARE.

IN "BOOKED" PATIENTS.

(TABLE 73)

During the years 1953-55 the incidence of placenta praevia in "booked" patients was 0.54%.

Of 90 babies delivered from "booked" cases 22.2% were

lost, of which 12.2% were stillborn and 11.4% neonatal deaths. In whites the perinatal mortality rate was 22.2% compared with a 30.3% in non-whites in all cases of placenta praevia. Both stillbirth and neonatal death rates were higher in the non-white.

IN "NON-BOOKED" PATIENTS.

(TABLE 73)

The incidence of placenta praevia was 3.9%.

Perinatal losses totalled 38%, which was higher than in "booked" cases, although statistically this was not significant.

Stillbirth losses were significantly higher however in "non-booked" cases (25.1% : 12.2%).

Neonatal losses were statistically not as significantly higher than in "booked" cases (17.2% : 11.4%).

PERINATAL LOSSES IN THE RACIAL GROUPS ACCORDING TO ANTENATAL CARE.

In white patients there were too few "non-booked" cases of placenta praevia to compare with "booked".

In non-whites the perinatal mortality rate was higher in "non-booked" as "booked" cases.

It was apparent therefore that stillbirth and neonatal mortality rates were higher in patients with inadequate prenatal supervision, a fact which was further emphasized in the non-white whose antenatal care was inferior to that of the white in whom there were few cases of placenta praevia.

PERINATAL MORTALITY RATES IN PLACENTA PRAEVIA IN OTHER CENTRES.

For the sake of convenience and comparison, treatment is discussed according to active and expectant management.

Ever since Macafee(1949) and Johnstone(1950) advised expectancy in selected cases, perinatal mortality has been reduced considerably because of the greater numbers of "mature" babies delivered.

TABLE 18.ACTIVE TREATMENT

A

<u>AUTHORS</u>	<u>NUMBER OF CASES.</u>	<u>FOETAL LOSS(%)</u>
Comyns Berkeley(1936)	4580	59
Browne(1949)	3103	54
Macafee(1945)	76	51
Mills(1945)	100	54
Neilson and Neilson(1953)	?	10.9
Westgren(1954)	?	73
Louw(1956)	134	21.0(S.B.'s)
U.C.T. (1952-55)	255	30.1

CONSERVATIVE TREATMENT

Mills(1948)	100	16
Macafee(1949)	275	20.4
Johnstone(1950)	201	21
Stallworthy(1951)	250	18
Neilson and Neilson(1953)	?	18.4
Westgren(1954)	?	45
Louw(1956)	40	22.5(S.B.'s)
U.C.T. (1952-55)	50	32

The lower foetal losses in cases of conservative

management were obvious in the majority of centres except in Westgren's and our units.

The explanation for the high losses in expectant treatment in our units was that in non-whites antenatal care was not of the highest order. Patients of this race were often admitted in an exanguinated condition, necessitating blood transfusion and as a result active intervention.

Caesarean section as a method of treatment was often ruled out because of the extreme prematurity of the baby, or the fact that the baby was already dead on admission.

Caesarean section in our units gave the best results with expectant treatment next best. Other treatments carried a high mortality.

The introduction of x ray visualization of the placental site as a diagnostic measure thereby ruling out often ill-advised premature vaginal examination in the operating theatre has certainly lowered our perinatal mortality rate. More patients too now are deriving the benefit of a more conservative approach to the treatment of placenta praevia, with a consequent lowering of foetal losses.

#### SUMMARY AND CONCLUSIONS.

#### "PLACENTA PRAEVI"

The incidence of placenta praevia in our units for the years 1952-55 was 1.15%. In whites this was 0.8% and in non-whites 1.15%.

In "booked" patients the incidence was 0.54%, and in "non-booked" 3.9%.

The perinatal mortality rate was 30.4% during 1952-55, in whites 21.5% and in Non-whites 32.4%, with a considerably greater stillbirth rate in the latter.

Expectant and active treatment in our units gave high

perinatal mortality rates, mainly because of the unsatisfactory antenatal care of the non-white.

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**(3) PREECLAMPTIC TOXAEMIA, ESSENTIAL HYPERTENSION, AND CHRONIC NEPHRITIS. (P.E.T.)**

**(TABLES 19,53,54,55,56. GRAPHS 3,4,5, 6,11,12)**

In the units of the University of Cape Town the following definition was used in our annual reports to classify preeclamptic toxæmia, essential hypertension and chronic nephritis:-

" ANY PATIENT WITH A BLOOD PRESSURE OF 140/90 OR MORE WITH OR WITHOUT OEDEMA, AND WITH OR WITHOUT ALBUMENUREA".

Any 2 of the above signs taken together warrants a diagnosis of preeclamptic toxæmia (P.E.T.)

No attempt is made to differentiate these 3 conditions in our annual reports, and are "clumped" together under one heading.

In the following précis ætiological factors in the causation of P.E.T. are not discussed. Emphasis will be laid on the dangers of prematurity, the influence of antenatal care especially as occurring in our clinics on perinatal mortality, and the effects of such antenatal care in the 2 racial groups.

**INCIDENCE OF P.E.T.**

In the obstetric units of the University of Cape Town during 1952-55 inclusive the incidence of P.E.T. was 16.8%.

During this period of time 4361 babies were delivered of women with P.E.T. out of 25930 babies born, during the 4 years.

**IN WHITE PATIENTS.**

During 1952-55 at the Howbray Maternity Hospital the incidence of P.E.T. was 21.4%. There were 2142

babies delivered from mothers with P.E.T. out of a total of 4261 born during 1952-55.

IN NON-WHITES.

At the non-white units of Somerset Hospital, St. Monica's, and Grootte Schuur Hospital during 1952-55 inclusive the incidence of P.E.T. was 16.5%. No fewer than 2202 babies were delivered of mothers with P.E.T. out of a total of 13293 delivered during that time.

Included in the above patients with P.E.T. were mothers with eclamptic fits, the incidence of which condition was 3.8% of all cases of P.E.T. In white patients the incidence of eclampsia was 0.29% and in non-whites 0.69%.

The influence of prenatal supervision in the racial groups on the incidence of eclampsia showed that in white patients fits were almost 10 times more frequent in "non-booked" as "booked" cases (2.1% : 0.24%).

In non-whites the incidence of eclampsia was far greater in the patient without adequate antenatal care ("non-booked") as compared with "booked" patients in the ratio of almost 25 : 1, or 4.1% compared with 0.16%.

Of all babies born to mothers with P.E.T. 172 or 3.9% were from cases of multiple pregnancy.

Of 842 babies delivered of mothers with accidental haemorrhage 305 or 36.2% were from mothers with P.E.T.

Hamilton, Jeffcoate and Lister (1949) from the University of Liverpool reported that 1226 infants were born of mothers with "toxæmia", i.e. an incidence of 5.8% P.E.T.

Reports on Public Health and Medical Subjects in Great Britain in 1949 indicate that "the toxæmias of pregnancy" were the most important of the maternal diseases in the causation of stillbirth and neonatal deaths.

Bourne and Williams(1948) reported an incidence of 11% for "the toxæmias".

Gemmel, Logan and Benjamin(1954) made a survey of the incidence of P.E.T. in the United Kingdom, and reported it to be between 3.5 and 18%. In Liverpool for the year 1951 the incidence of P.E.T. in primigravidae was 8.5% and in multigravidae 4.2%, with a total incidence of 5.6%

Nelson(1957) from the Aberdeen Maternity Hospital found an incidence of moderate and severe "toxæmia" to be 3.9% at 15-19 years of age, and 5% at 34 years and over.

Gibson(1954) from the Royal Maternity Hospital, Belfast reported "toxæmia" in 1420 of a total of 8497 patients for the years 1946-50, or an incidence of 16.7%.

Lewis(1956) noted that P.E.T. appeared in between 3 and 10% of pregnancies, generally later than the 32nd week of pregnancy, in a review of the literature on "toxæmia".

Browne(1949) reported on the relative frequency of the varieties of "toxæmia" as follows:- Preeclampsia, 70%; essential hypertension, 25%; and chronic nephritis, 5%.

Lawson and Lister(1954) from the University College, Ibadan, Nigeria, reported an incidence of P.E.T. of only 1.1% during an 18 months period. This was in spite of a very poor obstetric population, with grossly inadequate nutrition. These authors found that successful pregnancy occurred in only 33% of women with a blood pressure exceeding 150 Hg. or a diastolic pressure of 100 or more.

Hamblin(1952) from the Women's Hospital, Sydney, Australia found the annual rate for eclampsia in "booked"

patients to be between 1.2-2.5 per thousand patients in 1945-47. In 1935-47 the average was 2.9%

PERINATAL MORTALITY IN RELATION TO ANTENATAL CARE.

(TABLES 54,55,56,57.)

(Graph 6)

A large volume of literature over the past 2 decades indicates that P.E.T. provides a substantial number of foetal deaths each year from all teaching centres.

In more recent times, despite the dramatic fall in perinatal mortality, "toxaemia" appears to be the main cause of "non-improvement" in foetal death rates.

Dieckman(1952) analysed foetal deaths occurring at the Chicago Lying-In Hospital, and found the stillbirth rate in 756 women with P.E.T. to be 10.7%, whereas in 8313 "non-toxaemic" women the mortality was only 3.9%.

Reports on Public Health and Medical Subjects(1949) reveal foetal mortality associated with "toxaemia" as high as 29.2% in Manchester, 46.9% in Newcastle, 25.6% in London, and 21.5% in Liverpool. According to the same report, neonatal mortality rates in "toxaemic" mothers was 2 to 4 times higher than in women without "toxaemia".

Gibberd(1951) reported that the stillbirth rate for babies born of mothers with P.E.T. to be 10 times greater than for babies from normal women. He found 37 stillbirths in 337 cases of P.E.T., whereas in "non-toxaemic" mothers the stillbirth rate was only 3%.

Baird(1945) noted a stillbirth rate of 16% in cases with "toxaemia" ;Crosse(1945) a stillbirth loss of 11% ; and Schnoeneck(1955) only 4.3%

Macbeth(1955) from Australia reported a 33% foetal loss from "toxæmia",and Drillien(1949) a 27% stillbirth rate for the years 1943-47 from the Simpson Memorial Pavilion, Edinburgh.

A report from the Ministry of Health of Great Britain in 1949 indicates that all "toxæmias" cause 25-40% of all child life losses.

Hamilton,Jeffcoate and Lister(1949) reported that of 1226 fetuses born of "toxæmic" mothers,99 or 8.07% died in utero before the onset of labour,and that there were 77 stillbirths and 48 neonatal deaths. The perinatal mortality rate was therefore 17.9%.

These authors further report in this series of cases a foetal loss of 8.8% following spontaneous delivery in 400 cases,and 56 forceps following spontaneous onset of labour.

Following artificial rupture of membranes 558 babies were born. Of these 87 babies were delivered by operation (or 15.6%) with a foetal loss of 13.8%; 457 babies were born spontaneously with a loss of 11.6%; delivery by caesarean section led to a 35.7% foetal mortality.

Jeffcoate(1949) concluded that "induced" delivery per vaginam led to an equal loss of infant,whether by operation or spontaneously. A lower mortality followed induction by bougies or bags,than by artificial rupture of the membranes,except for babies weighing less than 4 lbs.

With elective caesarean section 112 babies were delivered with a 11% loss. Jeffcoate maintained that smallest babies do best when caesarean section was performed under local analgesia,and that the best results were attained because of selection of the best anaesthetic. This is not borne out in our units of the University of Cape Town(see later)

Jeffcoate goes still further and stresses that because of 40% intrauterine death before the onset of labour a more radical management of the "toxæmias of pregnancy" should be enforced.

Dewhurst(1955) discussed foetal mortality in "imminent" eclampsia and reported that of 89 babies delivered from such patients, 29 or 35% were lost mostly as stillbirths. The chief contributory factor in these bad results was prematurity. Results showed that it was in the group below 35 weeks maturity in which most deaths occurred, compared with babies with a greater maturity. Dewhurst also suggests a greater use of caesarean section for the premature baby. Another type who might benefit were those patients who did not start in labour after the membranes had been ruptured for 48 hours or more.

Jones(1957) states that a high percentage of foetal loss occurred in patients with a labile hypertension in pregnancy, with superimposed "toxæmia". He further stresses the greater use of caesarean section for premature babies, best performed under local analgesia and thiopentane. He noted that only 8.5% foetal loss occurred when caesarean section was done under local analgesia, whereas with general anaesthesia 30% were lost.

Dewar and Morris(1947) and Morris(1947) found that the lowest foetal loss occurred with bromethol sedation, compared with other forms of drug administration.

Vellen(1953) reported that stillbirths and neonatal deaths were 2½ times more common in P.S.T. and eclampsia as in non-hypertensives, and 3 times more common in essential hypertension. A high prematurity rate of 17% was blamed for these figures.

In 1957, Vellen again reported on 1010 pregnancies with toxæmia, and stressed that the more severe the disease the

the greater the loss, especially in eclampsia where the mortality was 3½ times greater than in preeclampsia.

All authors are unanimous in their opinion that the high incidence of premature babies born to mothers with "toxaemia" helps to maintain the relatively high foetal mortality, despite the striking fall in foetal mortality during the last 2 decades.

Hamblin(1952) and Dawson(1953) from Australia and New Zealand respectively have both shown that strict attention to antenatal care leads to a significant lowering of the incidence of eclampsia, and to a 50% lowering of foetal mortality. To attain this, early attention of "toxaemia" is essential, together with early admission to hospital for complete and prolonged observation and treatment.

Early recognition of P.E.T. depends on routine antenatal supervision designed to be comprehensive.

Hamblin and Dawson stress that a central hospital obstetric teaching unit be made responsible for all local authority antenatal clinics, which should be conducted by the staff of the central obstetric units. By this means, and only by this means continuity of management and treatment can be attained, and also uniformity in assessment of the patient throughout the area.

Hamblin has reported that admission to hospital of all cases has led to a decrease in the percentage loss of infants because of adequate and complete supervision, from 23.9% in 1938-41, to 7.1% in 1952-56. Of 1491 infants delivered of 1293 "toxaemic" mothers during 1948-55, the gross loss was 9.8%(uncorrected).

Jones concluded his paper on a note that an improved outlook in foetal mortality can be achieved by increasing admissions, much more early, thereby lessening the severity of the illness.

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DMT. and YEAR	NO. of BABIES	TOTAL BABIES.	B.		PREMS. NO. under 4 lbs.)	CAESARIAN SECTION			FORCEPS.			VAGINAL DELIVERY (Inc. Craniotomy Breech Decapitation)			TOTAL LOSS		A.R. (LOSS) S.B.	TWINS	ECLAMPSIA			
			B.	E.		NO.	S.B.	N.N.D.	NO.	S.B.	N.N.D.	NO.	S.B.	N.N.D.	SR.	NNI			NO.	B.	E.	S.B.
P.M.H. 1952	194	1847	150	44	99(34 under 4 lbs)	18	4	0	28	2	0	162	11	3	17	3	12	5	5	3	2	1
1953	389	2012	284	105	61(16 under)	38	4	5	34	5	2	317	34	11	43	18	18	10 (1 Trip)	11	7	4	4
1954	272	2016	232	40	43(14 under)	27	3	0	50	1	0	195	23	6	27	6	14	12	12	6	6	4
1955	390	2501	295	85	99(34 under)	46	5	3	41	5	1	303	30	14	40	18	16	17	21	7	14	5
M.S.H. 1952	138	1613	109	29	28( 5 under)	13	3	0	3	0	0	122	15	3	18	3	12	5	3	0	3	1
1953	127	1645	108	19	23( 9 under)	5	0	0	13	1	0	109	11	3	12	3	5	9	3	1	2	0
1954	173	1753	141	34	34(12 under)	15	0	0	25	6	0	133	19	6	25	6	7	11	11	7	4	3
1955	159	1955	108	51	41(16 under)	10	0	2	11	0	0	138	18	4	18	6	7	11 (1 Trip) 9	15	5	10	9
M.M.H. 1952	85	1002	69	16	12( 4 under)	11	0	2	8	0	0	66	3	3	3	5	1	8	1	1	0	0
1953	270	1038	234	36	47( 6 under)	25	0	4	24	2	0	221	4	4	6	8	1	11	3	2	1	0
1954	227	1190	199	28	24( 3 under)	15	0	1	15	1	1	197	3	3	4	5	1	6	4	1	3	1
1955	332	1031	296	36	31 5 under)	24	0	0	29	1	1	179	5	6	6	8	2	8	4	2	2	0
S.F.M. 1952	84	979	75	9	21( 4 under)	6	0	0	6	0	0	72	7	3	7	3	2	1	3	3	0	0
1953	71	1127	62	9	19( 7 under)	3	1	0	12	0	1	56	8	2	9	3	4	5	2	2	0	0
1954	142	1262	118	24	24( 4 under)	6	0	0	1	1	0	135	21	3	22	3	4	7	3	2	1	1
1955	133	1067	66	59	32(12 under)	5	0	0	3	0	0	128	18	1	18	1	2	5	6	0	6	4
G.S.H. 1952	368	647	136	232	148(45 under)	59	1	9	28	1	1	281	32	0	34	10	16	11	5	0	5	0
1953	411	664	192	219	116(50 under)	59	3	9	18	4	1	334	26	16	33	26	9	12	30	1	29	8
1954	396	581	216	180	100(49 under)	25	0	3	24	0	2	347	25	28	25	33	11	9 (2 Trips)	26	0	26	3
TOTAL	4361.	25930	3190	1171	891(292 under)	410	24	39	373	30	10	3578	313	119	367	168	139	161 (4 TRIP)	168	50	118	44
% Age.	16.8%		73.2%	26.8	20.4%(32.7%)	9.4	5.8	10.1 15.3%	8.5	8.0	2.9 10.7%	82.4	8.1	3.6 9.9%	8.4	4.2 12.0%	37.8%	7.6%	0.4%	29%	71%	26.1

PREECLAMPTIC TOXAEMIA ( including ECLAMPSIA) ESSENTIAL HYPERTENSION & CHRONIC NEPHRITIS.  
Foetal loss in relation to method of delivery, prematurity, twins, and antepartum haemorrhage.

TABLE 19

In the light of his experience, Jones feels that earlier termination of pregnancy would be a further means of reducing stillbirth losses by preventing intrauterine deaths.

PERINATAL MORTALITY IN OUR UNITS.

(TABLES 19, 55, 56. GRAPHS 3, 4, 5, 6, 11 and 12)

During the years 1952-55 inclusive, of 1933 babies lost as stillbirths and neonatal deaths, P.E.T. accounted for as many as 535 in one way or another. Perinatal mortality rate where P.E.T. was present was as high as 27.6%, of which there were 367 stillbirths or 18.9% and neonatal deaths 23.9%.

IN WHITE PATIENTS.

(TABLE 19a.)

Of 914 babies delivered of mothers with P.E.T. at the Mowbray Maternity Hospital 45 or 4.9% were lost. Stillbirths accounted for only 2.0% and neonatal deaths 2.8%.

IN NON-WHITE PATIENTS.

Of 2202 babies born at the Somerset Hospital, Groote Schuur Hospital and St. Monica's Home, from mothers with P.E.T. 317 or 14.4% were lost, of which stillbirths accounted for 9.9% and neonatal deaths 4.4%.

Hence there was a 3 times greater perinatal loss in non-whites as whites, stillbirths being nearly 5 times more, and neonatal deaths nearly twice.

The reason for the greater loss in non-whites can be found in the greater percentage of premature babies delivered, especially in the group weighing 4 lbs. and less, in women who were more seriously ill on the whole than white patients with P.E.T.; women who were induced surgically much more frequently than white women.

PERINATAL MORTALITY IN RELATION TO ANTENATAL CARE.(TABLES 54,55,56,57, GRAPH 6)

According to the records of our annual reports for the years 1953-55, 73.2% of mothers with P.E.T. were "booked" in our antenatal clinics, and 26.8% "non-booked".

These percentages however were found to be inaccurate in relation to the prenatal supervision provided. In very many instances these so-called "booked" patients were seen only on one occasion at the clinic, when they were found already to have signs of P.E.T. at various stages of pregnancy.

These women were either admitted to hospital immediately for supervision, or soon afterwards when a bed became available (mainly in non-whites). Strictly therefore these women could be classified as "non-booked".

In addition there were many patients admitted with P.E.T. who had not been attending our antenatal clinics for as long as 2 or even 3 months, and who had developed P.E.T. in the meantime. Again these women had been originally "booked" at the clinics, but were strictly "non-booked", i.e. without adequate care.

It could therefore be stated that especially in non-white patients, as many as almost 50% or even more had not had adequate antenatal care.

Of 2561 babies delivered of women with P.E.T. and who had attended our clinics ("booked") as many as 296 or 7.6% were lost, of which 5.1% or 131 babies were stillborn, and 2.6% or 65 babies were neonatal deaths,

In "non-booked" cases with P.E.T. 921 babies were born, of which 239 or 25.8% were lost. Of these 161 or 17.6% were stillborn and 78 or 10.2% were neonatal deaths.

There was therefore a significantly higher perinatal mortality rate in patients with inadequate antenatal care ("non-booked") compared with those women who had attended our clinics ("booked") in a ratio of nearly 3½ : 1.

Nearly 3½ times more stillbirths and 4 times more neonatal deaths occurred in "non-booked" as "booked" cases.

PERINATAL MORTALITY ACCORDING TO ANTENATAL CARE IN RACIAL GROUPS.

(TABLE 19)

IN WHITE PATIENTS (HOWBRAY MATERNITY HOSPITAL).

During 1952-55 inclusive of 914 babies born of mothers with P.E.T. 45 or 4.9% were lost, of which 19 or 2.0% were stillborn and 26 or 2.8% neonatal deaths.

In "booked" whites (87.9%) with P.E.T. during 1953-55 only 3.1% perinatal mortality rate was noted, of which 1.6% were stillborn and 1.5% neonatal deaths.

In "non-booked" whites (12.1%) with P.E.T. almost 4 times a greater perinatal mortality rate occurred as in "booked" cases, neonatal deaths being 7 times more frequent, and stillbirths twice greater in percentage.

IN NON-WHITES PATIENTS (SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. MONICA'S HOME)

During 1952-55 inclusive 2202 babies were born of mothers with P.E.T. of which 317 or 14.4% were lost. Of these babies 9.9% were stillborn and 4.4% neonatal deaths.

Therefore almost 3 times a greater perinatal mortality rate occurred in non-whites with P.E.T. as in whites.

The stillbirth rate in non-whites with P.E.T. was nearly 5 times larger than in whites and the neonatal mortality rate only slightly higher.

The differences in perinatal losses in non-whites and whites again might be sought in the fact that a greater percentage of premature babies were delivered to the former, and also a greater number of babies in the non-white weighed 4 lbs. and less. The more serious degree of P.E.T. in the non-white, was more frequently an indication for premature termination of pregnancy than in the white patient (see "surgical induction of labour" later).

PERINATAL MORTALITY IN NON-WHITE PATIENTS WITH P.E.T. (TABLE 19)

In "booked" cases.

During 1953-55, 63.4% of non-white patients with P.E.T. attended our antenatal clinics. Many of these women were unable to gain admission to hospital immediately because of shortage of "lying-in" beds, and were treated as "out-patients" until accommodation became available. Strictly speaking these women could be classed as "non-booked" in a large percentage of instances.

In "booked" women 10.9% of their babies were lost, of which 7.4% were stillborn, and 3.8% neonatal deaths.

There was therefore a more than 3 times larger perinatal mortality rate in "booked" non-white patients with P.E.T. as in whites. The inadequacy of antenatal care in the non-white might quite easily be an important factor in this difference in perinatal mortality, because of our failure to provide hospital accommodation for supervision of P.E.T. in this race, necessitating often premature surgical induction for a deteriorating P.E.T.

RACE.	TOXAEMIA etc. (Babies)	TOTAL (Babies)		PARITY (patients)		PREMATURE Babies (NO. under 4lbs)	CAESAREAN Section (Babies)			FORCEPS (Babies)			VAGINAL Delivery (Normal Breech etc)			TOTAL LOSS		A.H. as a cause of S.B's	MULTIPLE PREGNANCY with TOXAEMIA. (INCIDENCE)	
		B.	E.	M.	F.		NO.	SB.	NND	NO.	SB.	NND	NO.	SB.	NND	SB.	NND.			
WHITES.	914	4261	798	116	454	427	124 (18 under 4)	75	0	8	76	4	2	763	15	16	19	26	7	1 in 2617 1 in 13.3 single pregnancies.
% AGE	21.4		37.3	12.7%	51.6%	48.4%	13.5% (14.5 under 4)	8.2	0	10.6%	8.3	5.2	2.6	83.4	1.9	2.1	2.0	2.8	38.4	
NON-WHITES	2202	13293	1337	865	1203	893	586 (213 under)	206	8	23	144	13	5	1859	199	69	220	97	70	1 in 24.0 1 in 12.0 single births
% AGE	16.5		60.7	39.3	57.4	42.6	20.6% (36.3% under 4)	9.3	3.9	11.6	6.8	9.0	3.4	84.1	9.7	3.4	9.9	4.4	31.6	

TABLE 19a PRECLAMPTIC TOXAEMIA etc. (WHITES and NON-WHITES). FOETAL loss in relation to method of delivery, and accidental haemorrhage with incidence of prematurity and toxemia in multiple pregnancy. (A.H. - accidental haemorrhage)

In "non-booked" cases.

(TABLES 53,54)

During 1953-55 in mothers with P.E.T. delivered in our non-white units, more than twice as many babies were lost in "non-booked" as "booked" cases.

There were twice more stillbirths and 2½ more neonatal deaths in patients who were "non-booked" compared with "booked".

It was apparent therefore from a statistical analysis that there was a significantly higher perinatal mortality rate in women who had not attended our antenatal clinic when P.E.T. was present, than in those who had received reasonable care.

Similarly in non-whites, in whom antenatal care was unsatisfactory as compared with whites, perinatal mortality losses were high.

The greater incidence of prematurity in the non-white was an important factor in the higher perinatal mortality rate in this race, apart from socio-economic reasons.

PERINATAL MORTALITY IN RELATION TO THE METHOD OF DELIVERY.

(TABLES 19)

(1) VAGINAL DELIVERY.

Following vaginal delivery in 3951 cases during 1952-55, 11.9% of babies were lost, or 582 babies. Of these 343 or 8.6% were stillborn, and 129 or 3.5% neonatal deaths.

IN WHITE PATIENTS.

Of 839 babies born by the vaginal route only 37 or 4.4% were lost, of which 2.2% were stillborn and 2.3% neonatal deaths.

IN NON-WHITES.

As high a perinatal mortality rate of 14.6%

with vaginal delivery, of which 10.5% were stillborn and 3.8% neonatal deaths.

It was significant that more than twice the number of stillbirths occurred in non-whites as in whites. There was not a significant difference in the neonatal mortality rates.

Perinatal mortality losses were more than 3 times greater in non-whites.

The larger percentage of premature babies delivered to non-whites because of more severe degrees of P.E.T. appeared to be the main reason for differences in perinatal mortality rates.

#### PERINATAL MORTALITY RATES FOLLOWING FORCEPS EXTRACTION. (TABLE 19)

Of 373 babies delivered by forceps of mothers with P.E.T. during 1952-55, 40 or 10.7% were lost of which 8.0% were stillborn and 2.9% neonatal deaths.

There was hence a similarity in perinatal losses in patients delivered by forceps and the overall perinatal mortality rate of babies delivered per vaginam of women with P.E.T.

It was of interest to note that of 968 babies delivered by forceps in mothers without P.E.T. 97 or 10.7% were lost which was identical with the perinatal mortality rate in mothers with P.E.T. delivered by forceps.

It was however noteworthy that a larger perinatal mortality rate occurred in patients who were not "booked" in our antenatal clinics and who were delivered by forceps, compared with "booked" cases.

#### IN WHITE PATIENTS.

Of 76 babies delivered by forceps from mothers with P.E.T. at the Howbray Maternity Hospital only 6 or 7.9% were lost of which 5.2% were stillborn and 2.6% neonatal deaths.

IN NON-WHITE PATIENTS.

(TABLE 19)

Of 144 babies delivered by forceps in women with P.E.T. at the Somerset and Groote Schuur Hospitals and St. Monica's Home during 1952-55, 18 or 12.5% were lost of which 9.0% were stillborn and 3.4% neonatal deaths.

The larger percentage of "booked" patients delivered by forceps in whites(88%) as compared with non-whites(66%) suggests that inadequate antenatal care was an important factor in the differences in perinatal mortality in the racial groups.

PERINATAL MORTALITY RATES FOLLOWING CAESAREAN SECTION. (TABLE 19)

Of 410 babies delivered by caesarean section from mothers with P.E.T., 63 or 15.3% were lost of which 5.3% were stillborn and 10.1% neonatal deaths.

The reason for the high neonatal mortality rate following "section" was the high percentage of premature babies delivered by this method; babies frequently of 4 lbs. or less in weight from mothers with more severe degrees of P.E.T. especially in non-white patients.

A comparison of perinatal mortality rates in patients with P.E.T. and those without P.E.T. delivered by caesarean section revealed the following interesting data:-

In non-whites. In patients without P.E.T. who were "sectioned" in the period 1953-55, the perinatal mortality rate was 10.4%. The stillbirth rate was 5.4% and neonatal mortality rate 5.2%.

In patients with P.E.T. during the same period the perinatal mortality rate was 30%, neonatal mortality losses

being 27% and stillbirth rate 3.7%. There were almost 5 times more premature babies delivered in patients with P.E.T. as in those without P.E.T. by section, in non-whites.

In white patients. In the absence of P.E.T. with caesarean section the perinatal mortality was 8.7% of which 0.7% were stillborn and 8% neonatal deaths.

There was hence no statistical difference in perinatal losses in the racial groups when delivered by caesarean section in the absence of P.E.T.

In white patients with P.E.T. when delivered by section the perinatal mortality rate was 11.7%, all of which were neonatal deaths. Statistically therefore there was no significant difference in perinatal losses in white patients with and without P.E.T. when delivered by caesarean section.

It might therefore be concluded that the higher perinatal mortality rate in non-whites when delivered by section was due to the larger percentage of very premature babies born to this race especially in women with P.E.T. with a more frequent severer degree of hypertension.

The importance therefore of satisfactory prenatal care in patients with P.E.T. cannot be overemphasized, in order to prevent the occurrence of prematurity often induced prematurely by surgical rupture of the membranes because of severe degrees of P.E.T. The necessity therefore for adequate hospital supervision in the early stages of P.E.T. is again stressed. In the non-white patient the greater frequency of surgical induction of labour (vide infra) for P.E.T. was ample evidence of the inadequacies of such prenatal supervision.

Further evidence of the inadequacy of antenatal care in P.E.T. might be sought in the frequency with which eclampsia occurred in the racial groups.

In patients with eclampsia during 1952-55, 168 babies were born, of which 44 stillbirths occurred. The stillbirth rate in these cases was 26.1% which was 3 times greater than the overall stillbirth rate for P.E.T.

Only 29% of these babies born from mothers with eclampsia had received antenatal care in our units.

In white patients there occurred only 1 stillbirth out of 12 cases of eclampsia at the Howbray Maternity Hospital during the above period.

In non-white patients 107 babies were born of mothers who had had eclamptic fits. Only 19.6% of these mothers had received antenatal care in our clinics. The stillbirth rate in the non-white was 23.3% which was 3 times higher than in the white patient.

Again the significance of inadequate antenatal care in P.E.T. in the racial groups becomes obvious

#### P.E.T. IN A PRIVATE MATERNITY HOSPITAL.

As a further index of the part played by antenatal care in perinatal mortality in P.E.T. an investigation into the incidence of P.E.T. and perinatal losses at the Booth Memorial Home (entirely white hospital) was undertaken for the years 1950-57 inclusive.

The incidence of P.E.T. at the above institution was found to be 8.21% an institution in which private patients were delivered mainly by private general practitioners and specialists. It was taken for granted that prenatal care in this home was excellent, being supervised throughout with expert care.

Of 6588 babies delivered at this home, 541 were from mothers with P.E.T. (in accordance with the definition of P.E.T. outlined in our teaching units). Of these babies 24 or 4.06% were lost, 16 of which were stillborn, or 2.9%, and 6 neonatal deaths or 1.1% neonatal mortality rate.

Of the stillbirths 50% were macerated, and there were 30 premature babies delivered out of 541 from patients with P.E.T. or a prematurity incidence of 5.5%.

Of 541 babies delivered 362 were from mothers with essential hypertension (65.1%) and 179 from mothers with hypertension together with albumen or oedema.

The perinatal losses at the Booth Memorial Home according to the methods of delivery showed the following:-

- (1) Spontaneous delivery without induction in 426 cases a stillbirth rate of 2.1%.
  - (2) Caesarean section associated with a stillbirth rate of 1.4% in 71 cases.
  - (3) Forceps extraction associated with a stillbirth rate of 10% in 30 cases.
- and (4) Breech delivery associated with a loss of 2 babies in 14 cases, or 14.2% stillbirth rate.

During the 7 years mentioned above only 2 cases of eclampsia were admitted to the Booth Memorial Home, and who were "sectioned" soon after the onset of fits. In both instances the baby was alive, and survived.

It is apparent from the above analysis that apart from socio-economic factors that antenatal care played no unimportant part in the prevention of perinatal deaths, as witnessed by the fewer cases of severe degrees of P.E.T. and the smaller incidence of prematurity in the 3 types of hospital patient, in non-whites, hospital whites, and private white patients.

ALBUMEN	+	+	++	++	+++	+++	++++	++++	0	0	S.B.	NND.	SPONTANEOUS DELIVERY (SB.)	OPERATIVE DELIVERY (SB.)	INDUCTION ASSOC. C SB.
BLOOD PRESSURE	160 and under	over 160	160 and under	over 160	160 and under	over 160	160 and under	over 160	160 and under	over 160					
TOTAL STILL-BIRTHS.	56	60	33	23	17	26	28	44	59	21	367	168	293 (79.9%)	74 (20.1%)	98
% AGE.	31.6%		15.2%		11.7%		19.6%		21.8%		12.0%		2 Maternal		
ACCIDENTAL HAEMORRHAGE	30	21	14	5	4	6	15	15	19	10	Deaths assoc. with still-births.				
TOTAL	51		19		10		30		29		139(SB.)				
% AGE.	36.6%		13.6%		7%		21.5%		20.8%		37.8%				
MACERATION TOTAL	4	4	0	4	1	3	2	3	6	2	29 (SB.)				
% AGE. of SB's.	27.5%		13.7%		13.7%		17.2%		27.5%		7.9%				

TABLE 196 PRECLAMPTIC TOXAEMIA Etc. FOETAL LOSS. In relation to degree of albumen~~urea~~ blood pressure, ACCIDENTAL HAEMORRHAGE, and MACERATION and delivery.

ALBUMEN.	+	+	++	++	+++	+++	++++	++++	0	0	SB.	NND	M. (patients)	P. (patients)	A.H. (SB)	SPONTANEOUS DELIVERY (SB.)	OPERATIVE DELIVERY (SB.)	
BLOOD PRESSURE.	160 and under	over 160	160 and under	over 160	160 and under	over 160	160 and under	over 160	160 and under	over 160								
WHITES.	1	6	0	1	0	1	1	0	8	1	19	26	454	881	427	7	12	7
	36.8%		5.2%		5.2%		5.2%		47.3%		5.1%				38.4%	63.2%	36.8%	
NON - WHITES.	31	35	21	17	8	21	18	32	24	13	220	97	1274	2096	822	70	169	52
	29.9%		17.2%		13.1%		27%		16.2%		15.1%				31.6%	76.9%	23.1%	

TABLE 19c PRECLAMPTIC TOXAEMIA Etc. FOETAL loss in relation to degree of albumen~~urea~~, hypertension, accidental haemorrhage. ( in terms of patients delivered) n WHITES and NON - WHITES.

**PERINATAL MORTALITY IN RELATION TO THE DEGREE OF  
HYPERTENSION AND ALBUMINURIA.**

**(TABLE 19)**

Dieckman(1952) reported that mild and severe hypertensive disease of pregnancy had a decidedly higher foetal mortality than mild and severe preeclampsia.

Similarly eclampsia and nephritis showed a much higher foetal loss than the former.

Corwin and Herrick(1927) first pointed out that if the start of pregnancy was heralded by a blood pressure which exceeded 150 mm.Hg. or 120 diastolic, the prognosis for delivery of a viable child was poor.

Browns(1950) agreed with the previous authors and stated that at the University College Hospital only 33% of successful pregnancies followed when the blood pressure reached such proportions.

Ellen(1957) discussed 1010 pregnancies with P.E.T. and eclampsia and stressed that the severity of the disease influenced the infant death rate. He maintained that foetal losses were 3 times more common in essential hypertension as when preeclampsia was present.

Taylor, Tillman and Blanchard(1954) however found the prognosis for the foetus to be worse when the amount of albumen increased.

**IN OUR UNITS.**

During the period 1952-55 inclusive it was noted that in 21.8% of stillbirths associated with P.E.T. only mild or severe hypertension was present.

Almost 3 times a greater stillbirth rate occurred in patients with a blood pressure below 160 mms.Hg.as when the blood pressure was above that figure.

Similarly also when the blood pressure was below 160 Hg. and only a trace of albumen was present in the urine. As many as 31.6% of stillbirths occurred out of all cases of P.E.T.

Therefore when essential hypertension was present only or with only a trace of albumen in the urine as many as 53.4% of the stillbirths occurring all our cases of P.E.T. was found.

In 56.8% of cases of accidental haemorrhage occurring in our units during 1952-55 only mild essential hypertension or mild hypertension with albumenurea with or without oedema was present in association with stillbirth.

Maceration of the foetus which occurred in only 7.9% of all our cases of stillbirth associated with P.E.T. was more frequently found with essential hypertension or with mild hypertension with albumenurea.

#### IN WHITE PATIENTS

(TABLES 19b and 19c)

The greatest number of stillbirths occurred in our cases of P.E.T. when essential hypertension only was present in 47.3% of all stillbirths occurring in P.E.T., or when a trace of albumenurea was noted in 36.8%.

#### IN NON-WHITES.

There were no significant differences in stillbirth losses in relation to varying degrees of hypertension or hypertension with albumenurea

The effects on neonatal mortality rates however were more marked in the presence of severe cases of hypertension because of earlier interruption of pregnancy

Especially in the non-white in whom artificial rupture of the membranes was performed more frequently for P.E.T. as in white patients because of more severe degrees of hypertension with or without albumenuria, both stillbirth and neonatal rates were higher.

The inadequate antenatal attention in this race because of lack of hospital accommodation for supervision, and the fact that infrequent attendance at clinics was so common, contributed to a great extent to more severe degrees of illness in these patients.

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SUMMARY

"PREECLAMPTIC TOXAEMIA, ESSENTIAL HYPERTENSION  
AND CHRONIC NEPHRITIS". (P.E.T.)

The incidence of P.E.T. in our units during a 4 year period 1952-55, was 16.8%. In white patients at the Mowbray Maternity Hospital for the same period this was 21.4% compared with 16.5% in our non-white units at the Somerset and Grootse Schuur Hospitals and St. Monica's Home.

In other teaching centres the incidence of P.E.T. was very much lower than in Cape Town.

Perinatal mortality rates reveal that as much as 27.6% of losses were associated with the presence of P.E.T.

Of all stillbirths occurring in our units, P.E.T. was associated with 18.9% of such losses.

P.E.T. occurred in 23.9% of all our neonatal losses during 1952-55.

Perinatal losses in white patients were 4.9% of which 2.0% were stillborn and 2.3% neonatal deaths.

In non-whites with P.E.T. the perinatal mortality rate was 14.4% of which 9.9% were stillbirths and 4.4% neonatal deaths.

The main reasons for this much higher perinatal loss in the non-white could be attributed to the more severe degrees of P.E.T. - often occurring following "outpatient" treatment and non-hospitalization because of lack of accommodation - and a more frequent induction of labour (medical or surgical) in this race. The resultant larger numbers of premature babies delivered in the non-white, especially those weighing 4 lbs. and less was another important factor in the higher losses sustained.

"Booked" patients in both whites and non-whites showed a much lower perinatal mortality as in "non-booked".

The incidence of P.E.T. in a private maternity home and perinatal losses for a similar period of time show better figures when compared with our units.

The influence of different methods of delivery in patients with P.E.T. are compared. Vaginal delivery was followed by a lower perinatal mortality compared with delivery by the abdominal route, mainly because of the smaller numbers of premature babies born by the former route. Neonatal mortality rates were much higher when delivery was accomplished by caesarean section, because of the greater numbers of premature babies delivered by this method.

Perinatal losses in patients with P.E.T. undergoing caesarean section were much higher than when P.E.T. was not present, again because of the larger percentage of premature babies delivered in women with P.E.T.

Forceps extraction in patients with P.E.T. was followed by a perinatal mortality rate which was not significantly higher than when P.E.T. was not present.

As much as 3 times a greater percentage of babies weighing 8 lbs. or more were born of white mothers with P.E.T. as in non-whites. This could be explained possibly by the more severe degrees of P.E.T. in the latter, allied with the fact that the

average birth weight in non-whites is usually less than in the white patient.

Apart from socio-economic influences, it should be emphasized that antenatal supervision in hospital played no unimportant part in the white patient in procuring a larger baby; a baby which not infrequently was maintained in utero for a longer period, with careful supervision. In the non-white frequent termination of pregnancy was resorted to because of more severe degrees of P.E.T. on admission to hospital. Much smaller babies were hence more often delivered to the non-white; babies much more premature not only in relation to weight but also in maturity. Hence more babies weighing 4 lbs. and less were delivered from non-whites as whites, with a greater perinatal mortality as a consequence.

The significance of the degree of hypertension, with and without albumenuria in relation to perinatal loss (stillbirths) was noted. Higher stillbirth rates were found to occur with hypertension only, and also when there was a trace of albumen with hypertension of 160/100 and below.

Maceration of the foetus as noted in our annual reports occurred in only 7.9% of all stillbirths born of patients with P.E.T., and followed more frequently in the presence of hypertension only, or hypertension with a slight amount of albumen in the urine.

It can be concluded therefore that apart from socio-economic factors as a cause of a higher perinatal mortality in patients with P.E.T. in non-whites, that prematurity of the baby (spontaneous in onset or surgically induced) and unsatisfactory antenatal supervision go hand in hand in maintaining this high loss.

Our failure to provide adequate hospital accommodation in non-whites for the supervision of patients with P.E.T. together with "outpatient treatment" of such women because of the lack of such facilities, has led to an abnormally high perinatal mortality in this race as compared to whites.

A correction of such a state of affairs would in my opinion drastically reduce the high perinatal losses occurring in our units among non-white patients.

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YEAR	TOTAL	Total Loss		B O O K E D			Total	NON-BOOKED			Total Loss
	Patients	SB.	NND.	NO.	SB.	NND.	Loss	NO.	SB.	NND.	
1952	13	3	1	9	1	1	22%	4	2	0	50%
1953	26	6	0	18	0	0	0%	8	6	0	75%
1954	46	6	5	28	3	5	28.5%	18	3	0	16.6%
1955	22	1	0	22	1	0	4.7%	0	0	0	0
TOTAL 107		16	6	77	5	6	14.3%	30	11	0	36.6%

<u>% AGE</u>	14.9	6.9	72.0	6.4	8.3	28.0	36.6	0
	20.5%		* 14.3%			* 36.6%		

TABLE 21      DIABETES IN PREGNANCY.      Foetal loss in booked and non-booked cases.

**(4) DIABETES IN PREGNANCY.****(TABLE 21)**

The not uncommon predisposition for the pregnant diabetic woman in losing her baby because of sudden intrauterine death in the last trimester for no "known reason", is a well established phenomenon.

The tendency also for preclampsia to supervene in association with diabetes in pregnancy, with a high perinatal mortality is also now generally accepted.

An additional complication of pregnancy in diabetes is the occurrence of hydramnios, not only associated with the delivery of a large baby, but also the production of an unhealthy neonate susceptible to respiratory complications such as hyaline membrane, a condition very often fatal to such a baby.

A high perinatal mortality in diabetes with pregnancy is hence a well established fact, despite modern advances in the control of such an illness with insulin. Prediabetes also follows a similar pattern for the infant, although perinatal losses are fewer.

Oakley and Peol (1949) in 141 pregnancies with diabetes found a foetal loss of 24.9%. In 458 pregnancies investigated by questionnaire: 40.3% of babies were reported lost.

Reis, Da Costa and Allweis (1950) recorded a foetal mortality of 2 stillbirths and 2 neonatal deaths from 52 patients with 163 pregnancies.

Moss and Mulholland (1961) recorded a loss of 26.2% stillbirths in 450 pregnancies from 72 diabetic patients.

Nelson et al (1952) reported a 10% loss in 163 pregnancies; Jones (1953) a 30% loss in 162 pregnancies; and Long et al (1954) a 27% loss in 118 pregnancies.

From our units of the University of Cape Town, Louw and Sinclair (1957) reported on 107 pregnancies for the years 1952-55 in women with diabetes. The incidence hence was 0.4%. No fewer than 20.5% of babies were lost, 14.9% being stillborn and 6.9% neonatal deaths.

In 1956 a further 17 pregnant women with diabetes were confined. Hence of 124 such women during 1952-56, 51 were delivered by caesarean section and 73 by the vaginal route.

Only 2 babies were lost following caesarean section in the neonatal period. There were no stillbirths by this method of delivery.

By the vaginal route 34.3% babies were lost, or 6 times a greater perinatal mortality.

#### PERINATAL MORTALITY IN RELATION TO ANTENATAL CARE. (TABLE 21)

More than twice more babies were lost in "non-booked" as "booked" patients. Stillbirths were 6 times more frequent.

#### IN WHITE PATIENTS. (HOWDRAY M.H.)

During 1953-56 there were 12 patients with diabetes, and 14 babies were delivered. The incidence of diabetes was hence 0.3%.

Of the 14 babies born 3 or 21.4% were lost, of which 2 were deadborn and 1 neonatal death.

In "booked" patients 10 babies were delivered and 1 died in the neonatal period of 7 days.

In "non-booked" patients 4 babies were born, 2 of which were deadborn.

#### IN NON-WHITES. (SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. MONICA'S HOME)

Of 39 babies delivered of prediabetic and diabetic women 11 or 28.1% were lost. There were 9 stillbirths

or a stillbirth loss of 23.07%, and neonatal mortality of 6.6% or 2 babies. The incidence of diabetes in pregnancy in these units was 0.2%.

In "booked" non-white patients 26 babies were born and 6 or 23.07% were stillborn and neonatally lost, 4 or 15.3% of the former and 2 or 9.0% of the latter.

In "non-booked" non-whites 13 babies were delivered, of which 5 or 38.4% were lost as stillbirths.

It again becomes apparent that with adequate antenatal care perinatal losses are fewer than when inadequate supervision in pregnancy is forthcoming.

The early admission of these women with diabetes to hospital for control of their illness with sufficient obstetrical care will certainly lessen the chances of loss of life of the infant. Caesarean section in our units offered the best chances of foetal survival.

It should however be emphasized that abdominal section is not recommended for all pregnant women with diabetes. The treatment of choice in each patient should be assessed according to previous obstetrical history, and the best chances offered by each method of delivery. The necessity for termination as soon as possible of the pregnancy in the last trimester will be generally acknowledged.

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**((5)) SYPHILIS IN PREGNANCY.**

It is common knowledge that syphilis is one of the important diseases transmitted from mother to her infant.

It is true that syphilis is one of the deadliest diseases to the infant if such infection is not treated.

It is equally correct to emphasize that with early and adequate treatment syphilis of the baby is entirely avoidable.

The advent of the arsenical preparations was heralded by a striking decline in the incidence of syphilis in the infant, which was further improved by the use of antibiotic therapy.

**INCIDENCE OF SYPHILIS.**

Cruickshank (1924) recorded an incidence of 9% syphilis in pregnancy.

Dodds (1927) found maternal syphilis in 6% of patients as a cause of foetal death.

Browne (1949) reported an incidence of 1.13% syphilis in pregnancy at a joint committee meeting of the Royal College of Obstetricians and Gynaecologists and British Paediatricians. The meeting concluded that the incidence of syphilis found in hospital practice was largely dependent on the number of patients who obtained admission without submitting themselves to proper antenatal care.

Sacks and Selesnick (1953) from the Evaton antenatal clinic (entirely Bantu patients) in the Transvaal over a period of 5 years found a more or less consistent syphilitic rate of 30%. They record that other urban areas have a similar incidence.

INCIDENCE OF SYPHILIS IN PREGNANCY IN OUR UNITS.

Blood investigation, that is for syphilis, grouping and rhesus typing were routinely carried out in our units at the first visit to our antenatal clinics, and haemoglobin estimations always performed.

In the event of positive reaction for syphilis, confirmed usually by a second test, the patient was referred to a very competent venereology clinic controlled by a specialist in this field. Treatment was usually carried out at this clinic by injection with penicillin, a total of 2,400,000 units being administered.

The problem of the "non-booked" patient with syphilis admitted to our units was a real one, because of the large numbers of women seen who had not received any treatment whatsoever. The majority of these unfortunate women were primiparous, aged between 15 and 25 years, with illegitimate pregnancies, and non-whites. It will be noted that nearly all babies lost as stillbirths from mothers with syphilis were macerated, during 1952-55.

Emphasis should also be laid on the fact that although many women with positive reactions were treated in our clinic for venereology, the responsible man (? husband) was not always attended to at the same time because of our inability to trace such an individual. Particularly among our non-whites, illegitimate pregnancy was rife, and cohabitation again with the same offender was all too common.

Inadequate treatment, or treatment too late in pregnancy was another problem we had to face in the management of syphilis in pregnancy. Newborn babies from such mothers were hence given prophylactic antibiotic treatment, as were those infants from mothers who had had treatment for syphilis during the antenatal period.

The possibility of reinfection during pregnancy should also be borne in mind. Perhaps one could explain the high numbers of unexplained stillbirths in our units on this basis, bearing in mind of course that chronic ill-health could also be responsible for the large numbers of premature stillbirths occurring in our hospitals.

Incidence at the Somerset Hospital. (Non-whites)

From records analysed there was an incidence of syphilis of between 5 to 8% for the years 1953-55.

Incidence at Groote Schuur Hospital. (Non-white)

Records for the years 1952-54 were analysed, and an incidence of syphilis of 8.2% was noted. The majority of these women were "non-booked", and a stillbirth rate of 111.1 per thousand births was found due to syphilitic infection. During the same period of time the stillbirth rate in women with negative reactions was found to be 60.7 per thousand births.

Incidence at St. Monica's Home. (Non-white)

An incidence of positive reaction was found in only 3.3% of patients attending the antenatal clinics at this institution during 1952-54. All of these women were "non-booked". The stillbirth rate due to syphilis was hence 32.9 per thousand births.

Incidence at Howbray M.H. (Whites)

There was an incidence of only 0.5% positive reaction in whites at this institution, all of whom had received treatment at our antenatal clinics.

Altogether therefore there were 32 stillbirths all of which were macerated in our units during 1952-55, and all of which occurred in non-white patients.

None of these women had received antenatal care.

The stillbirth rate due to syphilis in our units was therefore only 2.6% of all stillbirths.

The influence of syphilitic infection in promoting premature birth was noted in 3.6% of all our patients.

In whites 0.6% of all premature births was associated with syphilis, and in non-whites, 4.0%.

The influence of adequate antenatal care and hence of treatment was obvious in the prevention of premature birth due to syphilis.

#### THE INFLUENCE OF ANTENATAL CARE IN SYPHILIS IN PREGNANCY.

Goodwin(1950) from the U.S.A. reported the following results in treated patients(with adequate antenatal care) and those not treated:-

<u>OUTCOME OF PREGNANCY.</u>	<u>NO A.N.C.</u>		<u>WITH A.N.C.</u>	<u>TREATED</u>
	<u>Early S.</u>	<u>Late S.</u>	<u>Penicillin.</u>	<u>BEFORE</u>
				<u>PREGNANC</u>
Normal full term living.	18.2%	74.4%	92.5%	91.0%
Living syphilitic babies.	40.9%	2.4%	1.5%	0.5%
Premature syphilitic babies.	2.3%	2.4%	0.3%	0.8%
<u>STILLBIRTHS.</u>				
Full term infants.	18.2%	12.2%	3.3%	3.4%
Premature infants.	6.5%	0.0%	0.9%	1.4%

The benefits of adequate care was apparent from these results.

Goodwin states without equivocation that it is not necessary to administer antesyphilitic treatment to a syphilitic woman during every pregnancy and that treatment may be withheld if,

(i) The mother had had at least 2.4 million units of aqueous penicillin or its equivalent.

In our units O'Malley gives 4 injections of PAM at weekly intervals for 4 weeks for complete protection of the foetus. When treatment has failed a repeat of double the above dose is administered. It was of interest to note that O'Malley reported a case of reinfection on 3 occasions in which the primary chancre occurred in one patient some months after the preceding attack of syphilis had been supposedly cured.

The possibility of reinfection in women of the non-white race attending our units must be born in mind, because of our inability to trace the man on many occasions.

In my opinion the repetition of treatment should be insisted upon in future pregnancies.

(ii) If the mother shows no clinical signs of active infection.

(iii) If the mother is sero-negative or if still sero-positive in a low titre only.

Goodwin states, "it is obvious that premature births can be prevented by early and adequate treatment of the infected mother during pregnancy". In other words, if antenatal care is adequate the incidence of syphilis can be ruled out.

Wammock, Carrozzino, Ingraham and Clair (1950) analysed 820 cases with syphilis in pregnancy and found that in 75 who had received no treatment with infectious syphilis, no living children were produced. With early adequate treatment in 745 women 93.8% of the infants were normal and at term, and 2% living with syphilis.

Shaffer and Courville (1952) state that women who have become sero-negative or sero-resistant in low titre after adequate treatment need not be retreated, but should be observed carefully during subsequent pregnancies.

#### COMMENT.

Syphilis in pregnancy is the one condition which with adequate care and treatment can be cured and prevented from causing loss of life in the baby, and a tendency to prematurity.

In our units there is ample evidence of inadequacy of treatment of syphilis in the non-white because of inadequacy of antenatal care. All such cases inevitably resulted in the loss of life of the infant, which was macerated at birth. In the white patient loss of life due to syphilis as manifested by stillbirth was virtually non-existent.

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### THE HAZARDS OF LABOUR.

It is within reason to believe that, if all labours were uncomplicated that the hazards of delivery of a normal child in a normal woman would be almost entirely eliminated.

It is indeed fortunate that more than 90% of all confinements are normal, with the consequence that the majority of babies are born easily by the vaginal route and in a good condition..

Such a state of affairs could be found to exist to large extent in a community blessed by good education and health, and of good physique, with opportunities for adequate antenatal supervision during the course of pregnancy.

Under adverse circumstances, often found in the practice of obstetrics in units of teaching hospitals and other institutions, catering for women frequently of inferior socio-economic status, in poor general health, with physiques unsuited to easy delivery, it is not surprising that the foetus is not infrequently lost or injured before and during labour.

The inadequacy of antenatal care will further aggravate such adverse conditions for confinement, and it is almost corollary that difficult midwifery and poor antenatal care are found at the same time.

In our units of the University of Cape Town serving in the main the poorest sections of the obstetric population, such as non-whites, and poor whites, such a state of affairs will be found to exist.. It was therefore not surprising to note that perinatal mortality rates was highest in these units, particularly in non-whites the majority of whom were the poorest, chronically ill, uneducated, with the least opportunities for adequate antenatal care because of extreme shortage of hospital accommodation.

The part played by the accoucher in maintaining a low perinatal mortality cannot be sufficiently emphasized, because it is his judgement and dexterity of manipulation which will often determine whether the baby will live or die. To this end his experience of obstetrics will be of the utmost value.

It is however in the antenatal period that the obstetrician is most able to "wield his sword" in the detection of and correction of any abnormality which might be found to exist. In the labour ward his "star will shine" with normal delivery after successful antenatal supervision.

However no matter what skill and judgement the obstetrician might exhibit, his successes will depend also to a large extent on the health and physical attributions of his patients. Poor antenatal supervision will further complicate his art, and no matter how skilled and experienced he might be, his results will ultimately be inferior.

In our units of the University of Cape Town the inadequacy of prenatal care particularly in the non-white as revealed by the high rate of "non-booked" admissions, and low rate of hospitalization in the obstetric population of the same race, increased the hazards of delivery to a marked degree.

The objects of the following paper were to note the effects of inadequate antenatal care particularly in relation to the hazards of delivery. Such hazards were certainly magnified in the premature baby, which in most instances was less able to withstand the forces of labour as compared with the mature child.

In the following chapter each obstetrical hazard will be discussed in relation to its incidence, compared with such hazards in other centres, and the effects of antenatal supervision on perinatal mortality.

(1) COMPLICATIONS OF THE UMBILICAL CORD. (TABLES 22, and 83)

Included in this subheading were cases of prolapse and presentation of the umbilical cord, and other less common abnormalities present during the course of labour.

INCIDENCE.

In our units of the University of Cape Town during 1952-55, there was an incidence of prolapse and presentation of the cord of 0.95%. As many as 248 babies were delivered, the majority with cord prolapse.

IN WHITE PATIENTS. (NOWBRAY M.H.)

The incidence of cord complications was 0.35%.

Altogether only 15 babies were delivered with cord prolapse at this institution during 1952-55.

IN NON-WHITES ( SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. MONICA'S HOME)

The incidence of this serious complication of labour in these units was 1.02%, and was indicative of the adequacy of antenatal care as compared with our white unit, which was 3 times less frequent.

Joubert (1954) reported a series of 203 cases of cord prolapse and presentation from the units of the University of Cape Town for the years 1948-53, and noted an incidence of 0.56%, 51.1% which occurred in "booked" patients, and 38% of the babies were alive.



Fenton and D'Esopo(1951) in 60788 deliveries reported 216 cases of cord prolapse, i.e. an incidence of 0.35%, which was similar to that occurring in our white unit. There were 20 twin pregnancies in which the mortality of the 1st baby was 72.7% and the second 11.1%.

Slater and Randall(1956) recorded an incidence of cord prolapse of 1 in 250 cases with a foetal loss of 33.0%.

Other authors report incidences of cord prolapse of between 0.2 and 1.5% and foetal losses as high as 60-70%.

Geldenhuys(1955) reported that 8.9% of stillbirths occurring at the Pretoria General Hospital and Holy Cross Home(non-whites) were due to cord prolapse.

Lawson and Lister(1954) from University College, Ibadan, Nigeria, reported an incidence of 0.80% cord prolapse. In "booked" cases the incidence was 0.5%, whereas in "non-booked" it was 1.9%. Perinatal losses were 69.4% in the former, and 72% in the latter patients.

#### PERINATAL MORTALITY ASSOCIATED WITH CORD COMPLICATIONS.

##### IN OUR UNITS.

Of 248 babies delivered 136 or 54.8% were lost, of which 50.4% were stillborn and 8.9% neonatal deaths.

In 29.1% of cases there was no foetal heart on admission of the patient to hospital.

##### IN WHITES.

Of 15 babies born with cord prolapse 5 or 33.3% were lost, 4 being stillborn and 1 dying soon afterwards.

##### IN NON-WHITES.

Of 136 babies delivered with cord complications 78 or 56.6% were lost, of which 52.2% were stillborn and 8.0% neonatal deaths.

Premature babies were born in 18.1% of those delivered with cord prolapse.

RACE.	NO.	B.	E.	PARITY.		PREMS.	FULLY DILATED CERVIX.	NO. FHS	PRESENTING PART				TOTAL LOSS		INTERNAL.	CAESAREAN.	BREECH.	EXPECTANT. and Replacement.	FORCEPS.	CRANIOTOMY. and decapitation															
				M.	P.				VERTEX SB. NND.	BREECH SB. NND.	TR. LIE SB. NND.	UNKNOWN SB. NND.	SB.	NND.	VERSION SB. NND.	SECTION SB. NND.	SE.	NND.	SE.	NND.	SE.	NND.	D.	C.											
WHITE	15	9	6	6	9	4	1	2	2	1	1	0	1	0	0	0	4	1	1	0	0	0	1	0	2	0	0	0	0	0	0	0	0	0	
% AGE		66.6	33.3	33.3	66.6	26.6	6.6	13.3	26.6 50%	25	53.2 2.5	0	20.0 11.1	0	0	0	26.6 33.3%	6.6	20	33.3	0	26.6 0	25	40	16.6	0	100	0	0	0	0	0	0	0	
LOSS %									75%	12.5%	33.1%	0%																							
NON - WHITES	136	71	65	101	35	26	56	33	41	3	11	2	14	0	5	1	71	6	13	1	4	2	11	1	34	1	3	1	2	2	3	3	3	3	
% AGE		52.2	47.	14.3	25.	19.1	41.1	23.	66.7 70.9	4.8	36.6 43.3	6.6	51.8 51.8	0	29.3 15.8	0	56.6%	8.0	68.4%	16%	73.6%	0.6	16.9 25%	8.3	36.6 46.6%	3.3	68	6.6	70%	42.8	14.2	57.1%	1.4	2.2	100%

PROLAPSE OF CORD AND CORD COMPLICATIONS. (WHITES AND NON - WHITES)  
 FOETAL LOSS IN RELATION TO PRESENTING PART AND METHOD OF DELIVERY. (TABLE 22a).

Altogether 48% of our patients with cord complications were "booked", and 77.7% were multiparous.

PERINATAL MORTALITY IN CORD COMPLICATIONS ACCORDING TO  
THE DEGREE OF ANTENATAL CARE. (TABLE 84)

During the years 1953-55, the incidence of cord complications was 0.9%. This period of time was chosen because of satisfactory detail provided in these reports.

Of these cases 52.3% occurred in "booked" patients, and 47.7% in "non-booked".

IN "BOOKED" CASES.

The incidence of cord complications was 0.58%.

Of 96 babies delivered, 45 or 46.7% were lost, of which 45.7% were stillborn and 1.9% neonatal deaths.

IN "NON-BOOKED" CASES.

The incidence of cord complications was 2.1%, which was almost 4 times greater than in "booked" cases.

Of 88 babies delivered, 67 or 76.1% were lost, of which 72.7% were stillborn and 15.0% neonatal deaths.

There was therefore a significantly statistically higher perinatal mortality in "non-booked" cases with cord complications.

IN WHITE PATIENTS.

The number of cases of cord complications in this race was too few to come to any reasonable statistical conclusions.

Of interest was the fact that at a private white maternity home in Cape Town, only 2 cases of cord prolapse occurred in 3247 deliveries during the 1952-55 period.

IN NON-WHITES."BOOKED" CASES.

In 59.4% of these patients antenatal care had supposedly been adequate, when they attended out antenatal clinics. Infrequent attendance however was common in this race, as many as 2-3 months intervening between visits.

Of 63 babies delivered with cord complications as many as 49.2% were lost, of which 42.8% were stillborn and 11.1% neonatal deaths.

IN "NON-BOOKED" CASES.

Of babies delivered with cord complications in "non-booked" non-whites 37.4% were lost, 62.7% being stillborn and 12.5% neonatal deaths.

It will be apparent therefore that adequate antenatal care (especially in the white patient) conferred a lower incidence of cord complications, and a lower perinatal mortality rate, although the losses due to this serious complication in both "booked" and "non-booked" patients were almost equally heavy in the non-white, because of not completely successful antenatal supervision.

PERINATAL MORTALITY ACCORDING TO THE PRESENTING PART OF THE FOETUS.

(TABLES 22)

In order of frequency, cord complications occurred most commonly in vertex presentations (especially P.O.P.) in 49.1% of cases; transverse and oblique lies in 22.5%; breech presentation in 22.1%; and in 10% the presenting part was not known for certain.

In vertex presentations the P.O.P. position was the most common, resulting in non-engagement of the foetal head, which was a most important contributory factor in cord

prolapse, during which 59.8% of babies were lost, of which 56.2% were stillborn and 8.1% neonatal deaths.

In white patients 75% of babies were lost with the vertex presenting, and in non-whites 70.9%

In transverse and oblique lies 58.8% of infants were lost when cord complications were present. 55.4% of these babies were stillborn and 8.0% neonatal deaths.

In white patients 11.1% of babies were lost, and in non-whites 51.8% (all stillborn).

With breech presentation associated with cord prolapse 22 babies were lost or a perinatal mortality of 49.0%, of which 34.5% were stillborn and 8.3% neonatal deaths.

In whites the perinatal loss was 12.5% and in non-whites 43.3%.

In cases of cord complications in which the presenting part was not known 44% of babies were lost, of which 40% were stillborn and 6.6% neonatal deaths.

In twin pregnancy 4.33% of cases were associated with cord prolapse or presentation.

#### PERINATAL MORTALITY ACCORDING TO THE MODE OF DELIVERY. (TABLE 22)

EXPECTANT. When this method of delivery was allowed or when the cord was merely replaced no fewer than 55 of 72 babies were lost, or a perinatal loss of 76.3%. In the majority of these cases in our units the foetus was already dead or in extremis when the patient was admitted to hospital. Stillbirths accounted for 73.6% of babies lost and neonatal deaths for 10.5%

In white patients only 2 babies were so treated and both were lost.

In non-whites with cord complications treated expectantly 50 babies were delivered and 70% were lost of which 68% were stillborn

INTERNAL VERSION (with or without immediate breech extraction) was performed in 47 cases or in 18.9% of cases, with the loss of 70.2%, of which 65.9% were stillborn and 12.5% neonatal deaths.

In whites only 3 babies were so manipulated and 1 was lost.

In non-whites 19 babies were so treated and 73.6% were lost, 68.4% being stillborn and 16.6% neonatal deaths.

FORCEPS EXTRACTION was performed in 8.4% of cases of cord prolapse with a perinatal mortality of 43.7% of which 37.5% were stillborn and 10% neonatal deaths.

In whites forceps extraction was not performed in any case.

In non-whites forceps were applied in 5.1% of cases of cord complications with a loss of 57.1%.

BREECH DELIVERY was performed (most frequently extraction) in 20.1% of cases of cord complications and 40.0% of babies were lost, of which 38% were stillborn and 3.2% neonatal deaths.

In whites 1 baby was lost in 6 delivered by the breech, or a perinatal loss of 16.6%.

In non-whites 46.6% of babies were lost when delivered by the breech.

CAESAREAN SECTION YIELDED THE BEST RESULTS. In all cases the foetal heart sounds were present and often sustained by vaginal pressure on the foetal presenting part, "keeping the presenting part off the cord". In the majority of instances the cervix was not sufficiently dilated to allow vaginal delivery.

Despite this heroic operation 25.4% of babies were lost, of which 15% were stillborn and 11.3% neonatal deaths.

CRANIOTOMY AND OTHER DESTRUCTIVE OPERATIONS resorted to in cases for delivery of an already dead baby.

Maternal deaths were noted on 2 occasions when heroic measures were attempted for delivery in the presence of prolapse of the cord, 1 after a "failed forceps" and another with a ruptured uterus.

It should be noted that full dilatation of the cervix was present in only 43.5% of cases of cord complications met with in our units during 1952-55. The greatest foetal losses occurred when cervical dilatation was insufficiently present for successful delivery, per vagina.

HAS ROUTINE VAGINAL EXAMINATION IN ALL PATIENTS ADMITTED TO THE LABOUR WARD REDUCED THE FOETAL MORTALITY DUE TO CORD PROLAPSE?

During the year 1960 all patients admitted to the labour ward (with or without ruptured membranes) with the foetal head not engaged were examined routinely in order to rule out cord presentation or prolapse.

Of 6930 patients admitted 81 babies were born in which presentation or prolapse of the umbilical cord occurred, or an incidence of 1.17%. This incidence was greater than in the previous 4 years. Of the 81 babies delivered 41 were from "non-booked" patients and 40 from "booked".

Stillbirths totalled 32 or 39.5% of which 26 occurred in "non-booked" cases and 6 in "booked", i.e. 81.2% of stillbirths occurred in "non-booked" cases. The significance of adequate antenatal care was therefore striking in this series of cord complications.

In 23 instances out of 32 babies delivered the foetal heart beat was not heard on admission or in 71.9%.

It was hence concluded that routine vaginal examination although of the greatest importance, was not a life saving

measure when antenatal care had not been previously administered.

Adequate supervision of women with instability of the presenting part will lessen the incidence of prolapse of the cord and its serious consequences to the baby.

The treatment of choice for cases of prolapse and presentation of the umbilical cord especially when the cervix is not fully dilated and the baby alive and of adequate size is caesarean section. Such treatment too in the presence of abnormal presentation, even with full dilatation of the cervix, will most often yield the best results for both mother and child, instead of heroic methods of vaginal delivery, with its high obstetric mortality.

#### SUMMARY AND CONCLUSIONS.

#### "UMBILICAL CORD COMPLICATIONS"

The incidence of cord complications in our units during the years 1952-55 was 0.95%, in 1953-55, 0.89% and in 1952-56 as high as 1%.

In white patients the incidence of such complications was 3 times less frequent than in non-whites (0.35% : 1.02%), mainly because of better antenatal supervision.

In "booked" cases the incidence of cord complications was 0.58% compared with 2.1% in "non-booked" cases.

The perinatal mortality rate in our units was 54.8% of which 50.4% were stillbirths. In 29.1% of such cases there was no foetal heart beat when the patient was admitted.

In non-whites the perinatal losses associated with cord complications were significantly higher than in whites.

Antenatal care of adequate degree was related to a lower perinatal mortality rate than when inadequate care was forthcoming. (45.7% : 72.7%)

Perinatal mortality rates in relation to the mode of delivery revealed that the treatment of choice in cord prolapse in our series of cases during 1952-55 was caesarean section.

Routine vaginal examination of all patients with unstable presenting parts (with and without ruptured membranes) did not lower perinatal losses when cord prolapse or presentation occurred. This was due to the fact that the majority of babies lost with this complication were from "non-booked" patients.

It is apparent therefore that adequate antenatal care played a most important part in reducing perinatal mortality due to cord complications.

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<u>BREECH</u>						<u>TOTAL LOSS</u>		<u>PARITY LOSS</u>				<u>PREMS</u>	<u>TWINS</u>	<u>A. P. H.</u>		<u>CORD</u>	<u>TOXAEMIA.</u>
<u>COMPLICATED.</u>	<u>NO.</u>	<u>B.</u>	<u>E.</u>	<u>M.</u>	<u>P.</u>	<u>SB.</u>	<u>NND.</u>	<u>SB.</u>	<u>M. NND.</u>	<u>P. SB.</u>	<u>NND.</u>			<u>PP.</u>	<u>AH.</u>	<u>COMPLI- CATIONS.</u>	
<u>WHITES.</u>	79	52	27	56	23	13	12	9	9	3	4	37	28	1	5	7	33
<u>% AGE</u>		65.9	34.1	70.9	29.1	16.4	18.1	16.0	19.1	13.0	20.0	48.2	35.3	1.2	6.0	8.8	41.7*
<u>TOTAL LOSS.</u>						31.6 %		32.1 %		30.4 %							
<u>NON - WHITES.</u>	352	209	143	255	97	99	41	70	28	29	12	170	109	22	43	30	94
<u>% AGE.</u>		59.4	40.6	62.5	37.5	28.1	16.0	27.4	15.1	29.9	17.9	48.3	30.9	6.2	12.2	8.5	26.7*
<u>TOTAL LOSS.</u>						39.7 %		38.4 %		42.2 %							
<u>UNCOMPLIC - ATED.</u>	34	25	9	16	18	4	0	2	0	2	0	6	0	0	0	0	0
<u>WHITES.</u>		73.6	26.4	47.1	52.9	11.7	0	12.5	0	12.5	0	17.6*	0	0	0	0	0
<u>% AGE.</u>						11.7 %		12.5 %		12.5 %*							
<u>NON - WHITES.</u>	225	150	75	186	39	32	15	17	8	15	7	69	21	0	2	5	4
<u>% AGE</u>		66.7	33.3	82.7	17.3	17.2	9.8	9.1	4.8	38.5	25.0	29.7*	9.3	0	0.8	2.2	1.6
<u>TOTAL LOSS</u>						20.8 %		11.1 %		56.4 %							

BREECH DELIVERY. (WHITES AND NON - WHITES.) FOETAL LOSS IN  
COMPLICATED AND UNCOMPLICATED CASES (IN MULTIPARA AND PRIMIPARA) AND  
ASSOCIATED COMPLICATIONS. (TABLE 26)

(2) BREECH PRESENTATION.(TABLES 23,24,25,26,27,28,29,  
74,75,76)

Although it is generally realized that breech delivery is a formidable complication of labour carrying a high perinatal mortality, and that correction of such malpresentation in the antenatal period will almost certainly reduce such wastage of life, too many infants are still being lost.

When breech delivery was undertaken by obstetrical teams experienced in such delivery and with special interest in the management of such a complication foetal mortality has been noticeably reduced.

In our units of the University of Cape Town the loss of life with breech delivery is a formidable one, and it is the object of this short paper to determine the causes of such a high perinatal mortality, and to show statistically that antenatal care of adequate degree played an important part in the management and successful treatment.

INCIDENCE.

Indian and Winchester (1951) reporting on 688 single breech deliveries in 17355 births for the years 1945-49 (i.e. an incidence of 3.9%) recognized the value of antenatal care in reducing foetal losses. These authors noted that the greatest losses occurred in non-hospitalized multiparous patients (42%) compared with a loss of 25% in patients delivered in hospital. Only 14% of babies were lost in primiparæ in hospital.

Wilcox(1949) recorded an incidence of 4.2% breech presentation in 54% primipara and 46% multipara with a foetal loss of 14.8% in multipara and 9.8% in primipara.

Seeley(1949) found an incidence of 4.8% breech presentation in 25532 deliveries, and stressed the dangers of prematurity.

Daley and Michael(1953) recorded an incidence of 4% breech presentation with a higher mortality in the multiparous patient. They stressed the relatively high foetal loss of 5-10% in uncomplicated cases despite the careful antenatal care and the performance of skilled delivery in the hands of operators with experience.

Fell(1954) found an incidence of only 1.35% breech presentation where all cases had been given the benefit of external cephalic version with or without anaesthesia beforehand. For the years 1948-52 he recorded only 67 breech cases, 50 of which had been delivered vaginally, and 17 by abdominal section. At the same time 107 attempts at external cephalic version in 101 patients with 80% success had been managed. Only 5 babies were lost.

Many other reports on breech presentation have come forward in the last 2 decades, with similar incidences to those above.

#### INCIDENCE IN OUR UNITS.

During the years the incidence of breech presentation was 4.4%.

Altogether 1140 babies were delivered by the breech. IN WHITES the incidence was 2.65% and in NON-WHITES 4.34%.

In "hooked" cases the incidence was 3.5% and in "non-hooked" 7.8%.

UNIT. and YEAR.	NO.	B.	E.	PARITY.		TOTAL LOSS		PARITY LOSS				PREMS	TWINS	A. P. H.		CORD. PROL- APSE.	TOXAEMIA.
				M.	P.	SB.	NND.	M.	P.	SB.	NND.			SB.	NND.		
P.M.H. 1952.	83	58	25	61	22	26	11	20	8	6	3	41	24 (11 -2nd)	4	4	7	7
1953	65	49	16	43	22	16	10	6	3	10	7	33	27	3	4	3	12
1954	33	19	14	22	11	9	5	4	5	5	0	11	10	2	3	3	6 (1 Ecl.)
1955	130	72	58	90	40	41	15	33	8	8	7	72	34	10	10	12	19 (2 Ecl.)
N.S.H. 1952.	46	28	18	25	21	17	4	11	2	6	2	18	1	3	1	4	2
1953	33	19	14	18	15	6	4	6	4	0	0	16	15	1	4	2	7
1954	57	35	22	46	11	15	4	13	2	2	2	25	29 (2 Trips)	2	8	6	17 (1 Ecl.)
1955	38	23	15	25	13	4	4	4	4	0	0	22	14 (1 Trip)	1	7	7	5
M.B.H. 1952	11	3	8	6	5	2	3	1	2	1	1	7	6	0	2	3	0
1953	24	17	7	8	9	5	5	4	5	0	1	13	5	0	0	1 (Rupt. Cord.)	13 (2 Ecl.)
1954	25	17	8	20	5	4	2	3	0	1	2	9	11	0	1	2	8
1955	19	15	4	15	4	2	2	1	2	1	0	9	6	1	2	1	12
ST. M. 1952	23	16	7	17	6	4	4	3	3	1	0	11	8	4	4	1	5 (1 Ecl.)
1953	15	12	3	13	2	7	3	7	1	0	2	9	2	1	1	1	2
1954	27	18	9	21	6	7	4	5	3	2	1	14	10	3	5	1	9
1955	31	13	18	27	4	13	4	9	4	4	0	16	11	0	6	3	2
G.S.H. 1952	26	19	7	22	4	9	1	0	0	9	1	14	3 (2nd)	0	5	2	18
1953	23	9	14	17	6	7	5	7	4	0	1	11	11 (2nd Trip)	3	2	3	7
1954	33	17	16	24	9	10	4	5	1	5	3	14	5 (1 Trip)	4	0	0	20 (1 Ecl.)
<b>TOTAL.</b>	<b>740</b>	<b>456</b>	<b>284</b>	<b>502</b>	<b>238</b>	<b>204</b>	<b>94</b>	<b>143</b>	<b>61</b>	<b>61</b>	<b>33</b>	<b>365</b>	<b>231</b>	<b>42</b>	<b>69</b>	<b>62</b>	<b>171 (8 Ecl.)</b>
<b>% AGE.</b>	<b>2.8</b>	<b>61.7</b>	<b>38.3</b>	<b>67.7</b>	<b>32.3</b>	<b>27.4</b>	<b>17.5</b>	<b>28.3</b>	<b>16.8</b>	<b>25.6</b>	<b>18.7</b>	<b>49.1</b>	<b>31.1</b>	<b>5.6</b>	<b>9.3</b>	<b>8.3 %</b>	<b>23%</b>
						<b>40.1 %</b>		<b>40.1 %</b>		<b>39.5 %</b>				<b>14.9 %</b>			

BREECH DELIVERY. (COMPLICATED). FOETAL LOSS AND IN PRIMIPARA  
AND MULTIPARA, INCLUDING THE INCIDENCE OF COMPLICATIONS (TABLE 29)

Complicated breech presentation was noted in 2.8% of our cases, and 1.52% in non-complicated.

In white patients (Murray M.H.), 1.6% of "breech cases" were complicated and in "non-whites 2.6%.

Of uncomplicated breech cases in whites there was an incidence of 0.8%. In non-whites this was 1.7%.

ASSOCIATED COMPLICATIONS WITH BREECH PRESENTATION. (TABLE 23)

(a) A total of 462 premature babies were delivered by the breech (40.4%), 365 in complicated breech and 97 or 24% in the uncomplicated variety.

(b) From multiple pregnancy 252 babies were born by the breech (22%), of which 231 or 31.1% occurred in complicated and 21 or 5% in the uncomplicated type.

(c) Antepartum haemorrhage was noted in 9.9% of breech cases, 3.6% in association with placenta praevia, and 6.3%

In complicated cases there were 14.9% of cases with antepartum haemorrhage, 5.6% being placenta praevia, and 9.8% accidental haemorrhage.

In uncomplicated breech deliveries bleeding occurred in only 0.75% of cases.

In non-whites there was a higher incidence of antepartum haemorrhage than in whites (11.6% : 5.3%), and a slightly higher incidence of premature babies, mainly because of the higher incidence of multiple pregnancy in the non-white.

(d) Cord complications were found in 5.8% of breech deliveries, with a greater incidence in complicated cases.

There was a similar incidence of this complication in the racial groups.

(e) Preeclampsia, essential hypertension and nephritic occurred in 15.3% of cases of breech delivery in our units.

UNIT and YEAR	NO	B.	E.	PARITY.		TOTAL LOSS		PARITY		LOSS.		PREMS	TWINS	A.P.H.		CORD. PROL- APSE	TOXAEMIA.	REMARKS
				M.	P.	SB.	NND	SB.	NND	SB.	NND			P.P.	AH.			
<b>P.M.H.</b>																		
1952.	11	9	2	6	5	0	1	0	1	0	0	0	0	0	0	0	0	
1953	24	15	9	15	9	5	1	4	0	1	1	0	0	0	0	0	0	
1954	74	58	16	44	30	11	3	6	2	5	1	24	11	0	1	0	0	W.R. (+) -2 MACERATED 5
1955	32	23	9	23	9	2	0	1	0	1	0	0	0	0	0	0	0	
<b>N.S.H.</b>																		
1952	15	12	3	8	7	1	0	1	0	0	0	6	0	0	0	0	0	1 MACERATED.
1953	32	19	13	21	11	6	0	3	0	3	0	6	1	0	1	0	0	
1954	29	23	16	7	12	6	4	2	3	4	1	9	0	0	0	0	0	5 MACERATED. 2 WR.(+). 1WR.(+)
1955	38	23	15	23	15	6	3	1	3	5	0	11	0	0	0	0	0	
<b>M.M.H.</b>																		
1952.	7	2	5	3	4	0	0	0	0	0	0	0	0	0	0	0	0	
1953	5	4	1	3	2	0	0	0	0	0	0	0	0	0	0	0	0	
1954	12	9	3	7	5	0	0	0	0	0	0	0	0	0	0	0	0	
1955	10	10	0	3	7	4	0	2	0	2	0	6	0	0	0	0	0	
<b>ST. M.</b>																		
1952	11	9	2	10	1	2	0	2	0	0	0	0	0	0	0	0	0	
1953	29	27	2	23	6	1	1	1	1	0	0	8	12	0	0	4	0	
1954	19	14	5	16	3	2	4	1	0	1	4	6	0	0	0	0	0	
1955	18	14	4	14	4	2	1	2	1	0	0	2	0	0	0	0	0	1 MENINGOCOELC 1 MACERATED.
<b>G.S.H.</b>																		
1952	3	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	
1953	31	16	15	24	7	6	2	4	0	2	2	19	8	0	1	NECK	4	
1954	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>TOTAL.</b>	400	290	110	263	137	54	20	29	11	25	9	97	21	0	3	5	.4	
<b>% AGE</b>	1.53%	72.5	27.5	65.7	34.3	13.5	4.4	11.0	4.7	18.2	8.0	24.2	5.0	0	0.75	1.1%	1%	
						18.5%		15.2%*		24.4%*								

BREECH DELIVERY. ( UNCOMPLICATED ). FOETAL LOSS, AND LOSS IN BOOKED AND EMERGENCY CASES, IN PRIMIPARA AND MULTIPARA. (TABLE 2a)

PERINATAL MORTALITY IN BREECH DELIVERY. (TABLES 23-29, and 74-76)IN OTHER CENTRES.

Peel and Clayton(1948) recorded a foetal loss of 11% in primiparae and 10% in multiparous women in 1657 uncomplicated cases.

Dacker(1949) reported a 33.5% foetal loss in 128 selected cases occurring in women over the age of 30 years with no complications and delivered vaginally. He lost no children delivered by caesarean section in women of similar age.

Seeley(1949) found a higher wastage of life in premature babies delivered by the breech. In babies of 2500G and over the loss was 5.2% compared with 24.1% in infants under this weight. He also reported a larger loss in patients over the age of 35 years.

Wilcox(1949) reported a higher foetal loss in multiparous patients.

Hedman(1950) also found that the primiparous woman lost fewer babies than in multiparous(23.8% : 36.7%).

Noble, Mackie and Paterson(1951) noted a relatively low foetal loss of 11.1% when patients were delivered under local anaesthesia.

Kuhnel(1951) reported a corrected foetal mortality of 1.6% in uncomplicated breech delivery. He advised routine external cephalic version after the 34th week of pregnancy in which he was successful in 75% of cases.

Lawson and Lister(1954) reported on breech delivery from the University College, Ibadan, Nigeria, and noted 110 cases, 55 of which resulted in premature babies.

The perinatal mortality at Ibadan was 56.3% of which 50% were stillbirths and 12.7% neonatal deaths.

In 79 uncomplicated cases of breech delivery 38 or 48.1% of babies were lost of which 40.5% were stillborn and 14.6% neonatal deaths.

In 31 cases of complicated breech 24 or 77.4% babies were lost, of which 74.1% were stillborn and 12.3% neonatal deaths.

No antenatal care was administered at all in 36.5% of "breech cases" at Ibadan, and many other patients attended rarely.

There were 48 primiparous patients in the above cases, in whom the perinatal losses were 50.0% compared with a loss of 60.3% in multiparae.

In 72 "booked" cases of breech delivery the perinatal mortality was 48.6%, and in "non-booked" 71.0%.

It should be mentioned that external cephalic version was not carried out routinely at Ibadan.

#### PERINATAL MORTALITY IN OUR UNITS.

During 1952-55 of 1140 babies delivered by the breech 372 or 32.5% were lost. Of these 258 or 22.6% were stillborn, and 114 or 12.8% were neonatal deaths.

There were 400 uncomplicated cases of which 13.5% of babies were lost, 13.5% being stillborn and 4.4% neonatal deaths.

Of 740 complicated cases 40.1% of babies were lost, 27.4% as stillbirths and 17.5% neonatal deaths.

#### IN WHITE PATIENTS (MOWBRAY H.S.)

(TABLES 2, 25)

Of 118 babies delivered by the breech 29 or 25.6% were lost of which 15% were stillborn and 12.5% neonatal deaths.

In complicated cases in white patients delivered by the "breech" the perinatal mortality was 31.6% and uncomplicated 11.7%.

IN NON-WHITES (SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. NONICAS HOME)

Of 577 babies delivered by breech delivery 187 or 32.4% were lost of which 22.8% were stillborn and 9.7% neonatal deaths.

There was hence no significant statistical difference in perinatal mortality rates with breech delivery in whites and non-whites in our units.

In both racial groups perinatal mortality rates in complicated breech delivery was much greater than in the non-complicated variety.

PERINATAL MORTALITY IN RELATION TO THE DEGREE OF ANTENATAL CARE.

(TABLES 74-76)

Further analysis of breech delivery in relation to the degree of adequacy of antenatal care was undertaken, and the years 1953-55 were taken.

Altogether 906 breech deliveries occurred during this time, or an incidence of 4.4%. 585 patients or 64.5% were "booked" in our clinics.

IN "BOOKED" CASES.

As many as 23.7% of babies were lost of which 15.2% were stillborn and 10.0% neonatal deaths.

IN "NON-BOOKED" CASES.

44.8% of babies delivered were lost of which 33.3% were stillborn and 17.3% neonatal deaths.

Statistically therefore there was a significantly greater loss in "non-booked" as "booked" cases when delivered by the breech, in the ratio of almost 2 : 1.

IN WHITE PATIENTS ("BOOKED")

<u>UNIT</u>	<u>YEAR</u>	<u>NO.</u>	<u>PARITY</u>			<u>A.N.C</u>		<u>TOTAL LOSS</u>	
			<u>M.</u>	<u>P.</u>	<u>D.</u>	<u>E.</u>	<u>S.B.</u>	<u>N.N.D.</u>	
<u>P.M.H.</u>	<u>1952</u>	153	79	76	153	0	6	3	
	<u>1953</u>	153	76	79	124	29	2	5	
	<u>1954</u>	151	67	84	151	0	3	2	
	<u>1955</u>	133	81	52	133	0	3	2	
<u>N.S.H.</u>	<u>1952</u>	109	53	56	109	0	5	0	
	<u>1953</u>	79	43	36	79	0	4	1	
	<u>1954</u>	104	40	64	104	0	6	4	
	<u>1955</u>	70	31	39	70	0	4	0	
<u>M.M.H.</u>	<u>1952</u>	128	74	54	128	0	2	0	
	<u>1953</u>	159	103	56	158	1	1	4	
	<u>1954</u>	146	100	46	146	0	3	0	
	<u>1955</u>	114	73	41	113	1	3	1	
<u>ST.H.</u>	<u>1952</u>	44	30	14	44	0	0	1	
	<u>1953</u>	93	83	10	93	0	3	0	
	<u>1954</u>	54	42	12	54	0	0	0	
	<u>1955</u>	80	63	17	80	0	1	0	
<u>G.S.H.</u>	<u>1952</u>	2	0	2	2	0	0	0	
	<u>1953</u>	1	0	1	1	0	0	0	
	<u>1954</u>	6	2	2	4	2	2	0	
<b>TOTAL</b>		<b>1779</b>	<b>1040</b>	<b>739</b>	<b>1745</b>	<b>33</b>	<b>48</b>	<b>23</b>	
<u>Σ DEC</u>			58.1%	41.9%	97.9%	2.1%	2.6%	1.3%	
							3.9%		

EXTERNAL CEPHALIC VERSION. PERINATAL MORTALITY (1952-55)

TABLE 28.

More than 3½ times more babies were lost in "non-booked" as in "booked" white patients (72.0% : 20.0%).

IN NON-WHITES.

More than twice the number of babies were lost in "non-booked" as in "booked" cases (46.6% : 22.3%).

It was apparent therefore that although there was no significant difference in perinatal mortality rates in the racial groups when delivered by the breech statistically there was an obviously higher loss in patients without adequate antenatal care in both races.

The striking effects of external cephalic version in relation to the lowering of perinatal mortality rates was witnessed in our antenatal clinics. Where possible routine external cephalic version was performed with and without anaesthesia.

RESULTS FOLLOWING EXTERNAL CEPHALIC VERSION IN OUR UNITS.

(TABLES 27 and 28.)

During the period 1952-55 no fewer than external cephalic versions in 1779 cases were performed. There were 1040 multiparous and 739 primiparous patients, 1741 of whom were "booked" (97.9%) in our clinics.

Altogether 71 babies were lost or 3.9%, of which 2.6% were stillborn and 1.3% neonatal deaths.

IN WHITES.

2.15% of babies were lost subsequently after external cephalic version, of which 1.6% were stillborn and 0.9% neonatal deaths.

IN NON-WHITES.

Only 3.6% babies were lost subsequently in patients who had had external cephalic version earlier. 2.2% were stillborn and 0.7% neonatal deaths.

<u>WHITES</u>	<u>STILLBIRTHS</u>	<u>NEONATAL DEATHS</u>
547	9	5
<u>% age</u>	1.6	0.9
	2.5%	
<hr/>		
<u>NON-WHITES</u>		
842	25	6
<u>% age</u>	2.2	0.7
	3.6%	

EXTERNAL CEPHALIC VERSION. PERINATAL MORTALITY IN  
WHITES AND NON-WHITES (1952-55).

TABLE 29 a.

CAUSES OF STILLBIRTHS AND NEONATAL DEATHS FOLLOWING E.C.V.

<u>STILLBIRTHS.</u>		<u>NEONATAL DEATHS</u>	
	48		23
1. Maceration	20	1. No cause	9
2. Fresh S.D.'s.	3	2. Abnormality.	6
3. Cord prolapse.	3	3. Premature (no cause)	3
4. Transverse lie.	3	4. Following C.S.	2
5. Breech delivery	10	5. Forceps delivery.	1
6. Impacted shoulders.	1	6. Transverse lie (internal version)	1
7. Ruptured uterus.	1	7. Pneumonia	1
8. Accidental H.	4		
9. Abscus factor.	1		
10. W.R. +	2		

TABLE 29 b.

The causes of loss of infant life following external cephalic version are enumerated in table 28. Of the stillbirths there were 27 which were entirely unrelated to the manipulation of external cephalic version. Of the neonatal deaths 10 were in no measure produced by the manipulation.

In only 34 babies or 2.1% could the external version be blamed in any way for the loss of life following delivery and in 15 due to the external version itself (less than 1%).

The striking value of good antenatal care in the prevention of breech delivery by routine external cephalic was obvious from the results above. It could be said that had no antenatal care been offered in these patients, that had breech delivery been undertaken, almost 10 times a greater perinatal mortality would have ensued.

Hence early recognition of breech presentation and external version at 32 weeks pregnancy or thereabouts in the absence of contraindications such as antepartum haemorrhage, P.E.T., twin pregnancy, gross disproportion and the like, not of course forgetting the abnormally large baby, would certainly a large number of babies.

Peel and Clayton (1948), Freeth (1951), Kuhnel (1951), Seeley (1949), Fell (1953), Daley and Michael (1953), and others also advise external cephalic version where possible, even under anaesthesia.

Hall and Kohl (1956) demonstrated that with good antenatal care the foetal mortality with breech presentation was only 12.2%, whereas without supervision 28% of babies were lost.

Kuhnel(1951) after routine external version was able to reduce foetal losses to 0.5%(corrected).

Freeth and MacVine(1951) in uncomplicated cases were able to lower their mortality to only 2.3% after version, and Fell(1953) to 4%.

These authors were able to show only a small percentage of foetal deaths due to their manipulations, in the neighbourhood of 1.5-2.0%.

Cox(1950) however does not perform external cephalic version under anaesthesia because the foetal losses due to breech delivery in his hands were only 1.7% which compares favourably with a loss of 1.7% due to external version.

The same author maintained that with careful and skilled operation the mortality could be kept down to 3% with a higher loss when the baby weighed over 7 lbs(10%).

Pomerance and Daichman(1953) delivered 716 full term breeches with a loss of 4.5%, over 80% being born by the vaginal route!

Ludlam and Winchester(1953) emphasized that the uncomplicated breech should not have a mortality of more than 4 or 5% and advised external version without anaesthesia.

Dorr(1953) recorded a higher foetal loss in multiparae.

Hall and Kohl(1956) recorded a perinatal mortality of 23.7% with vaginal delivery, and 20% by caesarean section! They noted a 12.2% loss with antenatal care and 28% in its absence.

Cutts and Abbas(1951) at the Simpson Memorial Pavilion Edinburgh had a gross foetal mortality of 23.4% in 867 breech deliveries. More babies were lost in multiparae.

**BREECH DELIVERY (TOTAL). FOETAL LOSS IN  
COMPLICATED & UNCOMPLICATED VARIETIES. (TABLE 26)**

BREECH DELIVERY	NO.	B.	E.	PARITY		TOTAL LOSS		PARITY		LOSS		PREMS	TWINS	A. P. H.		CORD. COMPLI- -ATIONS	TOXAEMIA.
				M.	P.	SB.	NND	M.	P.	SB.	NND			PP.	AH.		
<b>COMPLICATED.</b>	740	456	284	502	238	204	94	143	61	61	33	365	231	42	69	62	171
<b>% AGE</b>	2.85	61.6	38.4	67.8	32.2	27.4	17.5	28.3	16.8	25.6	18.7	49.1*	31.1*	5.6	9.3	8.3*	23.0*
						*40.1%		*40.4%		*39.5%				14.9%*			
<b>UNCOMPLICATED.</b>	400	290	110	263	137	54	20	29	11	25	9	97	21	0	3	5	4
<b>% AGE</b>	1.54	72.5	37.5	65.7	34.3	13.5	4.4	11.0	4.7	18.2	8.0	24%*	5.0*	0	0.75*	1.1*	1.0*
						*18.5%		*15.2%		*24.4%							
<b>TOTAL</b>	1140	746	394	765	375	258	114	172	72	86	42	462	252	42	72	67	175
<b>% AGE</b>	4.4	65.4	34.6	67.1	32.9	22.6	12.8	22.4	12.1	22.9	14.5	40.4	22.0	3.6	6.3	5.8	15.3
														9.9%			
<b>TOTAL LOSS % AGE</b>						32.5%		*31.8%		*34.1%							

**BREECH DELIVERY. (WHITES & NON - WHITES). TOTAL  
FOETAL LOSS & ASSOCIATED COMPLICATIONS. (TABLE 27)**

<b>WHITES.</b>	113	77	36	72	41	17	12	11	9	5	4	43	28	1	5	7	33
<b>% AGE</b>		68.2	31.8	63.8	36.2	15.0	12.5	15.2	14.7	14.6	11.1	38.9	24.7	0.9	4.4	6.2	29.1
						25.6%		*27.7%		*21.9%				5.3%			
<b>NON - WHITES</b>	577	359	218	441	136	131	56	87	36	44	19	239	130	22	4.5	35	127
<b>% AGE</b>		62.2	37.8	76.4	33.6	32.4%		*27.8%		*46	4%	41%	22.5	3.8	7.7	6.0	22.0
														11.6%*			

PERINATAL MORTALITY IN COMPLICATED AND UNCOMPLICATED CASES.

(TABLES 23-29)

Almost twice as many babies were delivered of complicated cases as in uncomplicated in our units during 1952-55, with twice a greater perinatal mortality (40.1% : 18.5%)

The complicating factors noted were mainly antepartum haemorrhage, P.E.T., prolapse of the cord, prematurity of the baby and of course the more difficult confinement.

It would be wise to emphasize the importance of delivery of premature babies by the breech because of the much greater perinatal losses sustained by this type of infant. A discussion on this subject will be given later under tables 75-77.

PERINATAL MORTALITY IN WHITES AND NON-WHITES.

Although a greater number of babies were lost in non-whites delivered of "breech babies", statistically there was no significant difference in perinatal mortality in the racial groups. ( $\chi^2 = 1.9916$ ).

However in white patients there was a significant statistically lower perinatal mortality in uncomplicated breech delivery as compared with non-whites. In complicated delivery again there was no significant statistical difference in perinatal losses in the racial groups.

PERINATAL MORTALITY IN PRIMIPARAE AND MULTIPARAE.

There was no statistically significant difference in breech delivery in multiparae and primiparae delivered in our units during 1952-55 in relation to perinatal mortality. (31.8% : 34.1%).

In complicated breech delivery also there was no significant statistical difference in perinatal mortality in relation to parity (40.4% : 39.5%).

In uncomplicated breech delivery a significantly higher perinatal mortality was noted in primiparous women compared to multiparae. (24.4% : 15.2%).

In non-white primiparous patients delivered "by the breech" a statistically significant higher perinatal mortality occurred as compared with white patients similarly confined (46.4% : 21.9%). In multiparous patients there was no significant difference in perinatal losses in the racial groups. (27.7% : 27.8%).

Although there was no difference in perinatal mortality rates in primiparous and multiparous patients in breech delivery in white patients, in non-whites a much greater loss was sustained in primiparae (46.4% : 27.8%).

It can therefore be concluded that there was a high perinatal mortality in breech delivery in our units, similarly in multiparous and primiparous patients of both racial groups, although many more babies were salvaged in white primiparae as compared with non-whites.

In non-whites, primiparous breech delivery carried a much higher perinatal loss than in multiparae.

Of obvious importance as a contributory factor in the high perinatal losses in both races was the high incidence of prematurity, the incidence of which was similar in both races with breech delivery (38.9% : 41%).

So too was there a similar incidence of twin pregnancy with breech presentation in both races.

WEIGHT (lbs)	8 - 8½		8½ - 9		9 - 9½		9½ - 10		10 and over.		TOTAL LOSS		TOTAL NO.	% AGE
	M.	P.	M.	P.	M.	P.	M.	P.	M.	P.	M.	P.		
TOTAL BABIES.	32	10	24	5	15	3	7	1	9	2	87	21	108	12.1%
S.B.'s	1	3	2	0	4	1	1	0	1	0	9	4	13	} 27.7%
DEAD BIRTHS.	3	0	3	1	5	0	1	1	3	0	15	2	17	
NEONATAL DEATHS	1	0	1	0	0	0	0	0	0	0	2	0	2	2.5%
TOTAL LOSS.	5	3	6	1	9	1	2	1	4	0	26	6	32	20.6%
% AGE LOSS	15.6	30.0	25%	20%	60%	33.3%	28.5	100%	44.4%	0%	29.8	28.5		
	16.6		21.8		55.5		37.5		36.3		29.6			

BREECH PRESENTATION. (BABIES of 8 lbs and over.)

Foetal loss in primiparous and multiparous patients  
in weight groups of 8 lbs and over. (1953 - 1955)

(TABLE 306.)

PERINATAL MORTALITY IN BREECH DELIVERY IN PRIMIPAROUS PATIENTS  
UNDER AND OVER THE AGE OF 30 years.

During the years 1953-55, of 262 primiparous patients delivered, 240 were younger than 30 years. Of these, 90 babies or 37.5% were lost, of which 22.9% were stillborn, and 18.9% neonatal deaths.

Of 22 babies delivered "by the breech" in women over 30 years of age during the same period, the perinatal loss was 22.7% of which 13.6% were stillborn and 10.5% neonatal deaths.

There was hence no significant statistical difference in perinatal mortality in the two age groups.

PERINATAL MORTALITY IN BREECH DELIVERY ACCORDING TO THE BABY'S  
WEIGHT.

TABLE 30a

<u>WEIGHT GROUP (lbs)</u>	<u>TOTAL NO.</u>	<u>S.B.'s.</u>	<u>N.N.D.'s</u>	<u>P.N.M.</u>
5½ lbs and less	467(40.9%)	131(28.0%)	92(27.1%)	49.8%
Over 5½ to	565(37.0%)	97(17.1%)	20(4.2%)	20.7%
8 lbs and	108(12.1%)	30(27.7%)	2(2.5%)	29.6%

The above table indicates that nearly 50% of babies "delivered by the breech" in the premature group (5½ lbs and less) were lost. (see also tables 69 and 70).

Best results were obtained in breech delivery when the baby weighed between 5½ and 8 lbs.

Neonatal losses in the premature baby following breech delivery was significantly higher than in the 2 other weight groups.

Cox(1950) noted that the mortality for babies weighing 7½ lbs and more was 10%.

PERINATAL MORTALITY WITH BREECH DELIVERY FOLLOWING VERSIONIN LABOUR. (TABLES 39,41)

(GRAPH 5)

Breech delivery (including extraction) after internal and bipolar version is an extreme hazard for the foetus.

At University College, Ibadan, Nigeria during 1953-54, following version in labour, 25 out of 40 babies were lost, or a perinatal mortality rate of 62.8%. In "booked" cases the loss was 52.1% and in "non-booked" 86.6%.

IN OUR UNITS.

Out of 189 babies so manipulated during 1952-55, 122 or 65% were lost, of which 107 or 56.6% were stillborn and 15 or 8.3% neonatal deaths.

In "booked" cases the loss was nearly  $\frac{1}{2}$  that occurring in "non-booked" cases (43.6% : 82.3%).

In 36 cases version in labour was performed for twin pregnancy, 33 times for the 2nd of twins, and twice for a 1st twin. In 1 instance a second of triplets was "turned".

Internal version for cases associated with prolapse of the umbilical cord, followed by breech extraction resulted in a perinatal loss of 70.2%, of which 65.9% were stillborn.

When primary breech presentation was encountered with prolapse of the cord the perinatal loss was 40%.

Version in labour as a preliminary to breech delivery carried a high mortality therefore, especially when there was inadequate antenatal care.

SUMMARY AND CONCLUSIONS"BREECH PRESENTATION"INCIDENCE.

In our units during 1952-56 the incidence of breech presentation and delivery was 4.4%.

In "booked" patients the incidence was 3.5%, and in "non-booked" 7.8%.

In white patients the incidence was 2.65%, complicated cases being 1.8% and non-complicated 0.8%.

In non-whites the incidence of "breech" was 4.34%, complicated in 2.8% and 1.7% uncomplicated.

PERINATAL MORTALITY.

The startling perinatal losses associated with breech presentation and delivery in our units during 1952-56 revealed that almost 1/5th of all the losses suffered in our institutions was associated with this hazardous delivery. Nearly 20% of all our stillbirths and 16% of our neonatal deaths were found to occur with breech presentation (table 4)

As many as 372 or 32.5% of babies were lost, in whites 25.6% and in non-whites, 32.4%

There was no significant difference statistically in the perinatal losses in the racial groups.

In relation to antenatal care perinatal mortality was 23.7% in "booked" cases, and 44.8% in "non-booked".

(i) In white patients more than 3½ times more babies were lost in "non-booked" as "booked" cases.

(ii) In non-whites more than twice the mortality occurred in "non-booked" as "booked" cases.

The striking value of external cephalic version in reducing the incidence of breech presentation and delivery is outlined. With this manoeuvre the perinatal mortality rate was only 3.9%, which was 10 times lower than if breech delivery had been allowed to occur.

Complicated breech delivery was much more serious to the life of the baby as compared with uncomplicated delivery, twice a greater percentage of loss occurring in the former.

In relation to parity there was statistically no significant difference in breech delivery losses in multiparæ and primiparæ, as there was no difference in mortality in the complicated variety in both parities.

In uncomplicated breech delivery a significant higher mortality was noted in primiparous women compared with multiparæ.

In non-white primiparous patients statistically there was a higher perinatal mortality than in primiparous whites. In multiparous women there was no significant difference in perinatal losses in the racial groups.

Prematurity played a most important part in the high perinatal losses sustained, 40% of babies so delivered weighing 5½ lbs and less. Perinatal losses in premature babies were 49.8%, compared with a much lower mortality in babies over that weight.

Breech delivery following version in labour was a fatal procedure in our units, with a very high mortality.

It can be concluded that antenatal care will greatly reduce perinatal losses sustained with breech delivery, firstly by its prevention by external cephalic version, and by preventing complications.

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UNIT.	P.M.H.	N.S.H.	ST. MONICA.	M.M.H.	G.S.H.	TOTAL % AGE.	NO. AGE.	TOTAL LOSS.
YEAR.	52.53.54.55.	52.53.54.55.	52.53.54.55.	52.53.54.55.	52.53.54.			
TOTAL.	32.47.33.51.	29 40 41 44.	15 21 24 26.	17 19 17 14.	15 24 16.		525	
BOOKED.	24 29 30 37.	16 23 32 36.	13 21 18 18	15 14 14 12	4 11 6	72	373	
EMERGENCY.	8 18 3 14	13 17 9 8	2 0 6 8	2 5 3 2	11 13 10	28	152	
PRIMIPARA.	5 15 14 12	13 12 8 14	1 3 3 4	9 8 6 2	5 9 4	28	147	
MULTIPARA.	27 32 19 39	16 28 33 30	14 18 21 22	8 11 11 12	10 15 12	72	378	
S.B.'s	6 5 4 7	4 12 4 5	3 2 4 2	0 1 1 0	5 8 3	7.23	76	
1st TWIN.	3 1 0 3	2 6 2 0	1 2 1 0	0 0 0 0	2 3 0	34.2	26	
2nd TWIN.	3 4 4 4	2 6 2 5	2 0 3 2	0 1 1 0	3 5 3	65.8	50	
N.N.D.'s	7 16 3 12	4 2 7 6	2 3 3 8	4 4 0 0	0 7 6	9.13	89	
1st TWIN.	4 8 1 3	1 0 3 3	0 2 2 2	2 1 0 0	0 3 3	42.7	38	15.7
2nd TWIN.	3 8 2 9	3 2 4 3	2 1 1 1	2 3 0 0	0 4 3	57.3	51	
PREMS.	29 58 31 64	24 34 55 43	18 18 25 24	23 19 14 10	12 35 36	54.5	572	
CORD PROLAPSE.	5 0 2 3	0 2 4 2	0 1 0 0	0 0 0 2	0 1 1	4.38	23	
TOXAEMIA.	5 10 12 17	5 9 11 9	1 5 7 5	8 11 6 8	11 12 9	30.6	161	
BINOVULAR.	19 26 21 18	24 27 23 30	6 12 18 19	7 12 10 7	7 8 15	58.6	308	
S.B.'s	3 4 2 2	3 4 1 5	2 0 3 1	0 1 0 0	0 3 3	12.0	37	14.7%
N.N.D.'s	3 7 3 5	2 1 3 5	2 2 3 2	4 2 0 0	0 4 6	19.9	54	
UNIOVULAR.	8 18 8 26	4 12 15 14	1 2 6 7	9 5 7 7	3 15 1	32.9	168	
S.B.'s	3 1 1 4	0 6 3 0	1 0 1 1	0 0 1 0	0 4 0	15.4	26	16.3%
N.N.D.'s	2 9 0 4	2 1 4 1	0 0 0 1	0 2 0 0	0 3 0	20.4	29	
UNKNOWN.	5 3 4 7	1 2 3 0	8 7 0 0	1 2 0 0	5 1 0	9.3	49	
S.B.'s	0 0 1 1	1 2 0 0	0 2 0 0	0 0 0 0	5 1 0	26.5	13	19.3%
N.N.D.'s	2 0 0 3	0 0 0 0	0 1 0 0	0 0 0 0	0 0 0	16.6	6	

TWIN PREGNANCY.

Foetal loss and loss in 1st and 2nd TWINS.  
and associated complications. (TOTAL)

TABLE 31.

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MULTIPLE PREGNANCY

(TABLES 31, 32, 58, 59)

It is generally acknowledged that multiple pregnancy and an increased perinatal mortality go hand in hand because of the following factors:-

- (i) A large proportion of the infants born are premature.
- (ii) The incidence of P.E.T. is higher in multiple pregnancy.
- (iii) The incidence of abnormal presentation and complicated labour is greater than usual.

Many authorities have brought forward evidence to show that the perinatal mortality rate is inversely related to the number of foetuses in the uterus.

It is the purpose of this paper to analyse the incidence of multiple pregnancy in our units compared that occurring in other centres, and perinatal mortality in relation to the degree of antenatal care. A later appraisal of the significance of premature birth in multiple pregnancy is given under the chapter on prematurity.

INCIDENCE OF MULTIPLE PREGNANCY.IN OUR UNITS:

During the years 1952-55 the incidence of twin pregnancy was 1 in 48.

In whites at the Mowbray H.H. the incidence was 1 in 60 and in non-whites at the Somerset and Groote Schuur Hospitals and St. Monica's Home 1 in 47.

During the same period the incidence of triplet pregnancy was 1 in 785.

INCIDENCE OF TWIN PREGNANCY IN OTHER CENTRES.

The Lellin-Zeleny hypothesis of multiple births records a moderately exact mathematical relationship existing in the rate of occurrence between the various magnitudes of human multiple gestation.

The dictum is as follows:-

"If twinning frequency of samples of the population was  $1/N$ , then triplets will occur in the figure  $1/N^2$ , and quadruplets  $1/N^3$ ."

Guttmacher(1953) doubts the validity of the above hypothesis. He analysed 57 million deliveries in the U.S.A. between 1928 and 1949 and discovered that twins occurred in 1.108% and triplets in 1 in 0.0108 %. The frequency of triplets therefore should have been 0.0122 according to this hypothesis, if it were a precise mathematical law. In the white population of the U.S.A. he found the incidence of twins to be 1 in 92, and in non-whites (negroes) 1 in 73. In triplet pregnancy the incidences were 1 in 9828 in whites, and 1 in 5631 in non-whites.

According to the same author the highest frequency of twinning was among the negro race and the lowest in Mongoloids. Among 12 nations of the world (excluding Africa) the incidence of twins and triplets in the order of frequency was (i) Norway, (ii) Netherlands, (iii) Germany, (iv) Bulgaria, (v) Scotland, (vi) Hungary, (vii) Italy, (viii) U.S.A., (ix) France, (x) Australia, (xi) Argentina, (xii) Japan.

Guttmacher further noted that the twinning tendency rises consistently until the age of 39 years, and then falls abruptly.

Lawson and Lister(1954) from the obstetric unit at University College, Ibadan, Nigeria, reported an incidence of multiple pregnancy of 1 in 18 in the period of 18 months April 1952-December 1954. In "booked" cases their incidence was 1 in 24. The incidence of triplet pregnancy was 1 in 1000.

A report from The Wesley Guild Hospital, Ilesha, West Nigeria, for the period 1st September 1958-31st August 1959 by D.A.H. Cannon showed an incidence of twin pregnancy of 1 in 19 pregnancies.

Lavery(1955) reported an incidence of 1 in 26 pregnancies in the native population at Baragwanath, Transvaal.

Nixon, Collins and Fisher(1956) found no difference in the incidence of twin pregnancy among Africans as compared with whites in Northern Rhodesia.

Anderson(1956) from Scotland noted an incidence of twins of 1 in 66 in 397 pregnancies. In the Registrar General's figures for Scotland during 1939-52 the incidence of twins was noted as 1 in 72.

Anderson also found that the incidence of twins increases with age and reaches its maximum in the 30-39 year group. Increasing parity had the same effect. This confirmed the opinions of McArthur(1953) and Stocks(1953).

It is apparent therefore that the twinning tendency is much higher in the Non-white race, especially in Africans. This fact of course is of the utmost significance in relation to perinatal mortality in the racial groups, because of the high prematurity rate associated with multiple pregnancy.

<u>WHITES</u>	<u>%Age</u>	<u>NON-WHITES</u>	<u>% Age</u>	
<u>TOTAL</u>	67	1.57 (1 in 63)	295	2.21. (1 in 44)
<u>BOOKED</u>	55	82.0	198	67.0
<u>N.B.</u>	12	18.0	97	33.0
<u>PRIMIPARA.</u>	25	37.3	76	25.7
<u>M.PARA.</u>	42	62.7	119	74.3
<u>S.B.'s.</u>	2	1.5 *	52	8.81*
<u>1st TWIN.</u>	0	0.0	19	6.44*
<u>2nd TWIN.</u>	2	2.9	33	11.18*
<u>N.N.D.'s.</u>	8	6.06*	48	18.13*
<u>1st TWIN.</u>	3	4.4	19	6.81*
<u>2nd TWIN.</u>	5	7.8	29	11.07*
<u>PREMS.</u>	66	49.3 *	324	54.9 *
<u>CORD PROLAPSE.</u>	2	2.9	11	3.7
<u>P.E.T.</u>	33	49.2	84	28.5
<u>BINOVULAR.</u>	36	53.7	189	64.0
<u>S.B.'S.</u>	1	1.4	25	6.6
<u>N.N.D.'s.</u>	2	2.8	30	8.5
<u>UNIOVULAR.</u>	28	41.8	80	27.1
<u>S.B.'s.</u>	1	1.8	16	10.0
<u>N.N.D.'s.</u>	2	3.6	12	7.3
<u>UNKNOWN.</u>	3	4.5	27	8.9
<u>S.B.'s.</u>	0	0.0	11	20.3
<u>N.N.D.'s</u>	0	0.0	1	2.3

TWIN PREGNANCY. INCIDENCE, PERINATAL MORTALITY, AND  
(1952-55) COMPLICATIONS IN WHITES AND NON-WHITES.

TABLE 31 a.

PERINATAL MORTALITY IN MULTIPLE PREGNANCY. (TABLES 31,32)IN OUR UNITS.

Of 1050 babies born of twin pregnancies during 1952-55 inclusive, 165 or 15.7% were lost, of which 76 or 7.23 were stillborn and 89 or 9.13 were neonatal deaths.

Of 33 babies delivered in 11 triplet pregnancies 17 or 51.7% were lost, 6 or 14.5% being stillborn and 11 or 40.7% neonatal deaths.

The perinatal mortality for multiple pregnancy in our units was therefore 16.8%, of which 7.5% were stillbirths and 9.9% neonatal deaths.

IN WHITES (NOWBRAY M.H.)

During 1952-55, as many as 134 babies were delivered from 67 twin pregnancies, and 10 or 7.46% babies were lost, of which 2 or 1.5% were stillborn and 8 or 6% neonatal deaths.

IN NON-WHITES.

During the same period 592 babies were born of twin pregnancies, and 95 or 16.1% were lost of which 52 or 8.7% were stillborn and 43 or 7.9% neonatal deaths.

There was hence a higher perinatal mortality rate in non-white twin pregnancy, both in total loss and stillbirth rates. Neonatal losses were similar in the racial groups.

The importance of prematurity as a cause of the higher losses in the non-white will be discussed later under "PREMATURITY".

PERINATAL MORTALITY IN INDIVIDUAL OF TWIN PREGNANCY. (TABLE 33)THE FIRST OF TWINS.

Of 525 babies delivered 645 were lost or a perinatal mortality rate of 12.2% of which 26 or 4.93% were stillborn, and 38 or 7.6% neonatal deaths.

THE SECOND OF TWINS.

Altogether 101 babies were lost or 19.5%, of which 50 or 9.5% were stillborn, and 51 or 10.7% neonatal deaths.

There was hence a significantly higher perinatal mortality rate in the second of twins, especially as far as stillbirths was concerned. There was not such a significant difference in neonatal deaths rates in the individual babies, mainly because of the large percentage of premature babies delivered.

<u>CAUSE OF DEATH</u>	<u>1ST TWIN</u>	<u>2ND TWIN</u>
Unknown (fresh)	9	22
Unknown (macerated)	6	11
Eclampsia	2	3
P.E.T.	1	2
Prolapse of cord	4	1
Antepartum haemorrhage	1	1
Obstructed labour		
(i) Transverse lie	0	5 (No F.H.S. in 3)
(ii) Breech	1	3 (No F.H.S. in 2)
(iii) Vertex	0	1
Intracranial haemorrhage	2	0
Haemangioma placentae	0	1
<b>TOTAL</b>	<b>26</b>	<b>50</b>

TABLE 33

Stillbirth occurred in 48 or 63.1% for no known cause. Of these babies 17 or 35.4% were macerated and 31 or 64.6% were fresh stillbirths, the majority of whom were premature.

In 33 babies delivered with unknown cause of death they were the 2nd of twins.

P.E.T. was associated with loss of 8 babies or 10.5%, and antepartum haemorrhage in 2 or 2.6%.

The hazards of labour accounted for 16 stillbirths or 21%, 5 in the first twin and 11 in the second.

#### NEONATAL DEATHS IN TWIN PREGNANCY.

The vast majority of neonatal deaths of which there were 89, were premature, in which no definite cause could be found for the loss of life. In the first of the twins 38 deaths occurred or 42.7%, and in the second twin 51 or 57.3%.

#### TRIPLET PREGNANCY.

Of 33 babies delivered in 11 pregnancies, 6 or 18.1% were stillborn and 11 or 40.7% neonatal deaths. The perinatal mortality rate was therefore 51.7%.

#### CAUSES OF DEATH IN TRIPLET PREGNANCY.

In all, 6 stillbirths (5 premature) the cause of death was not ascertained. Of 11 neonatal deaths 9 babies were premature, and no known cause for death was found.

#### PERINATAL MORTALITY IN ALL CASES OF MULTIPLE PREGNANCY.

Of 182 babies lost in twin and triplet pregnancy 68 were 1st babies (37.2%), 108 were second babies (59.3%), and 6 were third babies (3.5%).

In 31.3% of all foetal losses no apparent cause of loss of life could be ascertained. Prematurity appeared to

be the most important cause contributing to death, in the majority of foetal deaths.

At University College, Ibadan, during 1953-54, of 1st babies of twins 33.1% were lost, compared with 42.9% of the second.

Fenton and D'Esopo (1951) found that 72.7% of 1st twins were lost compared with 11.1% of the second twin.

Bender (1952) in a series of 472 twins reported a loss of 39 babies of the first of twins (7 stillbirths and 32 neonatal deaths), and 44 of second twins (10 stillbirths and 34 neonatal deaths). He stressed that operative delivery of the 2nd of twins was not associated with an increased mortality rate. A prolonged interval between delivery of the 1st and 2nd babies was of no significance in increasing mortality.

#### P.E.T. AND MULTIPLE PREGNANCY.

Another of the reasons for the higher perinatal mortality in multiple pregnancy was the higher incidence of P.E.T. in multiple pregnancy, and consequently a higher incidence of prematurity.

Of 525 twin pregnancies and 11 triplet pregnancies P.E.T. was found to exist in 30.3%.

Indirectly P.E.T. was responsible for a greater loss of infant life because of the premature termination of pregnancy (spontaneous and surgical).

It was of interest to note that at University College, Ibadan, there were only 10 cases of twin pregnancy associated with P.E.T. or an incidence of 3.2%, compared with the total incidence of 1.1% in all pregnancies.

MULTIPLE PREGNANCY AND PROLAPSE OF THE UMBILICAL CORD.

Of 49 babies delivered in which prolapse of the cord had been encountered, i.e. in 4.5% of cases, 6 babies were lost, with a perinatal loss of 12.6%. Stillbirths accounted for 5 babies and neonatal deaths, one.

HYDRAMNIOS IN MULTIPLE PREGNANCY.

Bender (1952) and Potter and Crunden (1941) found that twice more babies were lost in the presence of hydramnios in multiple pregnancy as when hydramnios was not present.

The seriousness of hydramnios in multiple pregnancy was noted in our units during 1952-55, when of 27 babies born (24 in twin pregnancy and 3 in triplet pregnancy) 15 babies or 55.5% were lost.

PERINATAL MORTALITY IN TWIN PREGNANCY ACCORDING TO THE DEGREE OF ANTENATAL CARE. (TABLES 59,60)

During 1953-55 the incidence of twin pregnancy in our units was 4.0% or 1 in 49.

In "booked" cases the incidence was 3.08% and in "non-booked" 5.00%.

Altogether of 836 babies delivered 147 or 17.6% were lost, of which 8.7% were stillborn and 8.8% neonatal deaths.

IN "BOOKED" CASES.

Of 631 babies born 91 or 14.4% were lost of which 7.2% were stillborn and 7.4% neonatal deaths.

IN "NON-BOOKED" CASES.

Of 205 babies delivered 56 or 27.3% were lost of which 13.1% were stillborn and 16.9% neonatal deaths.

There was hence almost twice a larger perinatal mortality rate in "non-booked" twin pregnancy as in "booked" cases, the incidence of the latter being significantly higher.

PERINATAL MORTALITY IN TWIN PREGNANCY IN RELATION TO ANTENATAL CARE IN THE RACIAL GROUPS.

IN WHITE PATIENTS (MOWBRAY M.H.)

Of 100 babies born 80% were from mothers "booked" in our clinics. Only 3 babies were lost, or 3% of which 2 were stillborn and 1 neonatal death.

In "non-booked" cases 20% of babies were lost.

IN NON-WHITES (SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. MONICA'S HOME)

Of 484 babies delivered from mothers who were "booked" in our clinics (70%), 17.7% were lost, of which 8.2% were stillborn and 10.3% neonatal deaths.

There was hence a significantly higher perinatal mortality rate in "non-whites" as compared with whites (17.7% : 3%). Both stillbirth and neonatal mortality rates were also greater.

Apart from poorer socio-economic conditions in the non-white as a cause for the larger losses in the birth of twins, antenatal care played not a small part in the greater mortality. The inability to provide adequate accommodation for hospitalization in the non-white in the latter weeks of pregnancy was a major factor, more premature babies being delivered of this race, and hence a bigger perinatal loss.

In "non-booked" cases in non-whites the perinatal losses were 18.6%, of which stillbirths accounted for 12.4% and neonatal deaths 7.1%.

There was therefore no significant statistical difference in perinatal mortality rates in non-whites in "booked" and "non-booked" cases, again for the reason that the "booked" patient's antenatal care was not adequate, apart from poor socio-economic circumstances.

Similarly from the University College, Ibadan, where in "booked" and "non-booked" patients the antenatal care was poor because of non-attendance at the clinics, perinatal mortality rates were high. Here also inadequate bed accommodation played an important part in the poor prenatal care. In "booked" cases the perinatal mortality rate was 32.2%, of which 9.9% were stillborn, and 24.7% neonatal deaths. In "non-booked" cases the perinatal loss was 50.4%, with a stillbirth rate of 33.3% and neonatal loss of 25.3%. The high percentage of very premature babies delivered at the above unit (over 80%) was a contributory factor in the high losses sustained.

#### PERINATAL MORTALITY RATE IN RELATION TO PREMATUREITY OF THE BABY.

A fuller discussion on this aspect will be outlined later under "Prematurity".

As high a prematurity rate as 54% in twin pregnancy occurred in our units during 1952-55. In whites the rate was 49.3% and in "non-whites, 55.9%. More small babies weighing 4 lbs. and less were born in non-whites.

#### PERINATAL MORTALITY RATES IN TWIN PREGNANCY IN OTHER CENTRES.

A comparison of the losses in our units with twin pregnancy, as compared with other centres showed as follows:-

<u>AUTHOR</u>	<u>CENTRE</u>	<u>TOTAL CASES</u>	<u>GROSS LOSS(%)</u>
McClure(1927-36)	Delfast	164	11.1
Potter and Crunden(1941)	Chicago	332	13.8
Munnell and Taylor(1946)	New York	135	28.0
Hawkins and Allen(1949)	St.Louis	145	22.0
Potter and Fuller(1949)	Chicago	252	14.0
Bender(1952)	Liverpool	472	11.0
Anderson(1956)	Scotland		
(i) 1938-42			4.2
(ii) 1943-47			5.3
(iii) 1948-52			3.9
Guttmacher(1939)	U.S.A.	277	31.0
St.Mary's(1944)	Manchester	?	16.0
? (1946)	Liverpool	?	10.6
? (1946)	Edinburgh	?	17.9
? (1947)	Newcastle	?	11.1
U.C.T.(1952-55)	Cape Town	525	15.7
U?C.I.(1953-54)	Nigeria	310	38.7

TABLE 34

It is apparent that perinatal mortality rates with twin pregnancy in other centres are higher than with single pregnancy.

Sutherland(1949) reported that the stillbirth rate in England and Wales for the years 1939-45 for single births was 35.5 per thousand births, compared with a loss of 66.9 for twins and 96.7 for triplets.

Guttmacher(1956) in totalling 6 twin series found an uncorrected mortality of 14.6%, which was 3 to 4 times that for single births.

Fenton and D'Esopo(1951) found the loss of the first of twins to be 72.7% compared with 11.1% in the second.

Kurtz,Keating and Loftus(1955) noted that the birth hazard of the second twin to be higher than that of the first.

Bender(1952) in a series of 472 twin pregnancies reported a greater loss of the second of twins as compared with the first twin.

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SUMMARY AND CONCLUSIONS.

"MULTIPLE PREGNANCY"

Multiple pregnancy(twins and triplets) occurred with greater frequency than in most other centres mainly because of the greater incidence in non-whites in our units.

Similarly in other non-white centres,especially in Africa,the incidence of twin pregnancy was higher than in white centres.

Our incidence was 1 in 48, in whites 1 in 60 and in non-whites 1 in 47.

Perinatal mortality rates in twin pregnancy was higher than in single births in our units(15.7% : 7.04%) mainly because of the larger numbers of premature babies delivered,associated with an increased incidence of P.E.T., hydramnios with its complications,malpresentations,and abnormal delivery.

In our units the perinatal mortality rate was 15.7%, with greater losses in non-whites as whites.

The effects of the degree of antenatal care in relation to perinatal losses are noted,and the higher mortality in "non-booked" as compared with "booked" cases is recorded. Similarly in "non-whites",in whom antenatal care was inferior because of inadequate care apart from socio-economic status,the perinatal losses were higher

than in white patients.

There was a larger perinatal loss in the second of twins as compared with the first. The causes of death of the individual babies are recorded.

The significance of prematurity as a contributory factor in the high perinatal losses sustained in our units is mentioned, a more detailed report on this aspect being noted later under "prematurity".

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UNIT and YEAR	NO.	P.	M.	BOOKED		NON-BOOKED		TOTAL LOSS		TRIAL & FAILED		S.B.	
				NO.	LOSS.	NO	LOSS	S.B.	N.N.D.	FORCEPS			
P.M.H.	1952	84	67	17	69	4 S.B.	15	2 S.B. 1 N.N.D.	6	1	3	2 C.S. (ALIVE) 1 CRANIOTOMY (F.F.)	1
	1953	102	66	36	69	1 S.B. 1 N.N.D.	33	11 S.B. 3 N.N.D.	12	4	5	3 C.S. (3 Const Ring) 2 "TRIALS" (SUCCESSFUL)	
	1954	160	126	34	138	5 S.B. 2 N.N.D.	22	1 S.B.	6	2	-		
	1955	122	78	44	90	4 S.B. 3 N.N.D.	32	5 S.B.	9	3	-		
	1952	92	65	27	75	5 S.B. 3 N.N.D.	17	5 S.B.	10	3	6	4 TRIAL FORCEPS (C.S.) (1 MATERNAL DEATH) UNDELIVERED 1 F.F.	
N.S.H.	1953	67	44	23	53	1 S.B. 3 N.N.D. 5 S.B.	14	3 S.B. 2 N.N.D. 4 S.B.	4	5	3	3 C.S. (1 N.N.D.) 2 F.F. 1 Ruptured Uterus	-
	1954	95	70	25	65	4 N.N.D.	30	4 N.N.D.	9	8	9	1 INTERNAL VERSION 7 "TRIALS" (ALIVE)	2
	1955	101	73	28	65	4 S.B. 1 N.N.D.	36	7 S.B. 2 N.N.D.	11	3	-		
	1952	49	38	11	40	-	9	2 S.B.	2	-	-	1 C.S. (ALIVE) Ruptured Uterus (F.F.)	1
M.M.H.	1953	65	45	20	53	2 S.B.	12	-	2	-	2		
	1954	47	40	7	39	1 S.B.	8	1 S.B. 1 N.N.D.	2	1	-		
	1955	61	48	13	53	-	8	1 S.B. 1 N.N.D.	1	1	-		
	1952	18	7	11	13	1 S.B. 2 S.B.	5	- 1 S.B.	1	-	3	3 C.S. (ALIVE) 2 C.S. (ALIVE)	-
St. M.	1953	32	19	13	26	1 N.N.D.	6	-	3	1	2	-	-
	1954	36	25	11	26	1 S.B.	10	1 S.B.	2	-	3	"TRIAL" FORCEPS	-
	1955	37	20	17	18	-	19	5 N.N.D. 2 S.B.	2	5	-		
	1952	31	21	10	9	-	22	3 S.B. 1 N.N.D.	3	1	4	1 C.S. (ALIVE) 1 Int. Version (ALIVE) 1 CRANIOTOMY & 1 EVISCERATION 1 "TRIAL" (ALIVE)	2
G.S.H.	1953	45	29	16	15	-	30	6 S.B. 3 N.N.D.	6	3	-		
	1954	36	23	13	12	-	24	2 S.B. 1 N.N.D.	2	3	4	2 C.S. (ALIVE) 2 F.F.	2
	1955	36	23	13	12	1 N.N.D.	24	2 S.B. 1 N.N.D.	2	3	4		
TOTAL.	1281	904	377	927	36 S.B. 20 N.N.D.	354	57 S.B. 24 N.N.D.	93	44	44	F.F. 13 TRIAL 31	13	
% AGE.	4.93	70.6%	29.4%	72.2%	3.8% 2.2% 6%	27.8%	16.1% 8.0% 22.8% *	7.2%	3.7%	3.4%	10.7%	31.7%	

FORCEPS EXTRACTION.

FOETAL LOSS IN RELATION TO BOOKED AND  
NON-BOOKED PATIENTS & "TRIAL" & "FAILED" FORCEPS.

TABLE 35.

**(3) FORCEPS EXTRACTION.****(TABLES 35,36,37,38,and 39)**

Although the ideal delivery is a spontaneous one, a timely application of the forceps or caesarean section may save life on many occasions besides being in the best interests of the mother.

It is realized that in the hands of the expert performing this operation daily, fewer infants are being lost, than if he applies forceps only occasionally. The occasion for the application of the "high" forceps has surely been relegated almost completely to the archives of obstetrical operations because of the higher perinatal mortality and maternal losses associated with such an operation.

The necessity for the operation of "trial forceps" has in my opinion come to stay, but such an undertaking should only be attempted in an institution with facilities for abdominal section should such "trial" be unsuccessful or hazardous.

It should be emphasized that besides the major injuries inflicted on the infant by "simple" forceps delivery, later focal incapacity as witnessed by cerebral palsies are not infrequent, although not manifest at the time of delivery (Bobath).

The following commentary is presented to note mainly the effects of antenatal care on perinatal mortality following forceps extraction.

**INCIDENCE OF FORCEPS EXTRACTION.****IN OUR UNITS.**

During the years 1952-55 the incidence of forceps extraction was 4.93%.

Altogether 1281 babies were delivered by this method.

FORCEPS EXTRACTION. FOETAL LOSS IN RELATION TO WHITES AND NON - WHITES. BOOKED AND NON - BOOKED CASES. (1952-1955)											
	NO.	BOOKED		NON - BOOKED			TOTAL LOSS		FAILED.		
		NO.	LOSS	NO.	LOSS.		SB.	NND.	NO.	LOSS	
			SB.	NND.		SB.	NND.			NO.	LOSS
										SB.	
NON-WHITE.	690	377	19	14	313	34	18	53	32	34	8
	(117%) 5.2%	63.5%	5%	3.6%	36.5%	15.9%	10.7%	8.9%	5.9%	4.9%	23.5%
			* 8.7%			* 24.4%		15.4% *		*	
WHITE.	220	183	3	-	37	4	2	7	1	2	1
	5.9%	82.3%	1.6%	-	17.7%	10.5%	6.2%	3.1%	0.4%	0.9%	50%
			* 1.6%			* 16.2%		3.6% *		*	

TABLE 36

OCCIPITO - POSTERIOR AND ARREST IN TRANSVERSE DIAMETER.

FOETAL LOSS IN WHITE AND NON - WHITES ACCORDING TO METHOD  
OF DELIVERY (1952-1955)

RACE.	TOTAL.	FORCEPS				C.S.		SPONTANEOUS		TOTAL LOSS		CRANIOTOMY	INTERNAL VERSION	D.T.A.					
	P.O.P.	MR. NO. MR.						(P.O.P)						MR and forceps.					
	and D.T.A.	SB.	NND.	SB.	NND.	SB.	NND.	SB.	NND.	SB.	NND.	SB.							
WHITES.	192	(18)	1	0	(22)	1	0	(20)	0	1	1	1	0	1 S.B. (P.F.)	(19) No Loss				
% AGE	(4.5)	6.2	-	4.5	-	5.0	-	0.9	0.9	2.8	0.5								
		6.2%		4.5%		5.0%		1.7%		3.1%									
		(101)	4	13	(48)	3	4	(87)	2	4	10	4	(209)	24	25	3	(6)	4 S.B.	2 S.B.
NON - WHITES.	522																		
% AGE.	3.9	3.9	14.7	6.6	9.0	2.3	4.8	4.7	2.0	5.1	5.0	100%	80.0						2.7%
		16.8%		14.5%		6.9%		6.7%		9.9%									

TABLE 37

INCIDENCE OF FORCEPS EXTRACTION IN WHITE PATIENTS, AND NON-WHITES.

In whites delivered at the Howbray Maternity Hospital during 1952-55, the incidence was 5.1%.

In non-whites delivered at the Somerset Hospital, Grootte Schuur Hospital and St. Monica's Home, the incidence was 5.2%.

In 70.6% of cases the patients subjected to forceps extraction were primiparous, and 72.2% were "booked" in our clinics.

In "booked" cases the incidence of forceps extraction was 4.4%, whereas in "non-booked" it was 8.0%.

The relatively low incidence of this operation in our units was difficult to explain both in white and non-white patients. In the latter, many of whom were natives, a lower incidence was expected because of the fact that this race were superior parturients to whites and coloureds.

However one should emphasize that many of the non-whites admitted to our units often delayed their entry to hospital "until the last minute" after protracted labours, and were delivered spontaneously.

In whites the low incidence of forceps extraction in our units was inexplicable.

INCIDENCE OF FORCEPS EXTRACTION IN OTHER CENTRES.

Jeffcoate (1953) discussed the modern trends in the use of forceps. In hospital deliveries he noted that forceps were being used with increasing frequency. At Liverpool Maternity Hospital in 1950 the forceps rate was 16-17%. At Queen Charlotte's Hospital in 1951, 13.4% of patients were being so delivered. Jeffcoate maintains that associated with the increased use of forceps the risks with such delivery are decreased.

At University College, Ibadan, Nigeria, the incidence of forceps extraction during an 18 months period (1953-54) was only 2.3%. This institution catered only for non-whites, who very frequently were admitted late in labour, and often after many hours. The foetus was commonly already dead in utero, and was extracted by destructive operation such as craniotomy which was commonly performed.

In so-called "booked" cases at Ibadan (many of whom attended infrequently at antenatal clinics) the incidence of forceps was only 1.7%, and in "non-booked" cases 4.1%.

#### PERINATAL MORTALITY WITH FORCEPS EXTRACTION.

In 3522 forceps extractions at the Liverpool Maternity Hospital for the years 1936-50, the perinatal loss was only 2%.

At Queen Charlotte's Hospital during the same period the perinatal mortality was only 5%.

At both of the above institutions the majority of patients had received excellent antenatal care.

Cosgrove and Weaver (1957) reported 1000 forceps operations with a stillbirth rate of 1.3%. With low forceps in 818 cases only 23 infants or 2.8% were lost, whereas following midforceps in 182 instances 18.2% of babies were stillborn, or died in the neonatal period.

Randall (1952) recorded 471 forceps extractions in babies with persistent occipito posterior positions. With low forceps the loss was only 1 baby in 89 delivered. After midforceps preceded by manual rotation of the foetal head, the perinatal loss was 6.6%. The perinatal mortality with forceps extraction without manual rotation was 5.8%.

The calamitous consequences following "failed" forceps to both mother and baby are well known.

Law(1953) reported 37 cases with a perinatal loss of 24.3%.

Gadd(1954) recorded a 28% loss following 100 such failures.

Freeth(1950) reported 38 babies having been lost following 100 "failed" forceps operations.

At University College, Ibadan, Nigeria, during 1953-54 following 134 forceps extractions 43 babies were lost, or a perinatal mortality of 32.1%, of which 22.4% were stillborn and 12.5% neonatal deaths. In "booked" cases, many of whom were admitted after long labours, as much as 22.9% were lost. In "non-booked" patients, the mortality was 47.0%.

In premature babies delivered at this latter unit, the perinatal mortality was as high as 30.7%, compared with a 32.4% in mature babies, many of which were delivered following perforation.

The disastrous results of inadequate prenatal care was very apparent at Ibadan.

#### PERINATAL MORTALITY FOLLOWING FORCEPS EXTRACTION IN OUR UNITS.

During the years 1952-55 inclusive, 1231 babies were delivered by forceps and 137 or 10.7% were lost, of which 93 or 7.2% were stillborn, and 44 or 3.7% neonatal deaths.

In white patients (Howbray Maternity Hospital) the perinatal mortality was 3.6%, of which 3.1% were stillbirths, and 0.4% neonatal deaths.

In non-whites (Somerset and Groote Schuur Hospitals, and St. Monica's Home) the perinatal loss was 15.4%, of which 8.9% were stillborn and 5.9% neonatal deaths.

PERINATAL MORTALITY IN FORCEPS EXTRACTION ACCORDING TO  
THE DEGREE OF ANTENATAL CARE. (TABLES 35,36,80)

Of 1281 forceps deliveries 927 or 72.3% were in "booked" cases, and 354 or 27.7% in "non-booked" cases during 1952-55.

During the same period the incidence of forceps was 4.4% in "booked" patients, and 8.0% in "non-booked".

In the 3 year period 1953-55 the incidence was 4.3% in "booked" cases and 7.0% in "non-booked".

PERINATAL MORTALITY IN "BOOKED" CASES.

Of 927 forceps extractions in mothers who had attended our antenatal clinics, 56 or 6.0% of babies were lost, of which 36 or 3.8% were stillborn, and 20 or 2.2% neonatal deaths.

IN WHITE PATIENTS only 1.6% of babies were lost, whereas in NON-WHITES the loss was 8.7%. Almost 20% less non-white women received antenatal care in our clinics, and often delayed their entry into hospital until many hours in excess of 24 hours. Frequently hence there were signs of foetal distress and not infrequently an absence of foetal heart sounds.

PERINATAL MORTALITY IN "NON-BOOKED" CASES.

Of 354 babies delivered 22.8% were lost in patients who had not attended our clinics.

There was hence a significant statistically greater perinatal loss in patients not receiving antenatal care in our units in the ratio of almost 4 : 1. Both stillbirth and neonatal death rates were 4 times greater in "non-booked" cases.

IN WHITES the perinatal mortality in "non-booked" cases was 16.2%, compared with a loss of 24.4% in NON-WHITES". This difference in mortality was not significant statistically.

It was apparent therefore that with adequate prenatal care, perinatal mortality rates following forceps extraction

UNIT and YEAR	P.O.P. NO.	FORCEPS EXTRACTION				C.S.		SPONTANEOUS (P.O.P.)		TOTAL LOSS		CRANIOTOMY	INT. VERSION	D.T.A. M.R. FORCEPS		C.S.	
		WITH M.R.		NO. M.R.		SB.	NND.	SB.	NND.	SB.	NND.			SB.	NND.	SB.	NND.
P.M.H. 1952	85	2	17	0	0	1	23	1	1	5	3	1	0	0	0	0	0
1953	96	0	11	0	2	0	21	1	2	4	2	0	0	0	19	1	0
1954	99	1	17	2	0	1	29	1	4	13	4	3	rotation with forceps (SB)	1	11	0	0
1955	77	0	14	0	0	2	11	1	2	7	1	1	0	1	8	0	1
M.S.H. 1952	65	0	9	0	1	10	13	0	0	2	1	0	vs.B.	0	6	0	0
1953	70	1	9	4	1	10	26	0	1	3	7	0	1 (SB)	0	23	0	0
1954	62	1	15	3	0	0	9	0	0	1	4	0	0	0	4	0	0
1955	55	1	15	3	0	0	9	1	4	2	8	6	18B 1NND	0	18	0	0
M.M.H. 1952	49	1	2	0	0	0	4	0	0	0	0	0	0	0	5	0	0
1953	48	0	6	0	1	0	9	0	0	0	1	0	0	0	0	0	0
1954	47	0	7	0	0	0	10	0	0	0	1	0	1EF. IV. (SB)	0	12	0	0
1955	29	0	2	0	0	0	0	0	1	2	1	0	0	0	1	0	0
ST. M. 1952	18	0	2	1	0	0	4	1	0	0	2	0	0	0	3	0	2
1953	47	0	7	0	0	0	5	0	1	0	3	0	0	1	7	0	1
1954	34	0	4	0	0	1	5	0	0	1	1	0	0	1	4	0	0
1955	22	0	3	0	0	0	2	0	2	0	0	0	1	0	0	0	0
G.S.H. 1952	29	0	5	0	0	0	7	0	1	1	3	1	2 (NO. RMS)	0	5	0	0
1953	28	1	5	1	0	0	5	1	1	0	2	3	0	0	0	0	1
1954	17	0	3	1	1	0	8	0	0	2	1	0	0	1	1	0	0
TOTAL	977	8	176	15	6	5	190	9	20	7	61	38	7	6 SB. 1 NND	5	127	1
% AGE	5.77	4.5	18	8.8	4.4	13.9	3.8	3.6	4.9	4.3	1.5	5.5	3.6	0.7	4.0	0.8	25% 12%
		13.9%			8.0%		8.4%		5.9%		8.9%				4.8%		35%

OCCIPITO - POSTERIOR & ARREST IN TRANSVERSE DIAMETER.

FOETAL LOSS IN RELATION TO METHOD OF DELIVERY. (TABLE 38)

were significantly lower: in not only the racial groups but also taken as a whole.

In the non-white, not only was there a greater percentage of "non-booked" patients, but also those women who attended our clinics often delayed their entry into hospital for many hours after the onset of labour, with the result that not infrequently the foetus was already distressed or had already died in utero.

The obvious consequence of such deficiency was the 5 times greater perinatal mortality in the non-white as in the white patient delivered by forceps.

STILLBIRTH LOSSES IN "FAILED" AND "TRIAL FORCEPS". (TABLES 35,36)

Of 44 babies delivered following "failed" and "trial" forceps no fewer than 13 stillbirths occurred, or a 31.7% stillbirth rate, which was 3 times greater than the overall stillbirth rate for all forceps deliveries.

PERINATAL MORTALITY RATES IN FORCEPS EXTRACTION ACCORDING TO WHETHER MANUAL ROTATION OF THE FOETAL HEAD WAS PERFORMED OR NOT.

(TABLES 35,36)

FOETAL ARRESTED IN THE P.O.P. POSITION.

(A) MANUAL ROTATION OF THE FOETAL HEAD FOLLOWED BY FORCEPS.

Of 312 deliveries with the head in the P.O.P. position, 176 were first manually rotated before the forceps were applied, i.e. in 58.2% of cases.

The perinatal mortality in these cases was 13.9%, of which 4.5% were stillbirths, and 8.8% neonatal deaths.

IN WHITE PATIENTS.

Following manual rotation and forceps extraction, 6.2% of babies were lost. Only 1 child was lost as a stillbirth in 16 delivered.

IN NON-WHITES.

Following a similar method of delivery as whites, as much as 16.2% of babies were lost, of which 3.9% were stillborn, and 14.7% neonatal deaths.

(B) FORCEPS EXTRACTION WITHOUT MANUAL ROTATION (FACE TO PUBIS).

The perinatal mortality following this method of delivery was 8.0%, of which 4.4% were stillbirths, and 3.8% neonatal deaths.

IN WHITE PATIENTS.

The perinatal loss was only 4.5%, and that a stillborn baby.

IN NON-WHITES.

As high a perinatal mortality as 14.5% was noted, of which 6.6% were stillborn, and 9.0% neonatal deaths.

There was therefore a significantly higher perinatal mortality in women delivered by forceps when manual rotation of the foetal head was first performed, as compared with delivery in the "face to pubis" position.

In the racial groups there was also a significantly higher loss in non-whites, with poorer antenatal supervision (a greater number of "non-booked" cases), and who had very often sought sooner entry into hospital because of poor education and poor attendance at the clinic.

No attempt was made to determine perinatal losses sustained with the foetal head arrested in various levels in the pelvis, i.e. in low, mid, and high forceps. Insufficient information for such analysis was available in our records.

FORCEPS EXTRACTION FOR ARREST IN THE "TRANSVERSE" DIAMETER.

In 128 deliveries with the foetal head arrested in the "transverse" diameter, manual rotation of the foetal head was attempted in all cases. The perinatal mortality following forceps delivery was 4.8%, of which 4.0% were stillborn, and 0.8% neonatal deaths.

"Failed forceps" was more frequent with the foetal head in this position, than in the posterior position, with a perinatal loss of as much as 35%.

In white patients there was no loss when forceps delivery occurred following manual rotation of the foetal head arrested in the "transverse" diameter. In non-whites 2.7% perinatal mortality was noted.

PERINATAL MORTALITY IN P.O.P. (FACE TO PUBIS) DELIVERED NORMALLY.

Spontaneous delivery of the baby occurred in 47.2% of babies in the P.O.P. position, with a perinatal loss of 5.0%; a loss which was significantly lower than with forceps extraction.

In non-whites almost 4 times more babies were lost as whites when spontaneous delivery occurred in the face to pubis position.

FORCEPS EXTRACTION FOLLOWING PROLONGED LABOUR. (TABLES 39a & b)

In our units prolonged labour was defined as one in which labour had been in progress for 48 hours or more.

In many instances it was difficult to estimate accurately the duration of labour, because of the long delay in admission to hospital.

Of 178 babies delivered after a labour lasting 48 hours or more, by forceps, 13.5% were lost, of which 9.5% were stillborn and 4.3% neonatal deaths.

In whites and non-whites the percentages of "non-booked" patients with prolonged labour were almost exactly similar.

In "booked" cases only 5.7% of babies delivered by forceps after prolonged labour were lost, compared with 22.8% lost in "non-booked" patients. The former had more often than not been adequately supervised throughout their entire labour in the labour ward, as was the case in white patients. In "non-booked" patients, and especially in non-whites a frequent delay had occurred before admission to hospital after a considerable number of hours. During this delay foetal distress had supervened, or foetal heart beats had disappeared.

In whites patients (Howbray Maternity Hospital) the perinatal mortality rate was 4.6% in all cases of prolonged labour delivered by forceps compared with a loss of 8.4% in non-whites.

A comparison of losses in "booked" and "non-booked" cases in the racial groups, showed that in whites the perinatal mortality in "booked" cases was only 1.5% compared with 14.7% in "non-booked".

In non-whites "booked" cases delivered by forceps showed a perinatal loss of 4.5% compared with a "non-booked" loss of 20.6%.



PROLONGED LABOUR.

(TABLES 39 a and b)

It is generally agreed that when labour is not terminated within a reasonable period of time, foetal life will be prejudiced due to abnormal pressure on the infant interfering with the circulation of the foetus, or from infection ascending from the vagina particularly when the membranes are not intact, or after vaginal examination.

The danger of aspiration of liquor amnii, infected or stained with meconium cannot be underestimated.

The following brief resumé outlines the dangers to the foetus and infant in prolonged labour.

INCIDENCE.

In our units during 1952-55 the incidence of this syndrome was 3.5%.

Altogether 792 babies were born to mothers who had been in labour for 48 hours or more.

In "booked" patients the incidence of prolonged labour was 2.7%, whereas in "non-booked" the incidence was 5.2%

In whites the incidence was 2.0% compared with 3.1% in non-whites.

INCIDENCE OF PROLONGED LABOUR IN OTHER CENTRES.

Holmes (1952) from Guys Hospital reported on 19745 deliveries, 3.2% of which were prolonged for 48 hours or more. This percentage was similar to that occurring in our units.

Hellman and Prystowsky(1952) recorded that 0.25-1.5% of their patients had had abnormally prolonged second stages of labour of more than 2 hours, and that 0.35-2.10% were prolonged in the 1st stage(no interval given).

Tarr(1952) defined a labour of 24 hours or more as a prolonged one. For the years 1946-49, 404 labours were unduly long in 7989 deliveries, or 5%.

Corner, Kistner and Wall(1951) found an incidence of 18.3% prolonged labour of 20 hours or more.

Bandall(1952) reported on cases with occipito posterior presentation and prolonged labour in 3.8% of 12150 deliveries.

Macrae(1949) found 631 cases of prolonged labour of more than 48 hours in 19475 deliveries, or 3.2%.

Wilson and Alesbury(1951) reported on an incidence of 1.8% prolonged labour of 24 hours or more in 6723 deliveries.

Jeffcoate and Lister(1952) gave an incidence of 0.8-1.4% prolonged labour in 22716 confinements.

Jeffcoate(1949) commenting on incoordinate uterine action as a cause of prolonged labour found an incidence of 39 cases in 6122 deliveries or 0.6%. In his own private practice there was an incidence of 7 cases in 101 multipara.

Macrae(1949) found an incidence of incoordinate uterine action of 3.2% as a cause of prolonged labour.

Low(1957) in a paper on constriction ring dystocia in the obstetric units of the University of Cape Town for 1952-56 found 56 cases in 37493 deliveries, or 1 in 660. Labour had been prolonged in all cases.

PROLONGED LABOUR. (WHITES AND NON - WHITES) (TABLE 39a)  
FOETAL LOSS AND IN BOOKED AND EMERGENCY CASES (1952-55)

WHITES.	NO.	B.	E.	M.	P.	TOTAL LOSS.		TOTAL LOSS.	
						SB.	NND.	B.	E.
	86	65	21	16	70	4	0	1 SB.	3 SB
<u>% AGE</u>	2.0%	75.5	24.5	18.6	81.4	4.6	0	1.5	14.2%
NON - WHITES.	413	311	102	126	287	25	10	10 SB 4 NND	15 SB 6 NND
<u>% AGE</u>	3.1%	75.3	24.7	30.5	69.5	6.0	2.6	3.2 1.3	14.7 6.9
<u>TOTAL %</u>						8.4 %		4.5 %	20.6%

CAESAREAN SECTION. (WHITES AND NON - WHITES.) (TABLE 40)  
FOETAL LOSS AND ASSOCIATED COMPLICATIONS. (1952-1955)

RACE.	B.	E.	M.	P.	SB.	NND.	PREMS	TOXAEMIA.	TOTAL	A. P. H.	
										PP.	AH.
WHITES.	149	64	103	110	2	16	38	38	213	24	6
<u>% AGE</u>	70	30	48.9	51.1	0.9	7.4	12.6	17.8		11.1	2.8
					8.4 %					14.0 %	
NON - WHITES.	412	250	385	247	34	48	139	180	632	58	8
<u>% AGE</u>	60.4	39.6	60.9	39.1	5.3	7.9	22.9	28.3		9.1%	1.2%
					12.9 %					10.4 %	

**THE PRESENTING PART IN RELATION TO THE CAUSE OF PROLONGED LABOUR.**

Of 792 babies delivered from mothers with prolonged labour, the following presenting part was noted from reports in our obstetric departments:-

(i) Occipito anterior:	449 (56.6%)
(ii) Occipito posterior.	258 (32.5%)
(iii) Transverse arrest.	36 ( 4.5%)
(iv) Presenting part not stated	17 (2.2%)
(v) Breech presentation.	15 (1.8%)
(vi) Face presentation.	6 (0.7%)
(vii) Constriction ring (anterior and posterior)	5 (0.6%)
(viii) Brow presentation.	3 (0.4%)
(ix) Cervical dystocia (anterior)	2 (0.2%)
(x) Double uterus (presenting part not stated)	1 (0.1%)

In over 90% of the above cases there was an associated incoordinate uterine action.

**PERINATAL MORTALITY IN CASES OF PROLONGED LABOUR.**

**IN OUR UNITS.**

**(TABLE 39)**

Of 792 babies delivered after prolonged labour, 560 or 70.7% were from mothers who had been "booked" in our clinics, and 71.7% were primiparous.

The perinatal mortality was 10.7%, of which 8.09% were stillborn and 2.9% neonatal deaths. Maceration of the foetus was present in 5 babies.

**IN WHITE PATIENTS.** 1.5% of babies were lost in "booked"

and 14.2% in "non-booked" cases.

IN NON-WHITES. 4.5% of babies were lost in "booked" cases of prolonged labour and 20.6% in "non-booked".

IN "BOOKED" CASES.

Of 560 "booked" cases in which prolonged labour occurred, 32 babies were lost or 5.7%. Of these 24 or 4.2% were stillborn, and 8 or 1.5% neonatal deaths.

(i) IN WHITE PATIENTS.

75.5% of white patients had received antenatal care in our clinics, and only 1 stillborn child was born or 1.5%.

(ii) IN NON-WHITES.

75.3% of this race were "booked" at our clinics.

The perinatal mortality in these patients was 4.5%, of which 3.2% were stillborn, and 1.3% neonatal deaths.

IN "NON-BOOKED" CASES.

Altogether 53 babies were lost out of 232 delivered, i.e. 22.8% of which 17.2% were stillborn and 7.0% neonatal deaths.

(i) IN WHITE PATIENTS.

Only 3 stillbirths were encountered, or a perinatal loss of 4.5%, compared with a perinatal mortality of 20.6% (14.7% stillborn, and 6.9% neonatal deaths) in non-whites.

(ii) IN NON-WHITES.

A significantly higher perinatal mortality of nearly 5 times greater than in whites was noted in "non-booked" cases.

ring dystocia, in which 84% of cases the babies were delivered by caesarean section.

SUMMARY AND CONCLUSIONS.      "FORCEPS EXTRACTION"  
(INCLUDING PROLONGED LABOUR)

The incidence of forceps extraction in our units during 1952-55 was only 4.93%. There was almost an equal frequency of forceps operation in whites and non-whites of 5.1% and 5.2% respectively.

No adequate reason could be found for this low incidence of forceps compared with other centres. It was possible that because the native was a superior parturient that forceps extraction was as low as reported in our units.

Perinatal mortality in our units was 10.7% for forceps extraction, stillbirth rate being 7.2% and neonatal losses 3.7%. In whites foetal losses were more than 3 times less than in non-whites.

Perinatal losses in "non-booked" cases were much higher than in "booked" (22.8% : 6.0%). Both stillbirth and neonatal death rates were almost 4 times larger in patients with inadequate antenatal care.

In "booked whites" foetal losses were more than 5 times lower than in "booked non-whites, not only because of better antenatal care in the former, but also because of the long delay of entry into hospital of non-whites, with often foetal distress or even absence of foetal heart.

In "non-booked whites" there was a 1½ times lesser perinatal mortality than in "non-booked non-whites" (16.2% : 24.4%), as loss which was not significant statistically.

With "failed" and trial forceps the stillbirth rate

delivered from mothers with constriction rings which had been the cause of prolonged labour of 48 hours or more. In all instances the baby was stillborn, despite caesarean section in 4 cases.

Fields(1953) described 44 cases of constriction ring dystocia, and only 6.8% of infants were lost, because in 84% of his cases caesarean section was performed early in labour.

#### PERINATAL MORTALITY IN BREECH DELIVERY AFTER PROLONGATION OF LABOUR(TABLE 35)

A careful search of our annual reports for the years 1952-55 revealed that in only 15 cases of primary breech presentation was labour unduly prolonged.

As many as 8 infants were lost or 53.3%. All were stillborn, and 3 were macerated.

#### PERINATAL MORTALITY IN PROLONGED LABOUR IN OTHER CENTRES.

All authors are unanimous that perinatal mortality is greater in the presence of a prolonged labour.

Hawksworth(1952) stresses not to judge by the length of labour but by maternal and foetal conditions, preferably until foetal distress has occurred with the membranes ruptured. Not all writers will agree with this statement, because of the higher losses associated with foetal distress, than in its absence.

Hawksworth in a series of trial labours in which 2 babies were lost in 124 deliveries, advocated "trial forceps".

Hawksworth and Allen(1951) dealing with the safety of trial labour published a report on 2725 cases in which forceps were applied in 8.5% and caesarean section in 3% of their cases. His results were remarkable in that only 15 per thousand stillbirths occurred and 3/1000 neonatal deaths(uncorrected).

Breach delivery in cases of prolonged labour occurred in 15 babies, with a loss of 53.3% (all stillborn), 3 of which were macerated.

Internal version was performed in 3 instances and 1 living baby was delivered, or a loss of 66.6%.

PERINATAL MORTALITY ACCORDING TO PRESENTING PART AND METHOD OF DELIVERY.

(1) OCIPITO POSTERIOR. Of 312 forceps extractions in the posterior position, 34 babies were lost or 10.9%, of which 14 or 4.5% were stillborn and 20 neonatal deaths or 6.7%.

(a) After manual rotation of the foetal head in 176 instances, or 56.2% of posterior positions delivered by forceps, 23 babies or 13.0% were lost of which 4.5% were stillborn, and 15 neonatal deaths or 8.5%.

(b) Forceps extraction in the face to pubis position.

136 babies were so delivered with a perinatal loss of 11 or 8.0% of which 6 or 4.4% were stillborn, and 5 or 3.8% neonatal deaths.

(2) FORCEPS EXTRACTION IN THE ANTERIOR POSITION OF THE FOETAL HEAD.

844 babies were extracted in the anterior position out of 1281 so delivered, i.e. 65.8%. Of these 38 or 4.5% were lost, of which 32 or 3.8% were stillborn and 6 or 0.7% neonatal deaths.

Almost 50% (or 429 babies) of babies delivered by forceps were from mothers with prolonged labour.

(3) CAESAREAN SECTION FOR OCCIPITO POSTERIOR PRESENTATION. (TABLE 35)

Of 190 caesarean sections performed when the foetal head was "posterior" the perinatal loss was 15 or 8.4% of which 3.6% were stillborn and 4.9% neonatal deaths. In only 1 instance was a baby lost in white patients (5% loss) and in 6 babies or 6.9% in non-whites.

was very high, as much as 31.7%.

Forceps extraction in the face to pubis position revealed better results for the foetus, than when the foetal head was first rotated anteriorly (8.0% : 13.9%).

In prolonged labour of 48 hours or more the perinatal mortality was 13.5%. In "booked" patients perinatal losses were 4 times lower than in "non-booked" ( 5.7% : 22.8%)

Similarly in the racial groups perinatal losses were higher in the non-white, who very commonly sought entry into hospital very late when adverse conditions were already present in the foetus.

The length of the first stage of labour was of more serious consequence on the foetal losses sustained than a prolonged 2nd stage.

In our units the incidence of prolonged labour was 3.5%, which was in agreement with the figures of other authors with a similar definition.

The presenting part in relation to prolonged labour is noted, occipito anterior being present in 56.6% and occipito posterior in 32.5%, and others in 11.5%.

Perinatal mortality in prolonged labour was higher than in labours of average duration. In our units it was 10.7%.

When labour was prolonged the best results achieved were following caesarean section, followed by spontaneous delivery. Breech presentation with prolonged labour was disastrous.

CONCLUSIONS. The benefit of adequate antenatal care in relation to perinatal losses following forceps extraction and prolonged labour are apparent. Similarly in the racial groups, where non-whites showed poorer results than in whites.

It can be concluded from the statistical evidence produced in cases of prolonged labour in our units that inadequate antenatal care was an important factor in the causation of 4 times a greater perinatal mortality as that occurring in "booked" cases.

Similarly in the racial groups, in the non-white whose antenatal supervision was inadequate as a whole compared with the white patients, the perinatal mortality was much higher.

It was apparent however that similar percentages of "booked" patients in both racial groups had undergone prolonged labour, with different perinatal losses. The explanation for this phenomenon must be sought in the fact that in the non-white long delay in admission to hospital, with subsequent more serious effects on the baby was frequently encountered. Inadequate supervision during labour in the non-white was therefore obvious.

#### PERINATAL MORTALITY ACCORDING TO THE METHOD OF DELIVERY IN PROLONGED LABOUR.

Caesarean section in patients with prolonged labour in our units was followed by a 5.9% perinatal mortality, of which 3.7% were stillborn, and 2.2% neonatal deaths.

Of 792 babies delivered by all methods, 188 were by caesarean section (23.7%).

Spontaneous delivery was followed by a perinatal loss of 8.0%, of which 5.5% were stillbirths, and 2.6% neonatal deaths.

50.5% or 400 babies were so delivered in all cases of prolonged labour.

Forceps extraction was undertaken in 22.4% of babies and 13.5% were lost, of which 9.5% were stillborn, and 4.3% neonatal deaths.

## PERINATAL MORTALITY IN SPONTANEOUS DELIVERY AS FACE TO PUBIS

Of 462 spontaneous deliveries as face to pubis, only 5.9% of babies were lost, of which 4.3% were stillborn, and 1.5% neonatal deaths. There was no evidence of a foetal heart beat in 3 instances, and in 2 others the foetus was macerated.

### CONSTRICTION RING DYSTOCIA.

This serious complication of labour occurred on 46 occasions in 25930 births during 1952-55.

The perinatal mortality was 13 stillbirths or 28.2%.

Louw (1957) in an admirable paper on this subject defined this condition as an abnormal labour which is either due to or responsible for the production of a circular or more or less circular ridge of uterine muscle protruding into or disturbing the normal contour of the uterine cavity.

The "ring" may be found during any stage of labour, most commonly at the junction of the upper and lower uterine segments.

Louw recorded no fewer than 56 constrictions in 37493 women delivered in the units of the University of Cape Town during 1952-56, i.e. an incidence of 0.1%. He reported a perinatal mortality of 30.3%.

It is apparent from the literature that the mortality for the foetus is high unless abdominal delivery is accomplished early in labour, once the condition is diagnosed.

Vaginal delivery has serious consequences for both mother and child because of the great difficulty experienced in manipulation once the ring has been established, i.e. irreversable.

In our units during 1952-55 only 5 babies were

Douglas and Kaltreider(1953) also favoured the use of trial forceps.

Holland(1929) reported on the causation of foetal death in prolonged labour for contracted pelvis in which 300 dead babies occurred. In contracted pelvis the foetal loss was 8%.

Holmes(1952) recorded a higher than normal maternal and foetal mortality in prolonged labour, foetal losses being 3% for stillbirths and 1.65% neonatal deaths. As many as 50% of the deaths occurred before the end of the first stage of labour.

Tarr(1952) reported a foetal mortality of 5.6% in labours under 30 hours, and 12% for more than 30 hours.

Randall(1952) recorded a 4.3% loss with normal delivery and 6.6% following operation after prolonged labour. With low forceps he lost 1 in 89 babies; with midforceps after rotation he lost 6.6%, and without rotation, 5.8%.

Macrae(1949) lost 12% of babies when labour was longer than 48 hours.

Jeffcoate and Lister(1952) lost 6.5% of babies in labour lasting 24 hours or more, their caesarean section rate being 50%.

Turtola(1948) reported a foetal loss of 4.3% in prolonged labour associated with incoordinate uterine action. This figure was high because of the large numbers of high forceps applications.

Calkins(1953) recorded 10,000 cases of P.O.P. in hospital practice and concluded that it was best to leave the foetal head in the posterior position and not force rotation.

Louw(1957) reported a foetal loss of 30.3% in constriction ring dystocia, all cases however not being prolonged labours for 48 hours or more.

Fields(1953) lost only 6.8% of babies in constriction

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	UNIT and YEAR	NO. (BABIES)	B.	E.	PARITY.		TOTAL LOSS		PREMS.	TOXAEMIA and Ess. HYP	A.P.H.		
					M.	P.	SB.	NND			FP.	AH.	
PMH.	1952	90	57	33	63	27	11	5	17	10	16	3	Eclampsia 1.
	1953	146	100	46	80	66	9	8	25	24	16	5	Diabetes 2 Prolapse Cord 3
	1954	125	88	37	82	43	12	4	13	19	11	1	Ruptured uterus 2 Prolapse cord 1
	1955	189	128	61	134	55	14	14	24	47	8+	-	6 with Tox.aemia. 75 previous C.S's.
NSH.	1952	64	46	18	38	26	9	3	9	1	3	-	
	1953	59	44	15	39	20	1	4	4	3	7	1	Pulmonary TB -1
	1954	93	65	28	64	29	8	3	7	7	-	1	
	1955	75	47	28	50	25	5	4	11	5	8	-	
MMH.	1952	40	26	14	21	19	1	4	7	3	3	2	
	1953	63	38	25	31	32	-	6	17	18	12	3	
	1954	52	43	9	31	21	-	3	1	8	3	1	
	1955	58	42	16	20	38	1	3	12	9	6	-	
ST.M.	1952	18	4	14	7	11	-	-	4	5	4	-	Prolapse cord-1
	1953	32	23	9	28	4	2	1	4	1	4	1	Obstructed Labour -1
	1954	27	25	12	18	9	1	4	7	3	8	-	Prolapse cord-1 NO. F.H.S.
	1955	34	22	12	19	14	2	1	16	8	6	1	Prolapse cord-1
GSH.	1952	45	16	29	29	16	-	3	15	18	5	1	
	1953	94	49	45	26	67	3	11	29	71	3	-	
	1954	95	53	42	67	28	3	14	40	58	10	4	
<b>TOTAL</b>		1399	916	483	847	552	82	95	352	258	122	32	
<b>%AGE</b>		5.39%	6.55%	34.5%	50.5%	49.5%	5.8%	7.2%	25.1%	18.1%	8.7%	2.2%	
													12.6%

CAESAREAN SECTION. Foetal loss and associated-complications.

TABLE 41.

**(4) CAESAREAN SECTION.****(TABLES 40,41)**

It is unquestionable that the introduction of the lower segment operation combined with the discovery of the antibiotics has heralded a new era in the field of obstetrics.

Not only are more caesareansections being performed today because of the reduced risk of this operation to the mother, but also the acceptable indications for abdominal section have been increased.

The increased frequency of caesarean section in placenta praevia, obstructed labour and in "the toxemias of pregnancy" are a few examples.

Has the operation had the benefit of increasing the numbers of surviving infants? This unfortunately has not transpired to the extent with which we would have expected.

Stillbirths which formerly would have occurred with vaginal delivery have today been transferred to neonatal deaths, often due to the birth of premature babies.

Consequently one finds that perinatal mortality following caesarean section is relatively high because of higher neonatal losses sustained because of the more frequent birth of premature babies especially in preeclamptic toxemia.

The object of this brief paper is to analyse the benefits derived from antenatal supervision in relation to perinatal mortality rates following caesarean section.

**INCIDENCE OF CAESAREAN SECTION.**

The frequency of caesarean section has risen as a direct result of the greater number of acceptable indications and the reduced risk of operation.

There is a marked variation in the frequency with which operation is being performed in various centres, often dependent on the type of patient admitted to hospital and the complications involved.

Not unimportant in this respect is the adequacy of antenatal care, a lack of which will certainly increase the frequency with which the operation is performed.

Nixon, Collins and Fisher (1956) reported 10,000 African deliveries in a well conducted antenatal clinic with an incidence of 9.33% caesarean section only!

Montgomery (1955) on the other hand from a rural area of Southern Rhodesia reported a caesarean section rate of between 2.7% and 7.3%.

Lewis (1956) stated that about 5% of women in hospital are now being delivered by this route.

At the Liverpool Maternity Hospital according to Jeffcoate (1953) the rate of caesarean section was 15%, and at Queen Charlotte's Hospital for the years 1945-54 3.3% out of 27930 deliveries.

Baird (1953) recorded an incidence of caesarean section in Aberdeen of 1% during the years 1938-47, which rose to 2.8% in the period 1951-52. The stillbirth rate had been reduced from 16 per thousand to 5/1000 during this time because of the lowering the rates due to trauma and anoxia.

The Aberdeen stillbirth rate was reduced from 37.6% in 1939-40 period to 9.2% during 1953-54 because of the fall in deaths due to trauma and antepartum haemorrhage (excluding those due to and associated with P.E.T.).

Baird, Thompson and Duncan (1953) had reported that the fall in stillbirth rate could be attributed to a fall in trauma causes and in the unknown (mature babies) causes groups, due to increased hospitalization with an increased incidence of caesarean section especially in elderly

primigravidae.

Marshall and Cox(1949) reported an incidence of 6.2% for the section rate at 19 British hospitals from 1943 to 1947.

Brandstrup and Per Schou(1952) from Denmark for a 10 year period 1941-50 in Copenhagen recorded an incidence of caesarean section of 1.8 per thousand deliveries in 1941. In 1950 this had increased to 4.8 per thousand deliveries. The indications for operation outlined by these authors were as follows:- Placenta praevia, 30.6% ; contracted pelvis and disproportion in 20.9% ; preeclampsia 7.1% ; malpresentations 6.7% ; and other indications in 20%.

Pomorenke(1952) quoted 665 caesarean sections in 30,463 deliveries, or an incidence of 2.2%. There were 26 stillborn(3.9%) and 33(5.1%) neonatal deaths of 672 babies delivered.

Landesman(1953) from 1933 to 1949 reported an incidence of 7.7% caesarean section, whereas from 1950-52 the incidence had fallen to 5.3%.

At the University College, Ibadan, Nigeria, a completely non-white obstetrical unit, a low incidence for caesarean section of 2.3% was reported in 1954. Of these 2.1% were for "booked" cases, and 3.5% for "non-booked". The main indications for operation at this institution were for disproportion and placenta praevia.

It should be emphasized that at Ibadan caesarean section was avoided as much as possible, especially for cases of placenta praevia, because of patients not returning for supervision in future pregnancies. This was particularly the case if a baby was lost with a previous section.

Where possible vaginal delivery was aimed at, if there was a risk of losing the babies life. Craniotomy, podalic version and other hazardous procedures were hence common in Ibadan.

INCIDENCE OF CAESAREAN SECTION IN WHITE PATIENTS. IN OUR UNITS.

At the Howbray Maternity Hospital during 1952-55 inclusive, 213 babies were delivered by caesarean section out of a total of 4261 born during that time. There was an incidence of 4.9% for caesarean section. Of the sections performed 70% were in "booked" patients.

IN NON-WHITE PATIENTS.

During 1952-55 inclusive, 662 caesarean sections were done out of a total of 13193 deliveries, or an incidence of 4.9%, of which 50.4% were for "booked" cases. Of the babies delivered by operation 66.9% were from multiparous women.

TOTAL INCIDENCE.

During the 4 years (1952-55) as many as 1399 babies were delivered by caesarean section from women in our units.

The incidence of caesarean section was altogether 5.39% of which 4.4% were performed in "booked" cases and 9.9% in "non-booked".

Similar percentages of primiparous and multiparous patients were "sectioned" during this time.

There were 352 premature babies delivered out of the 1399 born following caesarean section or 25.1% the majority of which were from patients with P.E.T.

In 18.1% of babies born after caesarean section the mother was known to have P.E.T., and in 10.7% there was antepartum haemorrhage (8.7% placenta praevia, and 2.2% accidental haemorrhage).

PERINATAL MORTALITY IN CAESAREAN SECTION.

(TABLES 40,41)

Literature from units elsewhere reveal that perinatal mortality varies enormously, particularly in relation to the type of obstetrics practised especially according to the efficiency of antenatal care, and whether complicated or not.

Stuttaford and Decker(1952) for the years 1942-51 noted a loss of 59 babies out of 654 delivered by caesareans section, which was perinatal loss of 8.8%. This figure was twice the overall loss.

Pomeranke(1952) lost 59 babies out of 672 delivered by section, which was also a 8.7% perinatal mortality rate.

Daird(1955) reported that the incidence of difficult labour rises with age, as does the tendency to unexplained intruterine death of the mature foetus, so that the foetus of the elderly primiparous woman is subject to a double hazard. In addition postmaturity increases the chance of a long labour and its associated dangers. Daird therefore advised a reduction in length of trial labour especially the older the primipara is over 25-29 years and over.

McNeill(1956) from Buffalo, U.S.A., reported a foetal mortality that was twice of that occurring in 38890 normal confinements, in caesarean section. The ratio of losses in "section" and normal was 3.04 to 6.3%. (compare with our figures during 1952-55 in part 2 under perinatal mortality in normal and operative delivery).

Diddle and Lambeth(1954) from 6 teaching hospitals in the U.S.A. during 1947-50 reported on 763 caesarean sections, when in their first report the perinatal losses were 119 per thousand and in a second report the figure was 68/1000.

FETINATAL MORTALITY FOLLOWING CAESAREAN SECTION IN OUR UNITS

(TABLES 40,41)

During the period 1952-55 inclusive 1399 babies were delivered by caesarean section and 177 or 12.6% were lost, of which 82 babies or 5.8% were stillborn, and 95 or 7.2% neonatal deaths.

IN WHITE PATIENTS.

Of 213 babies delivered by caesarean section at the Howbray Maternity Hospital, 18 or 8.4% were lost, of which 6.8% were stillborn, and 7.4% neonatal deaths.

Of the babies delivered by section in whites only 12.6% were premature.

There was preeclampsia in the mother in 17.8% of cases delivered by caesarean section.

Antepartum haemorrhage was a complication present when 30 babies were born by operation (14.0%). In 11.1% there was placenta praevia, and 2.8% accidental haemorrhage.

IN NON-WHITES.

Of 662 babies delivered by caesarean section 82 or 12.9% were lost, of which 5.3% were stillborn and 7.9% neonatal deaths.

It is apparent therefore that many more babies were stillborn in non-whites as whites (almost 6 times) when delivered by "section". Neonatal deaths rates were almost exactly similar.

Of the babies delivered by section in non-whites as many as 22.9% were premature, or nearly twice as many as in whites. P.E.T. was the most common factor in the causation of prematurity in the non-white in whom the severity of the illness was of greater importance.

There was evidence of P.E.T. in the mother in 28.3% of the babies delivered by caesarean section.

Antepartum haemorrhage was a complicating factor as an indication for caesarean section in 10.4% of the babies born.

PERINATAL MORTALITY IN RELATION TO ANTENATAL CARE. (TABLE 74)

During the years 1953-55 inclusive 1139 babies were delivered by caesarean section, of which 754 or 66% were from "booked" patients, and 385 or 34% from "non-booked".

The incidence of caesarean section during this period of time was 4.61% in "booked" cases, and 9.4% in "non-booked".

IN "BOOKED" CASES.

Of 754 babies delivered by "section" 62 or 8.2% were lost, of which 26 or 3.4% were stillborn, and 36 or 4.9% neonatal deaths.

(i) In white patients.

Of the babies delivered by caesarean section in whites, 74.5% were from "booked" patients, and only 8 neonatal deaths or 6.4% were lost.

(ii) In non-whites.

Only 57.7% of babies delivered by caesarean section in "booked" patients were from non-whites. There was a perinatal mortality rate of 8.4%, of which 2.3% were stillborn, and 6.2% neonatal deaths.

Again the similar neonatal losses in whites and non-whites are apparent. Stillbirth rates however were much higher in non-whites.

IN "NON-BOOKED" CASES.

Of 385 babies born, 73 or 18.9% were lost, of which

34 or 8.8% were stillborn, and 39 or 11.1% were neonatal deaths.

The much larger losses in "non-booked" cases delivered by caesarean section as in "booked" were therefore obvious.

(i) Perinatal mortality in "non-booked" whites.

In "non-booked" white patients delivered by caesarean section 12.5% of babies were lost, which was almost twice that lost in "booked" cases.

(ii) In "non-booked" non-whites.

Here again more than twice the number of babies were lost than in "booked" patients delivered by caesarean section, or 17.8% compared with 8.4%.

It was hence apparent that from the statistical evidence produced that a much higher perinatal mortality occurred in "non-booked" cases compared with "booked". Similarly in non-whites, in whom prenatal supervision was inferior to that of whites, the perinatal mortality was higher than in whites. Although neonatal mortality rates were similar in the racial groups, stillbirth rates were higher in non-whites.

Analysed still further it was previously noted that a larger number of very premature babies were delivered to non-whites, especially those babies weighing 4 lbs. and under, in which the perinatal mortality rates were very high, including stillbirth rates.

FREQUENCY OF INDICATIONS FOR CAESAREAN SECTION.

The following table represents as accurately as possible (allowing for overlapping) the frequency of indications for caesarean section in our units for the years 1952-55. A comparison is made with 2 other centres.

	<u>QUEEN CHARLOTTE'S.</u> (1949-50)	<u>FLUSHING H.</u> <u>NEW YORK</u>	<u>U.C.T</u> (1952-55)
DISPROPORTION AND CONTRACTED PELVIS.	15.3%	22.2%	30.0%
P.E.T.	15.0%	11.1%	18.1%
UTERINE INERTIA.	12.0%	?	?
PLACENTA PRAEVIA.	10.8%	8.30%	8.7%
PREVIOUS SECTION.	9.0%	37.3%	21.5%
ABNORMAL PRESENTATION. ( Transverse lie, brow, face, breech, etc.)	8.0%	2.4%	8.2%
PROLAPSE OF CORD.	?	?	3.8%
ACCIDENTAL HAEMORRHAGE.	1.3%	3.9%	2.2%
DIABETES.	1.3%	0.7%	2.9%
OTHER CAUSES.	26.3%	14.1%	4.6%
<b>TOTAL INCIDENCE</b>	<b>3.9%</b>	<b>4.0%</b>	<b>5.9%</b>

It will be noted that the indication for section in almost 1/3rd of our cases was disproportion and contracted pelvis. In many of these instances labour had been prolonged for 48 hours or more in association with incoordinate uterine action.

Nearly 1/5th of the indications for operation was for previous section, in the majority of which trial of labour was first allowed before proceeding with repeat section.

In 18.1% of operations performed there was an associated preeclampsia for which section was primarily indicated, although many of these cases had been allowed to "labour" for various periods of time. A rising blood pressure or increasing albumenuria, with or without other urgent symptoms often predetermined the necessity for section in many of these patients.

The fairly high percentage of caesarean sections for diabetes will be noted in our units.

#### CAESAREAN SECTION FOR DISPROPORTION AND CONTRACTED PELVIS.

The poor physique of the non-white and often the abnormal configuration of the pelvis in the socio-economically poor patients admitted to our units were contributory factors in the high percentage of disproportion and contracted pelvis in our patients. In addition to the large proportion of generally contracted pelvis in our non-whites, android pelvis and distortion due to tuberculosis of the spine and lower extremities and also infantile poliomyelitic deformities were common in the non-white.

Incoordinate uterine action was frequently found in these patients, often admitted after many hours in labour.

#### CAESAREAN SECTION FOR PREECLAMPSIA.

Although 410 babies were delivered of patients with preeclampsia by caesarean section, in only 258 instances or 18.1%, was operation primarily performed for "toxæmia".

**CAESAREAN SECTION FOR CASES OF ANTEPARTUM HAEMORRHAGE.**

**(a) PLACENTA PRAEVIA.**

In 122 instances out of a total of 183 cases of placenta praevia (i.e. in 2/3rds) caesarean section was performed primarily for controlling bleeding, either immediately on admission of the patient to hospital, or soon afterwards, following resuscitative measures.

In 61 cases, or 33.3%, after conservative treatment, patients were subjected to operation following examination "on the table" when placenta praevia was confirmed.

It was therefore not surprising in our units to find a high prematurity rate following caesarean section, and consequently a fairly high perinatal mortality rate.

This was especially experienced in non-white patients with placenta praevia; patients who were often admitted in poor condition after long delay before admission.

**(b) ACCIDENTAL HAEMORRHAGE.**

Caesarean section was performed for abruptio placentae only in 38 cases or in 2.7% of all caesarean sections performed. In 36 instances operation was performed primarily to prevent further bleeding after unsuccessful attempts at induction of labour. Perinatal mortality in these cases was almost 100%, the foetus having died in utero beforehand.

**(c) CAESAREAN SECTION FOR DIABETES IN PREGNANCY.**

Altogether 51 mothers were subjected to "section" where there was an associated diabetes, i.e. in 2.9% of all "sections" performed in our units, during 1952-56.

This subjected patient had received adequate prenatal supervision beforehand in all instances.

The excellent results obtained for the baby in women subjected to caesarean section was previously discussed under "diabetes in pregnancy".

(d) CAESAREAN SECTION IN CASES OF BREECH PRESENTATION.

During the period 1952-55, only 16 women were delivered by caesarean section for breech presentation primarily. These were women who had abnormally large babies, elderly primiparae, contracted pelvis with breech presentation, and other complications such as associated fibroids etc. The frequency of caesarean section in this group was therefore only 1.1% of caesarean sections performed during the above 4 year period.

(e) CAESAREAN SECTION FOR PROLAPSE OR PRESENTATION OF THE CORD.

In only 3.8% of all caesarean sections performed during 1952-55, was the complication of the umbilical cord responsible.

In spite of "section" for this complication the perinatal mortality rate was as high as 25.4%.

(f) REPEAT CAESAREAN SECTION.

The large percentage of previous caesarean sections for which there were indications for "repeat operation", revealed that in the majority of these instances "trial labour" had been allowed for varying periods of time, before resorting to operation again. As will therefore be realized, we did not follow the dictum "once a caesarean section, always a section".

Successful vaginal delivery was accomplished in not a small number of patients who had had previous operation.

An analysis of such cases during 1953-55 showed

that of 380 patients who were subjected to trial labour following previous caesarean section, 284 or 74.4% were delivered by the vaginal route. In 96 instances or 25.6% caesarean section was performed again, because of unsuccessful "trial".

Of the women delivered vaginally(practically all by routine forceps extraction at the commencement of the second stage), 287 babies were born, of which 18 or 6.3% were lost. There were 12 stillbirths or a stillbirth rate of 4.2%, and a neonatal loss of 6 or 2.2%.

This perinatal mortality was hence lower than in the overall perinatal loss following forceps extraction, which was 10.7%.

Of the 12 stillbirths occurring with forceps extraction 3 followed on antepartum haemorrhage; 2 were macerated, 1 was associated with rhesus incompatibility; and 1 weighed only 2 lbs. 15 ozs. In 5 other stillbirths the cause was probably the result of trauma.

Of the 6 neonatal deaths which occurred following forceps extraction, 2 were from diabetic mothers; 2 died as a result of trauma; 1 died following forceps in a patient whose uterus had ruptured beforehand and 1 weighed only 3 lbs. 15 ozs.

Of 96 patients who had had "repeat" section, there were 3 stillbirths and 5 neonatal deaths, giving a perinatal mortality rate of 8.3%, a figure which was lower than the overall perinatal mortality rate for caesarean section.

Of the stillbirths, 1 was an anencephalic baby; 1 was born of an eclamptic mother; and the 3rd died during labour as a result of trauma following trial labour.

Of 5 neonatal deaths, 3 followed rupture of the uterus

a second baby had a congenital heart lesion and a 3rd died probably as a result of trauma following trial labour.

Under supervision therefore of patients who had had adequate antenatal care, and previous caesarean section, the perinatal mortality rate following a subsequent vaginal delivery (nearly all by forceps) or "repeat" caesarean section was no higher than when previous caesarean section had not been performed. In fact the losses were even less allowing for correction.

#### THE INFLUENCE OF PREMATUREITY IN CAESAREAN SECTION.

This subject will be discussed more fully later in Part 2, when prematurity will be analysed as occurring in our units.

However it can be stated that following caesarean section in our units a large percentage of the perinatal mortality was associated with the birth of premature babies, especially in the form of neonatal deaths, especially in patients with preeclamptic toxæmia, and antepartum hæmorrhage. It was apparent that the babies of under 4 lbs. were the chief sufferers, of which the greater percentage occurred in non-white patients.

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#### SUMMARY.

An increased number of caesarean sections are being performed today because of the smaller risk entailed, and the greater number of acceptable indications.

In our units the incidence of caesarean section during 1952-55 was 5.39%. Similar rates were noted in whites and non-whites.

Perinatal losses in our units were high, as much

as 12.6% being lost. This high mortality was mainly due to the large percentage of premature babies delivered from patients with preeclampsia, and antepartum haemorrhage especially placenta praevia.

In non-whites there was a  $\frac{1}{2}$  perinatal mortality than in whites, because of the larger percentage of premature babies born to the former, mainly in the less than "4 lb. group". So similarly was there a greater perinatal mortality in patients with inadequate antenatal care ("non-booked") as compared with "booked" patients, twice as many babies being lost in the former.

Again it should be stressed that inadequate antenatal care in the non-white, particularly with P.E.T., because of inadequate hospital accommodation played no small part in higher perinatal losses in this race. "Outpatient" treatment of toxemia was frowned upon, but was of necessity practised in our units because of lack of beds for hospital supervision. The later admission of these women in a more precarious state of health, often necessitated early induction of labour, with the birth of premature babies.

The frequency of indications for caesarean section in our units associated with various complications of pregnancy and labour is discussed. Disproportion and contracted pelvis was the most common of the indications, in 30% : previous "section" in 21.5% : preeclampsia in 18.1% ; antepartum haemorrhage in 10.9% ; prolapse of the cord in 3.6% : 2.9% in diabetes and 4.6 other indications.

The significance of prematurity as a cause of perinatal mortality cannot be underestimated, a full discussion of which will be outlined later.

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(5) TRANSVERSE AND OBLIQUE LIE.

(TABLES 43, 44, and 75)

The seriousness of such malpresentation, especially in patients in labour is too well appreciated for any further major discussion, both mother and child being in extreme danger of losing their lives. The mere presence of transverse lie in a woman not in labour should excite ones curiosity until the cause of such abnormal position is elicited and corrected if possible.

Each year the world literature enumerates the sad calamities associated with transverse lie; tragedies which might have been avoided with adequate antenatal supervision. It is with this object in view that a short dissertation on this subject is presented, with particular reference to prenatal care.

INCIDENCE.

Lennie (1950) reported 37 shoulder presentations in 3266 deliveries at Edinburgh, or an incidence of 1.1%.

Kiebel and Credlock (1952) found an incidence of 0.6% transverse lie in 25065 deliveries.

Rosensohn (1954) reported 186 cases of transverse lie in 7488 deliveries or 2.5%

Noach (1958) discovered 447 shoulder presentations in 78,101 patients or in 0.6%.

Calkins and Pearce (1957) noted an incidence of 0.5% transverse lie in 19611 cases.

INCIDENCE IN OUR UNITS.

During the 4 year period 1952-55 there was an incidence of 0.7% transverse and oblique lie in our units, during which time 208 babies were delivered.

Of these women with transverse lie who were delivered in our units, 61.6% had not attended for antenatal care in our clinics, and 86.1% were multiparous.

Further analysis of transverse lie in our units during 1953-55 revealed an incidence of this malpresentation to be 0.8%.

In "booked" patients the incidence was 0.4% whereas in "non-booked" it was as high as 2.4%.

In white women attending the Mowbray M.H. the incidence was 0.3%, more than  $\frac{1}{2}$  of the patients being "booked" (53.3%)

In non-whites at the Somerset and Groote Schuur Hospitals and St. Monica's Home the incidence was 0.7% and only 41.7% had attended our antenatal clinics.

There was hence a statistically significant difference in incidence of transverse and oblique lie in the racial groups.

#### PERINATAL MORTALITY IN TRANSVERSE AND OBLIQUE LIE.

Lennie (1950) reported 14 stillbirths in 37 shoulder presentations or a stillbirth rate of 37.8%

Kiebel and Credlock (1952) noted a 39.2% stillbirth rate in 156 transverse lies. In single pregnancies the loss was 58%, and the second twin was lost at a rate of 5.3%.

Rosensohn (1954) lost 15 babies in 37 transverse lies, i.e. a 40.5% stillbirth rate.

Noack (1956) advised more abdominal sections for this malpresentation because of his high loss of 42%.

Calkins and Pearce (1957) reported a 30% loss of babies with this complications, and who weighed more than 5½ lbs. There was prolapse of the cord in 17% of his cases, and placenta praevia in 9%.

UNIT and YEAR	NO.	B.	E.	PARITY		TOTAL LOSS		VERSION			CAESAREAN SECTION			SPONTANEOUS and Destructive LOSS		P.C.	E.C.V.	REMARKS
				M.	F.	S.B.	N.N.D.	Internal and Bipolar	NO. S.B.	N.N.D.	NO	S.B.	N.N.D.	NO	LOSS			
P.N.H.	20	9	11	15	5	10	4	13	7	2	4*	1	1	2*	2S.B.	8	1(N.N.D.)	* 1 Hysterectomy.
1952																		
1953	31	5	26	25	6	20	2	25	17	2	1	0	0	1	1S.B.	7	2*	* Decapitations. E.C.V. Failed.
1954	17	8	9	14	3	4	2	9	4	1	1	0	0	1	0	4	6 (1 N.N.D.)	
1955	22	8	14	19	3	12	2	13	7*	0	3	1	0	6	4S.B.*	8	0	* 1 Ruptured Uterus o 1 Corpore C. and 1 spontaneous rectification
N.S.H.																		
1952	14	5	9	12	2	9	1	10	9	1	1	0	0	2*	0	5	1 (alive)	* Arm replaced.
1953	9	2	7	8	1	5	1	5	1	2	2	1	0	2	2 S.B.	0	0	
1954	11	5	6	8	3	7	1	6	3	1	3	2	0	2*	2 S.B.	8	0	* Corpore conduplicato
1955	15	2	13	14	1	11	1	11	10	0	3	0	1	1	1 S.B.	0	0	
M.M.H.																		
1952	2	1	1	1	1	1	0	1	1	0	1	0	0	0	0	1	0	
1953	6	3	3	5	1	1	0	2	1	0	3	0	0	1	0	1	0	
1954	4	3	1	3	1	0	0	0	0	0	0	0	0	0	0	0	4	
1955	3	1	2	3	0	2	0	2	2	0	0	0	0	0	0	1	0	
ST.M.																		
1952	5	0	5	5	0	3	0	2	1	0	1	0	0	1	1 S.B.	1	1*	* E.C.V. failed. Decapitation.
1953	8	8	0	8	0	4	0	4	3	0	2	0	0	2*	1 S.B.	3	1 (alive)	* 1 E.C.V. in labour successful. * Twins alive.
1954	9	4	5	9	0	4	0	8	3	0	0	0	0	1	1 S.B.	3*	1*	* Macerated.
1955	13	7	6	13	0	4	1	12	4	1	0	0	0	1*	0	1	0	* E.C.V. in labour successful.
G.S.H.																		
1952	3	0	3	3	0	2	0	1	1	0	1	0	0	1*	1 S.B.	1	0	* Spontaneous evolution.
1953	7	5	2	6	1	1	0	3	1	1	4	0	0	0	0	2	1 (alive)	
1954	9	5	4	8	1	2	0	1	1	0	6	0	0	1	1 S.B.	2	0	* Decapitation.
TOTAL	208	81	127	179	29	102	15	128	76	11	36	5	2	*25	17 S.B.	56	18 (3 N.N.D.)	* 6 Decapitations. (6 S.B.) * 19 Spontaneous (14 S.B.)
% Age	0.7%	38.4	61.6	86.1	13.9	49.9	14.1	61.5	59.4	21.1	17.3	13.9	5.5	12.0	68%	26.9	8.5 (20%)	
% Age LOSS							56%		67.9%		16.6%							

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TRANSVERSE AND OBLIQUE LIES.

FOETAL loss in relation to method of delivery and prolapse of cord.

TABLE 43.

Harris and Epperson(1950) noted a stillbirth loss of 33.5% with transverse lie.

Webster and Goitmann(1956) recorded a foetal mortality of 48% with this malpresentation. With caesarean section there was only a 18.42% mortality whereas in 23 patients in whom internal version and extraction was done 82.6% or 19 infants were lost.

Holmes(1956) from Guys Hospital collected figures from various centres and found that following 256 vaginal deliveries ,39% of babies were lost,whereas after 143 abdominal sections only 7% died.

Holmes concluded from this analysis that internal version was a serious operation,and he stressed the following factors necessary for successful manipulation:-

- (a) Adequate anaesthesia was of prime importance. Relaxation of the uterus was essential.
- (b) The cervix should be effaced and dilatable.
- (c) The foetal head must be displaceable.
- (d) There must be absence of true contraction of the pelvis.
- (e) Lack of haste was essential,and the operator must be experienced.

Ewing(1949) reported the remarkable results of only a 5.7% foetal mortality following internal and bipolar version,when only 31 babies were lost in 534 transverse lies.

#### PERINATAL MORTALITY IN OUR UNITS.

(TABLES 63,44 and 75)

Of 208 babies with transverse and oblique lie delivered in our units during 1952-55,no less than 117 or 56.0% were lost,49% being stillborn and 14.1% neonatal deaths.

TRANSVERSE AND OBLIQUE LIE. ( WHITES AND NON - WHITES.) (TABLE 43)

Foetal loss according to method of delivery.

RACE.	NO.	B.	E.	TOTAL LOSS.		VERSION. (Internal and Bipolar.)			CAESAREAN. SECTION.		SPONTANEOUS. and DESTRUCTIVE.	
				SB.	NND.	No.	SB.	NND.	No.	LOSS.	No.	LOSS.
WHITES.	15	8	7	4	0	5	4	0	4	0	0	0
% AGE.		53.3	46.7	26.6	0		80	0				
				* 26.6 %			80 %					
NON - WHITES.	103	43	60	.52	5	63	37	6	23	3 SB.	14	10
% AGE.		41.7	58.3	50.4	9.7		58.7	23.0		13%		71.4
				* 55.3 %			68.2 %					

VERSION IN LABOUR. ( WHITES AND NON - WHITES.) (TABLE 44)

COMPARISON OF FOETAL LOSS IN BOOKED AND  
NON-BOOKED CASES AND NUMBER OF TWINS.

RACE.	NO.	BOOKED.			NON-BOOKED.			TOTAL. LOSS.		TWINS.
		NO.	SB.	NND.	NO.	SB.	NND.	SB.	NND.	
WHITES.	13	3	0	0	10	7	0	7	0	2 (2nd)
% AGE.				0 %		70 %		53.8 %		
NON - WHITES.	95	52	17	4	43	37	3	54	7	18 { 2nd ) 1 Triplet) 2nd.
% AGE.			32.6	11.7		86.0	50	56.7	17	
			40.3 % *			93 % *		64.2 %		

IN WHITE PATIENTS.

Of 15 babies delivered with transverse and oblique lie at the Mowbray M.H. during 1952-55, only 4 or 26.6% were lost. These were all stillbirths.

IN NON-WHITES.

Of 103 babies born with the above complication 57 or 55.3% were lost, 50.4% being stillborn and 9.7% neonatal deaths.

There was therefore a statistically significant difference in perinatal mortality in the racial groups, more than twice the percentage being lost in non-whites.

PERINATAL MORTALITY IN TRANSVERSE AND OBLIQUE LIE IN  
RELATION TO THE DEGREE OF ANTENATAL CARE.

(TABLE 75)

A more detailed analysis of the benefits of antenatal care with this malpresentation was undertaken for the years 1953-55.

During this period 165 babies with transverse and oblique lie were delivered of which 98 or 59.3% were from "non-booked" mothers and 67 or 40.7% from "booked" patients.

The perinatal mortality rate was 52.1% or 86 babies lost, of which 77 or 40.6% were stillborn and 9 or 10.2% neonatal deaths.

IN "BOOKED" CASES.

Of 67 babies born, 21 or 31.3% were lost, of which 18 or 26.8% were stillborn and 3 or 6.5% neonatal deaths.

(i) In whites. There was no loss of life in "booked" cases.

(ii) In non-whites. Of 36 babies delivered 42.1% were lost, of which 36.8% were stillborn and 8.3% neonatal deaths.

UNIT. and YEAR	NO	BOOKED.			EMERGENCY			INDICATIONS		TOTAL LOSS		P.H.S.	TWINS	REMARKS.
		NO.	S.B.	N.N.D.	NO.	S.B.	N.N.D.	T.L.	BROW P.P.& P.C.	S.B.	N.N.D.			
<u>F.H.H.</u> 1952	19	11	4	1	8	5	2	15	2 P.C. 2 P.P. 1 Vortex	9	3	2	2 - 2nd TWIN.	
<u>1953</u>	26	4	2	1	22	16	1	24	1 P.C.	18	2	14	4 - 2nd TWIN	
<u>1954</u>	18	12	4	2	6	4	-	12	2 P.P. 1 P.C. Breach Brow.	8	2	2	3 - 2nd TWIN	
<u>1955</u> <u>N.S.H.</u>	18	5	3	-	13	8	1	14	4 P.P.	11	1	5	3 1/2 2nd TWIN	1 Eclampsia.
<u>1952</u>	15	7	3	2	8	6	-	8	P.C. 2 Mao 2 P.P. 3	9	2	1	-	
<u>1953</u>	6	1	-	-	5	4	1	5	1 P.P.	4	1	1	-	
<u>1954</u>	14	10	5	-	4	3	1	8	4 P.P.	8	1	1	3 - 2nd twin	
<u>1955</u>	12	12	1	-	-	9	-	11	1 P.P.	10	-	6	1 - 2nd TRIPLET. 4 - 2nd TWIN	
<u>N.M.H.</u>														
<u>1952</u>	3	-	-	-	3	3	-	1	1 P.O.P. 1 P.C.	3	-	-	-	
<u>1953</u>	3	1	-	-	2	2	-	2	-	2	-	1	1 - 2nd TWIN	1 Failed Forceps C.S.
<u>1954</u>	2	2	-	-	-	-	-	2	-	-	-	-	-	
<u>1955</u>	5	-	-	-	5	2	-	2	(TWIN)2nd.	2	-	-	1 - 2nd TWIN	
<u>St. H.</u> <u>1952</u>	3	-	-	-	3	1	-	1	-	1	-	-	1 - 2nd TWIN	
<u>1953</u>	6	6	3	-	-	-	-	4	1 P.P. 1 (?)	3	-	-	-	1 Mento-post (Int. Version)
<u>1954</u>	11	6	1	-	5	3	-	8	1 Brow. 2 P.P.	4	-	-	2 - 2nd TWIN	
<u>1955</u>	12	6	2	1	6	3	-	12	-	5	1	-	6 - 2nd TWIN	
<u>U.S.H.</u> <u>1952</u>	5	1	1	-	4	2	-	2	Brow 1. FF - 1 2nd TWIN	3	-	-	1 - 2nd TWIN	
<u>1953</u>	9	3	1	1	6	4	1	4	1 P.P. 1 P.C.	5	2	1	2 second TWINS 4 - 2 1st TWINS (1 P.C.) (1 P.P.)	
<u>1954</u>	2	-	-	-	2	2	-	1	1 Brow	2	-	-	-	
<b>TOTAL</b>	189	87	30	8	102	77	7	136	P.P.21 P.C.8 BROW 4 Etc.29	107	15	34	34 - 2nd TWINS 2 - 1st TWINS	
% Age.	0.7%	46.5%	34.4%	14%	53.5%	75.5%	28%	71.9%	28.1%	56.6%	18.2%			
% Age Loss.				43.6%			82.3%*							65%

VERSION IN LABOUR. (TABLE 44a)

Postal loss in relation to Booked and Emergency cases, and indications.

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IN "NON-BOOKED" CASES.

(TABLE 75)

Of 65 babies with transverse and oblique lie delivered in our units 62.7% were lost, 55.8% being stillborn and 15.7% neonatal deaths. This enormous perinatal mortality occurred in "non-booked" non-white patients at the Somerset, Grootte Schuur and St. Monica's Hospitals.

On the other hand in white women at the Howray M.E. 50% of babies were lost in "non-booked" patients.

It was apparent therefore from the above analysis that only 33.7% of the babies delivered from "non-booked" patients were salvaged, whereas in 68.7% babies were rescued in "booked" patients with transverse and oblique lie.

Antenatal detection and adequate management of these patients with transverse and oblique lie will result in a much more satisfactory result for the baby than when inadequate attention is administered.

PERINATAL MORTALITY IN ALL PATIENTS UNDERGOING VERSION DURING LABOUR.

(TABLES 44)

When version during labour was performed for 189 babies delivered in our units during 1952-55, as many as 122 babies or 65.0% were lost of which 56.6% were stillborn and 18.2% neonatal deaths.

Of this number 128 operations of version in labour were done for transverse and oblique lie, and 87 or 67.9% of babies were lost.

PERINATAL MORTALITY IN VERSION IN LABOUR FOR INDICATIONS OTHER THAN TRANSVERSE AND OBLIQUE LIE.

The indication for operation in these cases was

for cord prolapse, unsuccessful rotation of the foetal head in the P.O.P., brow presentation etc.

Of these babies 57.4% or 35 infants were lost, of which 31 or 50.8% were stillborn and 4 or 13.3% neonatal deaths.

The foetal heart beat was not heard in 34 babies in all cases of version in labour beforehand, i.e. in 12.7% of instances.

Version in labour was performed for the second of twins in 34 babies, many of whom were premature, and many of whom died in the neonatal period for reasons unknown (? brain damage), because of insufficient autopsy performance. The seriousness of operative delivery of premature babies in terms of resultant loss of life cannot be underestimated (see later under "prematurity"). It should be born in mind therefore that routine extraction after internal version of a second of twins is fraught with danger, because of prematurity of this child. Skillful non-interference under such circumstances would certainly rescue many more second of twins especially when no malpresentation exists beforehand.

#### VERSION IN LABOUR IN WHITE PATIENTS.

(TABLE 42)

Few such operations were done at the Howbray H.R. during 1952-55. Only 13 babies were so delivered with a perinatal mortality of 53.8% (all stillbirths).

#### VERSION IN LABOUR IN NON-WHITES.

Of 95 babies so delivered the perinatal loss was 61 or 64.2%, of which 54 were stillborn or 56.7% and 7 neonatal deaths or 17%.

There was hence no significant statistical difference in perinatal mortality following version in labour in the racial groups.

**PERINATAL MORTALITY FOLLOWING VERSION IN LABOUR IN RELATION  
TO THE DEGREE OF ANTENATAL SUPERVISION. (TABLES 43,44)**

**IN "BOOKED" CASES.**

Of the babies with transverse lie admitted to our units 46.5% were from mothers "booked" in our antenatal clinics. Of these infants 38 or 43.6% were lost, of which 30 or 34.1% were stillborn and 8 or 14% neonatal deaths.

(i) In "booked" white patients. No babies were lost in these women, undergoing version during labour.

(ii) In "booked" non-whites. 40.3% of these infants were lost of which 32.6% were stillborn.

**IN "NON-BOOKED" CASES.**

53.5% of babies delivered by version during labour were from "non-booked" women, and 82.3% of their babies were lost, of which 75.5% were stillborn and 28% neonatal deaths.

(i) In "non-booked" whites. 70% of these babies were lost, all being stillborn.

(ii) In "non-booked" non-whites. 93.0% of babies were lost.

It is apparent therefore that there was a significantly higher perinatal mortality rate in version during labour when patients had not received antenatal care, in both racial groups. Particularly was the benefit of supervision obvious in the white patient.

In patients not receiving adequate care the perinatal mortality rate was statistically not different in both races, because of the seriousness of the manoeuvre of version during labour.

**PERINATAL MORTALITY IN RELATION TO THE METHOD OF DELIVERY IN  
TRANSVERSE AND OBLIQUE LIE.** (TABLES 43,44)

**(1) DELIVERY BY CAESAREAN SECTION.**

Of 189 babies presenting as transverse and oblique lie, 36 or 17.3% were born by abdominal section.

Of these babies 7 or 16.6% were lost, of which 5 or 13.9% were stillborn and 2 or 5.5% neonatal deaths.

**IN WHITE PATIENTS.** There was no loss with 4 caesarean sections.  
**IN NON-WHITES.** Of 23 babies delivered by "section" there was a perinatal loss of 13% or 3 stillbirths.

This method of delivery offered the best chance of survival for the baby with transverse and oblique lie in our units.

**(2) DELIVERY BY INTERNAL AND BIPOLAR VERSION.**

As high a perinatal mortality rate as 67.9% occurred following internal and bipolar version for transverse and oblique lie in our units. 59.4% of these were stillbirths.

**IN WHITES.** Of 15 babies delivered from patients with this malpresentation 5 were born by internal version, 4 of which or 80% being lost as stillbirths.

**IN NON-WHITES.** Of 63 babies delivered by version 43 or 68.7% were lost, of which 58.7% were stillborn.

Internal and bipolar version was hence a very lethal method of delivery to the baby with transverse and oblique lie, in both racial groups. There was no statistical difference in perinatal mortality rates in the racial groups when the baby was so delivered.

Internal and bipolar version therefore as a method of delivery was fraught with danger to the baby, and should be frowned upon especially if the baby is premature, or if facilities for abdominal section be ~~not~~ available.

(3) EXTERNAL CEPHALIC VERSION IN TRANSVERSE AND OBLIQUE LIE.

(TABLES 43)

Of 189 babies presenting as transverse and oblique lie, 18 were delivered after cephalic version had been performed.

Of 11 such manipulations performed successfully during labour there were 3 neonatal deaths, and 1 macerated stillbirth. There was hence a perinatal mortality rate of 36.3% after external cephalic version in transverse and oblique lie.

In the remaining 7 cases when external version was unsuccessful, 3 babies were delivered subsequently following destructive operations such as decapitation, craniotomy etc.

The other 4 babies were delivered by abdominal section.

(4) SPONTANEOUS DELIVERY WITH TRANSVERSE AND OBLIQUE LIE.

In 13 cases following replacement of the hand or arm, or following external cephalic version, or following spontaneous correction of the malpresentation, only 6 babies or 46.1% survived.

(5) DESTRUCTIVE OPERATIONS IN TRANSVERSE AND OBLIQUE LIE.

(TABLE 46)

In 12 instances was this operation undertaken, 6 with craniotomy and extraction, and 6 decapitations with extraction.

IN WHITE PATIENTS.

During 1952-55 at the Mowbray M.H. there were no operations for destruction of the foetus prior to delivery, or spontaneous delivery following spontaneous correction of transverse or oblique lie.

IN NON-WHITES.

At the Somerset and Groote Schuur Hospitals and St. Monica's Home, there were 14 babies delivered following spontaneous correction of transverse and oblique lie, or following destructive operation. Only 10 babies were lost or 71.4%.

It is therefore apparent that transverse and oblique lie, especially when the patient was in labour was a very serious complication of labour to the baby, especially if such a patient had not received adequate antenatal care.

Caesarean section offered the best chance for the baby.

All other manipulations for procuring delivery were very lethal to the infant.

PROLAPSE OF THE UMBILICAL CORD ASSOCIATED WITH TRANSVERSE AND OBLIQUE LIE.

(TABLE 22)

This complication of labour occurred in 56 instances with the loss of 58.8% of babies, 55.4% of which were stillborn and 8.0% neonatal deaths.

IN WHITES. In only 3 cases did the cord prolapse with transverse and oblique lie, with the loss of 1 baby.

IN NON-WHITES. 27 babies with this complication of labour

were noted in our non-white units during 1952-55, and 14 babies or 51.8% were lost, all being stillborn.

It is suggestive that with better antenatal care especially in the white, fewer cases of transverse lie in labour were admitted to our wards, compared with such a complication in the non-white. Perinatal losses associated with this malpresentation were therefore less often noted in patients with good antenatal care, apart from those associated with conditions predisposing to such malposition, viz. placenta praevia, contracted pelvis etc.

PERINATAL MORTALITY RATES IN THE PRESENCE OF PREMATURE BABIES ASSOCIATED WITH TRANSVERSE AND OBLIQUE LIE. (TABLE 85)

Of 60 premature babies with transverse and oblique lie delivered in our units during 1953-55, 42 or 70% were lost, of which 61.6% were stillborn and 21.7% neonatal deaths.

During the same period of time 105 babies weighing more than 5½ lbs were delivered with the above complication, and 44 or 41.9% were lost, 38% being stillborn and 6.1% neonatal deaths.

Statistically this difference in perinatal mortality rates in mature and premature babies with transverse lie was significant, but only a "chance" difference according to the  $X^2$  comparison test.

SUMMARY AND CONCLUSIONS"TRANSVERSE AND OBLIQUE LIE".  
(INCLUDING VERSION IN LABOUR)

The incidence of transverse and oblique lie in our units during 1952-55 was 0.7%.

In white patients the incidence was less than  $\frac{1}{2}$  that occurring in non-whites (0.3% : 0.7%).

In "non-booked" women the incidence of transverse and oblique lie was more frequent than in "booked".

Perinatal mortality losses showed that 56.0% of babies with this complication in our units were lost, the vast majority being stillborn.

In "non-booked" cases there was a significantly higher perinatal mortality than in "booked" cases (66.3% : 31.3%).

So similarly in "non-white patients" the perinatal losses were much higher than in whites (55.3% : 26.6%).

It was apparent therefore that antenatal care was of the utmost benefit in the prevention of transverse and oblique lie, and lowering of mortality in the infant.

The influence of the method of delivery on perinatal losses again reveal the advantages of prenatal supervision.

Caesarean section gave the best results for the foetus in our units, with a loss of only 16.6%.

Other methods of delivery, i.e. per vaginam, were lethal for the infant.

Version in labour which was less frequently performed in patients attending our antenatal clinics regularly, i.e. in whites. The incidence of this manipulation in whites was 0.3% compared with 0.7% in non-whites.

Perinatal losses associated with version in labour was 64.2%. In "non-booked" cases the loss was 82.6% compared with a "booked" loss of 43.6%. Losses in "non-booked" cases in both racial groups were similar.

Statistically therefore there was a significant difference in perinatal mortality rates in "booked" and "non-booked" cases in cases of transverse and oblique lie, as there was in whites and non-whites.

Antenatal care hence was of the utmost benefit in not only the prevention of transverse and oblique lie, but also for the best choice of treatment to save life.

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**(7) RUPTURE OF THE UTERUS****(Table 45)**

This, often fatal, accident of pregnancy or labour to both mother and child at once suggests a labour badly managed. (Manro Kerr)1949. Not only is the foetal mortality nearly always 100%, but also the mother is nearly always in danger of losing her life.

Kerr also believes that in the majority of instances in which rupture has occurred, the accident must be considered discreditable to the obstetric art, and to the individual who has charge of the patient. There are however exceptional cases in which this accident is unavoidable.

Again here, as elsewhere, rupture of the uterus tends to occur more frequently in regions or institutions where complicated obstetrics is performed. The inadequacy of antenatal care and careful supervision in pregnancy and labour will tend to favour the rate at which rupture will inevitably occur.

**INCIDENCE.**

Burrows(1941) of Cleveland reported an incidence of rupture of the uterus in 1 in 1483 deliveries, and Lynch(1945) from Boston in 1 in 1118 deliveries.

Bill, Barney and Melody(1944) found rupture of the uterus in 1 in 2675 deliveries; Delfs and Eastman(1945) 1 in 1000; and Dugger(1945) of 1 in 3029 cases.

Browne(1950) noted rupture of the uterus to account for 6.6% of all maternal deaths, but her reports that it is probable that many cases are not diagnosed as such and registered at death as due to haemorrhage and shock.

Harris and Angava(1951) from Kenya reported an incidence of 1 in 117 deliveries.

Lavery(1955) from Baragwanath Hospital, Transvaal, reported an incidence of 1 rupture in 137 deliveries.

RUPTURED UTERUS. Foetal loss in  
booked and emergency cases.

UNIT.	YEAR.	NO. (Babies)	BOOKED			NON - BOOKED.		
			NO.	SB.	NND.	NO.	SB.	NND
P.M.H.	1952	3	0	0	0	3	3	0
	1953	4	1	1	0	3	3	0
	1954	4	0	0	0	4	4	0
	1955	6	3	1	0	3	1	0
N.S.H.	1952	3	1	0	0	2	0	0
	1953	3	2	0	0	1	1	0
	1954	5 *	3	2	0	2	1	1 * see text.
	1955	4*	2	2	0	2	2	0 * see text.
M.M.H.	1952.	0	0	0	0	0	0	0
	1953	1	1	1	0	0	0	0
	1954	0	0	0	0	0	0	0
	1955	0	0	0	0	0	0	0
ST. M.	1952	0	0	0	0	0	0	0
	1953	3	2	2	0	1	1	0
	1954	1	1	1	0	0	0	0
	1955	1	0	0	0	1	1	0
G.S.H.	1952	1	0	0	0	1	1	0
	1953	0	0	0	0	0	0	0
	1954	0	0	0	0	0	0	0
	TOTAL.	39	16	10	0	23	18	1
	% AGE.	0.15	4.1	62.5	0	59%	78.2%	20%
			• 62.5%			• 82.6%		
	TOTAL LOSS.		69.1%			82.6%		

TABLE 45

Montgomery(1955) from a Rhodesian rural area noted an incidence of 1 rupture of uterus in 300. Antenatal care was poor in this area.

From University College, Ibadan(1954) the incidence of rupture of the uterus was 0.6%. In "booked" cases this was 0.1% and in "non-booked" 2.7%.

#### IN OUR UNITS.

During the years 1952-55 there were 39 babies delivered of women with rupture of the uterus out of 25930 babies delivered, that is 1 in 665, or 0.15%.

In white patients. Only 1 case of rupture of the uterus occurred at the Howbray M.H. during 1952-55, in 4261 babies delivered.

In non-whites. 21 babies were delivered from women with rupture of the uterus, i.e. an incidence of 1 in 633 deliveries, or 0.16%.

In patients with antenatal care in our units the incidence was 1 in 1345 deliveries(0.07%), whereas in "non-booked" cases the incidence was 1 in 191 deliveries(0.5%).

#### FOETAL MORTALITY.

Durrows(1941) reported a 69% foetal loss with rupture of the uterus; Bill, Barney and Melody(1944) 62%; Delfs and Eastman(1945) 88.2%; Dugger(1945) 62%; Fitzgerald, Webster and Fields(1949) 79.1%; and Donnelly(1951) and 85.5% mortality.

#### IN OUR UNITS. (Table 45)

Of 39 babies delivered of women with rupture of the uterus, no fewer than 29 were lost(74.3%), of which 28(71.7%) were stillborn, and 1 neonatal death(2.0%).

In white patients. There was 1 case of rupture of the uterus and the baby was stillborn.

In non-whites. Of 21 babies delivered 14 were lost (66.6%) 13 being stillborn and 1 neonatal death.

#### FETAL MORTALITY IN RELATION TO ANTENATAL CARE.

In "booked" cases. Of 16 babies delivered 10 were lost (62.5%) all being stillborn.

In "non-booked" cases. Of 23 babies delivered 19 were lost, or 82.6%, 18 being stillborn (78.2%) and 1 neonatal death (20%).

In "booked" non-whites. 11 babies were born of women with rupture of the uterus and 7 were lost (63.6%) all of which were stillborn.

In "non-booked" non-whites. Of 10 babies delivered, 8 were lost (80%), 7 being stillborn and 1 neonatal death.

From the above statistical analysis it was obvious that rupture of the uterus carried a high mortality for the foetus, both in "booked" and "non-booked" cases.

Obviously the much smaller incidence of this accident in whites suggests that adequate antenatal supervision played an important part in its prevention, and thereby reduced the foetal mortality due to its occurrence.

#### SUMMARY

The incidence of rupture of the uterus in our units was high compared with other centres overseas. This was mainly due to the larger number of cases occurring in our non-white population. The general incidence in our units was 0.15%, in non-whites 0.16% and in whites 1 in 4261 deliveries (0.02%).

The foetal loss associated with this accident was high in all centres, in our units it being 74.3%, most of the losses occurring in non-whites in whom antenatal care left much to be desired, because of the large numbers of "non-booked" patients admitted.

The foetal losses in both "booked" and "non-booked" cases were high (62.5% : 82.6%).

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UNIT and YEAR	TOTAL NO.		BOOKED		NON- BOOKED
P.M.H. 1952	7	2	1. Face (M.P.) (C). 2. Impacted Shoulders. (Macerated) (CL)	5	1. P.O.P. (I.U.D.) - 2 (C) 2. BREECH. Aftercoming head (C) 3. Transverse Lie - 2
1953	8	2	1 Hydrocephalus. (C). 2 Transverse Lie Int. version (C).	6	1. Obstructed Labour. (I.U.D.) 4 (C) 2. Transverse Lie - 2 (D).
1954	3	0	-	3	1. Construction Ring. (E). 2. Obstructed Labour (I.U.D.) (C). 3. Hydrocephalus. (C).
1955	5	3	1. P.O.P. (I.U.D.) (C). 2. Cord Prolapse (C). 3. Hydrops foetalis (C).	2	1. Hydrocephalus. (C). 2. Breech (C).
N.S.H. 1952	1	0	-	1	1 Breech. Ruptured Uterus (C). Hysterectomy.
1953	3	1	Hydrocephalus (C)	2	1. Hydrocephalus (C) 2. Cord Prolapse (C)
1954	5	1	Cord Prolapse (C)	4	1. Hydrocephalus (2) (C) 2. Anencephaly (C) 3. P.O.P. (I.U.D) (C)
1955	0	0	-	0	-
M.M.H. 1952	0	0	-	0	-
1953	1	0	-	1	Hydrocephalus (C)
1954	0	0	-	0	-
1955	0	0	-	0	-
ST. M. 1952	3	1	P.O.P. (I.U.D.) (C)	2	1 Hydrocephalus (C) 2 Transverse Lie (D)
1953	1	0	-	1	Obstructed Labour (I.U.D.) (D)
1954	1	1	Hydrocephalus (C)	0	-
1955	2	0	-	2	1 Obstructed Labour (I.U.D.) (C). 2. Obstructed Labour (I.U.D.) (C)
G.S.H. 1952	4	0	-	4	1. Hydrocephalus (C) 2. Obstructed Labour (C) 3. Failed Forceps (C) 4. Transverse Lie (D)
1953	4	1	P.O.P. (I.U.D.) Eclampsia.	3	1 P.O.P. (I.U.D.) Eclampsia (C) 2. Hydrocephalus (C) 3. Breech (C)
1954	1	0	-	1	1 Hydrocephalus (C)
TOTAL	49	12	HYDROCEPHALUS - 3 P.O.P. (I.U.D.) - 6 * Other Causes - 3	37	HYDROCEPHALUS - 10 OBSTRUCTED LABOUR (I.U.D.) - 26 * Others - 1
% AGE	0.15	24.5		75.5	

DESTRUCTIVE OPERATIONS. Stillbirths in emergency and

Booked cases with indications for operation.

(CRANIOTOMY (C) ) (DECAPITATION - D). (CLEIDOTOMY - CL.) (EMASCERATION - E.)

TABLE 46

**(8) DESTRUCTIVE OPERATIONS.****(TABLE 46)**

During the 4 years 1952-55 destructive operations for the purpose of procuring delivery per vaginam were undertaken in 49 cases, or an incidence of 0.19% of all deliveries.

Operations performed were those of craniotomy, decapitation, cleidotomy and evisceration.

Craniotomy was performed in 43 cases (0.16%); the main indication being to facilitate easier vaginal delivery of an already dead baby the passage of which had been unduly delayed due to inefficient uterine contractions, obstruction due to an unduly large head, in the presence or absence of contraction of the pelvis, and because of foetal malformation.

In the majority of instances in which craniotomy was performed, incoordinate uterine action had been manifest for many hours of a prolonged labour. In as many as 61.2% of these cases inefficient uterine contractions were present.

Hydrocephalus was noted in 13 cases for which craniotomy was done, or in 26.5%.

Decapitation was performed in 4 babies in the presence of transverse lie with intrauterine death.

Cleidotomy was recorded in only 1 case; a case in which the infant had been impacted by its shoulders in a vertex presentation.

Evisceration occurred in 1 case when a constriction ring was discovered.

ANTENATAL CARE IN RELATION TO DESTRUCTIVE OPERATIONS. (TABLE 46)

Of 49 destructive operations performed 12 were done in "booked" cases, or in 24.5% of cases.

The incidence of the performing of these operations was 0.05% in patients who attended our antenatal clinics, and in 0.8% in women who had not had antenatal supervision.

Only 12 destructive operations were performed during 1952-55 in "booked" patients, 8 of which were done for conditions other than foetal abnormality. The incidence for such operations other than malformation of the foetus was hence 1 in 2681 cases.

In "non-booked" patients 29 such operations were done for conditions other than foetal malformation, or an incidence of 1 in 151 cases.

There was therefore almost a 20 times greater incidence for destructive operations in "non-booked" patients as in "booked" for conditions other than foetal malformation.

In white patients at the Howbray Maternity Hospital only 1 destructive operation was done during 1952-55 in 4261 delivered, and that for a hydrocephalic baby.

In non-whites at the Somerset and Groote Schuur Hospitals and St. Monica's Home during 1952-55, destructive operations were done in 25 cases, 5 of which were in "booked" cases (or 20%) and 20 in "non-booked". When foetal malformation was excluded, only 3 operations of this nature were done in "booked" patients and 11 in "non-booked".

The significantly higher incidence of destructive operations performed in "non-booked" patients, and in the racial groups was obvious proof of the benefits conferred by antenatal care, especially when foetal malformation was excluded.

## STATISTICS FROM OTHER CENTRES FOR DESTRUCTIVE OPERATIONS.

Detailed statistics on this subject from the world literature were very meagre.

Lawson and Lister(1954) from University College, Ibadan, Nigeria reported on 66 cases of embryotomy and craniotomy over an 18 month period, with an incidence of 1.2%.

In "booked" cases the incidence of destructive operations was 0.3% , whereas in "non-booked" it was 4.9%, which was almost 16 times greater.

Craniotomy was performed for obstructed labour in the absence of foetal malformation in 78.8% of cases.

As many as 5 maternal deaths occurred following this operation.

Montgomery(1955) from a rural district of Rhodesia reported 45 destructive operations in 3275 deliveries, with an incidence therefore of 1 in 73 or 1.1%. Antenatal care was poor as in Ibadan, Nigeria.

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## SUMMARY AND CONCLUSIONS.

The benefits of antenatal care in preventing destructive operations, apart from those performed for foetal abnormality are strikingly obvious when considering not only the increased incidence in "non-booked" patients, but also in our racial groups in whom the degree of such care was at variance.

UNIT. and YEAR.	NO.	FACE.						REMARKS.	NO.	B R O W.						REMARKS.
		PARITY.		B.	E.	TOTAL LOSS				PARITY.		B.	E.	TOTAL LOSS		
		M.	P.			SB.	NND			M.	P.			SB.	NND	
P.M.H. 1952.	9	7	2	5	4	3	2		1	0	1	1	0	0	0	
1953	8	7	1	6	2	1*	0	* Ruptured Cord	6	3	3	3	3	0	0	
1954	6	2	4	5	1	0	0		0	0	0	0	0	0	0	
1955	12	8	4	11	1	2	2		13	10	3	8	5	0	1	
H.S.H. 1952.	6	5	1	4	2	1x	0	* Anencepha- -lic	3	2	1	2	1	1	0	
1953	6	4	2	4	2	1	0		1	1	0	1	0	0	0	
1954	5	1	4	3	2	1*	0	* Anencepha- -lic	2	0	2	1	1	0	0	
1955	11	7	4	6	5	0	1		1	0	1	1	0	0	0	
M.M.H. 1952	4	1	3	4	0	0	0		1*	0	1	1	0	0	0	* 1st TWIN.
1953	2	1	1	2	0	0	1*	* Achondro- plasia.	4	3	1	1	3	0	0	
1954	2	1	1	2	0	0	0		2	0	2	2	0	0	0	
1955	2	1	1	2	0	0	1		4	2	2	0	4	0	0	
1952 ST. M.	5	3	2	5	0	0	0		0	0	0	0	0	0	0	
1953	3	3	0	3	0	1	0		3	3	0	3	0	0	1	
1954	0	0	0	0	0	0	0		0	0	0	0	0	0	0	
1955	5	5	0	1	4	0	0		1	1	0	0	1	0	1	
G.S.H. 1952	2	2	0	2	0	0	0		2	1	1	1	1	0	1	
1953	1	1	0	1	0	0	0		0	0	0	0	0	0	0	
1954	1	-	1	1	0	1	0		1	1	0	0	1	1	0	
TOTAL.	90	59	31	67	23	11	7		46	28	18	25	21	2	4	
AGE.	0.3	65.8	34.2	74.5	25.5	12.2	8.8		0.1	60.8	39.2	54.4	45.6	4.3	9.3	
LOSS.		20 %								13 %						

FACE AND BROW PRESENTATION. FOETAL LOSS.

TABLE 47

**(9) FACE AND DROW PRESENTATION.****(TABLE 47)****(A) FACE PRESENTATION.**

All textbooks of obstetrics stress the higher stillbirth and neonatal mortality rates with this type of presentation because of delay in labour, particularly in the primigravida and the complications associated with such delivery.

King and Scegar(1948) reported 51 cases of face presentation in 28169 deliveries or an incidence of 0.19%.

Helman(1950) quoted an incidence of 0.21% face presentation.

Gomez and Denner(1956) noted an incidence of 1 in 555 deliveries or 0.18% of face presentation.

**INCIDENCE OF FACE PRESENTATION IN OUR UNITS.**

During the period 1952-55 inclusive 90 babies were born as face presentation. The incidence for this presentation was therefore 0.34%.

**IN WHITE PATIENTS(KOWDRAY H.H.)**

The incidence of face presentation was 1 in 426 deliveries or 0.2%.

**IN NON-WHITES (SOMERSET AND GROOTE SCHUIR HOSPITALS AND ST. MONICA'S)**

The incidence of face presentation was 1 in 295 or 0.3%.

**PERINATAL MORTALITY IN FACE PRESENTATION.**

Of 90 babies born with face presentation 18 or 20.0% were lost of which 11 or 12.2% were stillborn, and 7 or 8.8% were neonatal deaths.

Of 90 cases of face presentation 74.5% occurred in "booked" patients, and 65.8% of the women were multiparous.

PERINATAL LOSSES ACCORDING TO THE DEGREE OF ANTENATAL CARE.

(1953-55)

IN "BOOKED" CASES.

There were 48 "booked" cases or an incidence of 0.29%.

Altogether 5 babies were lost during the early neonatal period, and no stillbirths were recorded. The perinatal mortality rate was hence 10.4%.

IN "NON-BOOKED" CASES.

Of 11 cases of face presentation or an incidence of 0.26%, only 2 babies were lost or a perinatal mortality rate of 8.1%.

IN WHITE PATIENTS.

A perinatal loss of 20% was recorded in white patients with face presentation, or 2 neonatal deaths. One baby was an achondroplastic dwarf.

IN NON-WHITES.

There were 5 stillbirths and 1 neonatal death out of 45 babies born, or a perinatal loss of 13.5%. Two of the babies born were anencephalic.

PERINATAL MORTALITY IN OTHER CENTRES.

King and Seegar (1948) reported a foetal loss of 12% in mento-anterior and mento-transverse positions, whereas in mento-posterior the loss was 29.4%.

Helman (1950) recorded a 7.3% perinatal loss in all face presentations.

Gomez and Denner (1956) report a foetal mortality of 20% for all face presentations.

From the unit at University College, Ibadan, Nigeria 21 cases of face and brow presentation were recorded during an 18 months period 1953-54, with an incidence of 0.3%, and a perinatal mortality rate of 38%. This high loss was mainly attributable to the very poor antenatal care and the high frequency of intrauterine foetal death.

#### SUMMARY.

Face presentation in our units was comparatively more common than in many other centres.

The incidence of this presentation was similar in both whites and non-whites.

Perinatal mortality with face presentation was higher than with normal vertex presentation, as much as 20% of babies being lost.

Although the numbers of cases quoted were few, there was no significant difference in foetal losses between "booked" and "non-booked" cases, or in whites and non-whites.

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**(B) BROW PRESENTATION.****(TABLE 47)**

During the years 1952-55 inclusive there were 46 cases of brow presentation recorded in our units, or an incidence of 1 in 584 deliveries or 0.18%.

In white patients there were 12 brow presentations with an incidence of 1 in 355 or 0.29%.

In non-whites the incidence of brow presentation was 1 in 949 deliveries or 0.01%.

In "booked" cases the frequency of brow presentation was 0.11%, whereas in "non-booked" it was 0.48%

**PERINATAL MORTALITY IN BROW PRESENTATION.**

Of 46 babies delivered, 6 or 13.0% were lost, of which 2 or 4.3% were stillborn and 4 or 9.3% neonatal deaths.

**PERINATAL LOSSES ACCORDING TO ANTENATAL CARE.**

Of 46 cases of brow presentation 25 were from "booked" patients and 21 from "non-booked".

**IN "BOOKED" CASES.**

The perinatal losses were as much as 26.6%.

**IN "NON-BOOKED" CASES.**

The perinatal mortality was 28.5%.

**IN WHITE PATIENTS (MOWBRAY M.H.)**

In patients with brow presentation the perinatal mortality was 20%.

**IN NON-WHITES (SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST. MONICA'S)**

The perinatal mortality for brow presentation was 50%.

Statistically there were too few cases of brow presentation for differential comparison in the racial groups.

PERINATAL MORTALITY IN BROW PRESENTATION WITH INCIDENCE IN  
OTHER CENTRES.

King and Seegar(1948) reported an incidence of brow presentation as 1 in 1760 deliveries,with a foetal loss of 18.7%.

Helman(1950) recorded an incidence of 1 in 498 deliveries and a foetal loss of 7.1%.

SUMMARY.

Brow presentation occurred with a frequency of 1 in 564 deliveries in our units during 1952-55,with a more common diagnosis of this complication in whites as compared with non-whites in the ratio 3 : 1.

Perinatal mortality was 13.0%,with a neonatal mortality twice larger than stillbirth rate.

There was no significant statistical difference in perinatal mortality in "booked" and "non-booked" cases.

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REFERENCES.

"BROW PRESENTATION"

(SEE "FACE PRESENTATION")

MISCELLANEOUS CAUSES OF FOETAL LOSS OF LIFE.(i) RHESUS INCOMPATIBILITY.

Of recent years this condition has come more into the picture as a cause of perinatal mortality.

Boorman, Dodd and Mollison(1947) however maintain that disappearance of rhesus incompatibility would scarcely make a difference to the stillbirth rate.

Sutherland(1949) agrees with the above authors, and stated that rhesus incompatibility foetal losses scarcely come into the picture as a factor in increasing the stillbirth rate.

Zoutendyk(1947) states that the Bantu showed a much smaller incidence of rhesus negative women(only 5%) than in whites, and that the icterus gravis was extremely rare in Africans.

Moore(1956) noted that the incidence of rhesus negative women in our units for the years 1953-55 inclusive was as follows:-

<u>RACE</u>	<u>RHESUS + ve</u>	<u>RHESUS - ve</u>	<u>RH - ve % age</u>
WHITES	3003	530	15.3
COLOURED	8750	419	4.6
NATIVE	2357	100	4.0
UNKNOWN	537	60	10.0

It is apparent therefore that fewer non-white patients are Rh negative than white patients in our units. The incidence of 4.6% in non-whites is similar to that of Zoutendyk.

Boorman, Dodd and Mollison(1949) recorded an incidence of rhesus incompatibility of 1 in 400 pregnancies.

Moore,(1956) noted that of 1110 Rh negative women in our units during 1953 and 1954,56 or 5% developed antibodies during pregnancy.

FOETAL LOSSES ASSOCIATED WITH RHESUS INCOMPATIBILITY.

Gibberd(1954) reported that at Queen Charlotte's Hospital during 1946-49, there were 34 babies lost in 11035 deliveries, or a foetal mortality of 0.32%. During the same period at Guys Hospital the foetal loss was only 0.035% in 4689 deliveries.

Murray and Taylor(1949) noted that in 35 women who were Rh negative in whom there was no previous history of an affected infant, 10 babies were lost or a 28.5% foetal mortality. When there was a history of a previously affected child in 21 negative women 16 of their subsequent babies died, i.e. in 76.1%.

Allen, Diamond and Vaughan(1950) discussed the effect of maturity of the foetus in relation to foetal loss. They reported that in 95 women who were Rh negative and more than 38 weeks pregnant, the stillbirth and neonatal deaths totalled 11, with an 88% recovery. When pregnancy was less than 38 weeks in 32 women, 10 infants were lost with a recovery of only 69%.

Mollison and Walker(1952) compared the results to the foetus when labour was allowed to start spontaneously with induction of premature labour and noted the following results:-

<u>TYPE OF ONSET OF LABOUR</u>	<u>NO.</u>	<u>FOETAL LOSS</u>	<u>S.E.'s</u>	<u>N.N.D's</u>	<u>FOETAL LOSS(%)</u>
INDUCED	77(20)	28(4)	6(2)	22(2)	36.4%(20%)
SPONTANEOUS	108(29)	26(6)	14(1)	12(5)	21.1%(20.7%)

Note. Figures in brackets from the University of Cape Town as noted by Moore(1956).

Spontaneous onset of labour was followed by a lower foetal mortality than when labour was induced, according to Mollison and Walker.

In our units there was no statistical difference in foetal losses when labour was induced or spontaneous, although when labour was premature but spontaneous in onset the mortality was much higher than when at term and spontaneous, by as much as 4 times. Induced labour at term was followed by a much smaller loss of life in the baby, than when premature and induced. It should however be mentioned that too few cases were analysed in our units by Moore(1956) who managed to investigate only 50 affected children.

#### FOETAL LOSSES ACCORDING TO FOETAL HAEMOGLOBIN ESTIMATION.

Moore reported that from our units 20 babies were investigated, in which transfusion was given following haemoglobin estimation as follows:-

<u>LEVEL OF HB(Gm)</u>	<u>Number</u>	<u>NO. TRANSFUSED</u>	<u>DIED(% age)</u>
6 - 15.5	14	12	4(28.5)
15.5 - 19.5	12	7	1( 8.3)
Unknown	4	1	0( 0.0)

The prognosis for the baby was therefore worse when the haemoglobin estimation was less than 15.5 Gm., especially at even lower levels.

During the period 1952-55 in our units out of 25930 babies delivered there were 22 stillbirths, 10 of which were macerated due to rhesus incompatibility, i.e. 1.7% of all stillbirths.

#### ANTENATAL CARE IN RELATION TO RHESUS INCOMPATIBILITY.

It is apparent that adequate antenatal care in rhesus sensitized women would be of value to both mother and baby in the prevention of loss of life.

The dangers of incompatible blood transfusion to the sensitized

patient is well known.

As far as the baby is concerned timely induction of labour might prevent the not occasional intrauterine foetal death in a patient with a previous bad history, and save babies in the neonatal period by exchange blood transfusion. Adequate nursing care of the premature baby in an institution will certainly be of great benefit.

In our units of the University of Cape Town there were too few cases of rhesus incompatibility to be able to determine statistically the benefit of antenatal care. No doubt there were cases of macerated babies being born due to incompatibility, in whom no antenatal care had been administered. Autopsy examination was not always possible in these babies, and these cases were merely labelled as stillbirths, cause "unknown".

#### SUMMARY AND CONCLUSIONS.

#### "RHESUS INCOMPATIBILITY"

The correct incidence of rhesus incompatibility in our units was not determined because of inadequate autopsy investigation.

During the years 1952-55 there were 22 stillbirths, 12 of which were macerated due to erythroblastosis. The incidence of stillbirth was therefore 1.7% of all stillbirths.

Rhesus incompatibility was much less frequent in non-whites as compared with whites, because of the lower percentage of rhesus negative women in the latter. Altogether 15.3% of white women delivered in our units were rhesus negative, compared with 4.6% in non-whites.

Of 1110 Rh negative women in our units during 1953-54, 56 or 5% developed antibodies during pregnancy.

In our units there was no statistical difference in the foetal losses sustained when labour was induced or spontaneous in onset. When labour was premature but spontaneous in onset foetal mortality

was much higher than when at term and spontaneous in onset, by as much as 4 times.

Induced labour at term was followed by a smaller foetal loss than when premature and induced.

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#### (ii) Epilepsy in Pregnancy.

During the years 1952-55, 31 babies were delivered from mothers with epilepsy in our units. Of these babies there was 1 stillbirth and 1 neonatal death.

#### (iii) Haemorrhagic disease of the newborn.

Three neonatal deaths were attributable to this condition in our units during 1952-55.

#### (iv) Maternal asthma.

Although minor degrees of asthma were recorded in our annual reports for 1952-55, in 2 instances babies were lost

where asthma may have been a predisposing factor. 1 stillborn and 1 neonatal death were recorded.

(v) Carcinoma of the liver in the mother.

A premature baby was born in this case and the baby died soon after delivery, as did the mother.

(vi) Stab wound of the abdomen in the mother.

As a direct consequence of injury to the mother and the uterus, laparotomy was performed and a premature baby was delivered, which died soon after being born.

(vii) Extrauterine pregnancy.

There were 4 stillbirths following extraction of babies in extrauterine pregnancies.

(viii) A stillbirth baby was delivered from each of the following conditions recorded in our annual reports for 1952-55:-  
Short umbilical cord, angione placenta, ruptured spleen, hydrops foetalis(not rhesus) and disseminated lupus erythematosic.

(ix) Internal jaundice.

One stillbirth associated with jaundice in the mother was noted during 1952-55. No cause for the condition was given.

## POSTMATURITY

### ITS SIGNIFICANCE IN THE CAUSATION OF FOETAL DEATH

Evidence is being steadily accumulated to show that when pregnancy is unduly prolonged past "term", perinatal mortality is significantly increased.

There is however considerable controversy in many quarters as to the importance of "postmaturity", as to whether such a clinical entity exists, and the rational method of management of a pregnancy which has been prolonged beyond the "due date".

A considerable difference of opinion exists on the importance of "postmaturity" as a cause of foetal death (Stillbirths and neonatal mortality).

D'Esopo and Marchetti (1942) reviewed 1000 stillbirths at the New York Lying-In Hospital and Sloane Hospital for Women in New York, and did not mention "postmaturity" as a cause. Postmortems were done in 89% of babies.

Potter and Adair (1943) did not list "postmaturity" as a cause of foetal death in a 10 year clinico-pathological study of perinatal mortality from 1931-41.

Clifford (1954) however believed that "postmaturity" was an important cause of loss of foetal life. He stated that 1 in 10 postmature primigravidae (over 300 days) loses her baby, and that "postmaturity" in a patient over 26 years of age is associated with a 1 in 3 loss of babies. In multiparae "postmaturity" was not so important. The foetal mortality in these latter women was no higher than in "mature" infants.

Clifford described the "postmature" baby as usually heavier than the average. The head is large and ossified, with the fontanelles tending to close. The skin is dry and cracked, and peels readily due to the loss of vernix, and is stained with meconium.

The umbilical cord and membranes are stained green and the finger nails are unduly long.

Rathbun(1943) of Boston did not find a higher incidence of unexplained deaths in "postmature" infants either before or during labour.

Walker(1954) reported that foetal deaths in utero, when there was no other clinical abnormality, was more common in a gestation of 40 and 41 weeks, and by 43 weeks in primipara and multipara postmaturity was the highest single cause of death. By the 42nd week and subsequent weeks at least 1/3 of all foetal deaths are unexplained. That anoxia due to increasing placental insufficiency after term was the deciding factor in the cause of the increasing foetal loss, was Walker's main contention.

McCafee(1958) McDonald(1953 and 1954) and Crichton(1953) however maintain that it was not the decreasing oxygenation which caused the death of the foetus, but the increase in size of the foetal head and difficult delivery which caused the damage.

#### INCIDENCE OF "POSTMATURITY".

Many authors have outlined the relatively high incidence of "pregnancy prolonged beyond the expected date", of which the following are noted:-

TABLE 48

#### PREGNANCY OF 287 DAYS

<u>Author</u>	<u>Total Cases</u>	<u>No. of Postmature Cases</u>	<u>% age Incidence</u>
Racker et al (1949)	1642	410	31.7
Gibson and McKeown(1950)	17072	5416	31.7
Gibberd(1952)	2724	647	23.7
McKiddie(1952)	6803	1642	24.1

PREGNANCY OF 294 DAYS

<u>Author</u>	<u>Total Cases</u>	<u>No. of Postmature Cases</u>	<u>% age Incidence</u>
Clayton(1941)	9649	707	7.3
McKiddie(1949)	6803	765	11.3
Rathbun(1943)	3289	250	7.6
Gibson and McKeown(1951)	17072	2397	14.1
Latto(1951)	4653	171	3.7
Racker et al(1953)	1642	149	9.1

INCIDENCE OF "POSTMATURITY" IN OUR UNITS.

Unfortunately there was very little information in our annual reports on "postmaturity" until 1954 and 1955. Previous to this time on very rare occasions was mention made of such a condition, especially not in our non-white patients. The reasons for this lack of information was due to:

- (i) Little attention was paid to the fact that "postmaturity" as such was a clinical entity, or that risks to such a baby were greater than when pregnancy terminated at term. Cases of postmaturity were hence not even recorded, especially in non-whites.
- (ii) In our non-whites there was often inaccurate recording of menstrual data, because such information was not readily available from the patient herself owing to language difficulties, or more frequently because of low standard of education. Cases of "postmaturity" hence were often disregarded, and not recorded.

An attempt was made to determine the accuracy of the menstrual data furnished by the patient, or the recorded last menstrual period, in relation to the actual date of delivery from the records of the Somerset Hospital for the year 1953, where 1000 consecutive folders

were carefully examined with the recorded menstrual data and the expected date of confinement, in relation to the actual date of delivery.

There were 454 primipara and 546 multipara in the 1000 case notes examined, 316 of which were from natives (i.e. Bantu, Fingo etc.)

In 230 case history notes the records of the last menstrual period bore no relationship to the date of delivery. Actually in 50 instances there was no record of the last menstrual period, because the patient had no idea of when such an event occurred. The date of delivery of baby was incorrect by as much as 6 to 8 weeks either way. The height of the uterine fundus often bore no relationship to the date of the last period, and the duration of pregnancy could only be surmised in the majority of instances. The frequency of delivery of a 7 lb or even 8 lb baby at a recorded date of 32 weeks was common.

In 289 antenatal recordings of the last menstrual period the month only was noted viz. March, April etc. No exact date was noted. Again, under such circumstances, the actual date of delivery was often wrong by as much as 4-6 weeks. Cases of premature termination of pregnancy, because of an abnormality of pregnancy, were excluded when assessing the above menstrual data, such as in patients with antepartum haemorrhage, P.E.T. and the like.

In a further 209 case notes there were inaccuracies in data when the actual date of the last period was noted, and the date of delivery was wrongly assessed by as much as 2-3 weeks.

It was therefore concluded that in only approximately 40% of cases was there any relationship between the menstrual dates provided and the actual date of delivery.

The incidence of "true" abnormal prolongation of pregnancy in non-whites could therefore not be established with any degree of accuracy and was hence not recorded in our units, because it appeared

to be a waste of time to attempt a reasonably accurate analysis from case records.

#### In white patients.

Again here, as with non-whites, the recognition of "postmaturity" as a clinical entity with risks to the infant was not accepted by the majority of our clinical staff until recent years, and hence adequate recording of such information was not available until about 1954 or even later.

There was greater accuracy of recording of menstrual data among whites, and hence the dates of actual confinement were within reasonable limits in the majority of instances.

At the Nowbray H.R.(all whites) for the years 1953-56(inclusive) 108 out of 423 inductions of labour(rupture of membranes)performed were for "postmaturity", when 2 or more weeks had passed after the expected date of delivery. Therefore 25.5% of inductions at the above institution were for "postmaturity".

There was a perinatal mortality rate of 4.7% for these cases, which was higher than for "mature" babies, in white patients.

#### FOETAL LOSS IN "POSTMATUREITY".

Racker, Burgess and Manly(1953) investigated foetal mortality in "postmaturity" following induction of labour. In 203 patients with induction of labour when the baby was not "postmature" 3 stillbirths occurred(1.47%). In 410 patients with prolongation of pregnancy, 19(4.63%) stillbirths were reported. Induction of labour when a patient was 7-10 days overdue was recommended by these authors.

Gibson(1955) found the incidence of foetal death to be doubled when pregnancy had extended 4 weeks beyond the expected date.

Similarly other authors, including Clayton, Clifford, Gibberd, Iatto, McKiddie and Walker found an increased foetal loss with prolongation of pregnancy, especially when 43 or 44 weeks.

Walker(1954) pointed out that the foetal losses increased with each week in which pregnancy was prolonged beyond the expected date as follows:-

Pregnancy of 288-294 days	(877 cases)	the stillbirth rate was	1.6%
" " 295-301 days	(421 cases)	" " " "	3.3%
" " 302-308 days	(216 cases)	" " " "	7.4%
" " over 308 days	(128 cases)	" " " "	2.3%

It was significant that the stillbirth rate was markedly increased when pregnancy was prolonged to 43 weeks.

Other authors similarly found this increase of foetal losses with "postmaturity".

Temesvary(1952) reported however that pregnancy prolonged beyond the 290th day was associated with an infant mortality of only 1.96%.

He noted that more infants died before the onset of labour and soon after the onset.

Browne(1957) in a critical study of the incidence and sequelae of induction of labour for "postmaturity" in British Hospitals concluded following postmortem on 500 stillbirths and neonatal deaths that:

- (i) The dangers to mother and child were undoubted: they are chiefly associated with difficulty in the passage of the child.
- (ii) Because of the fear of disproportion and difficulty in labour, rather than anoxia associated with "postmaturity", prevention of this condition by induction of labour was being resorted to more frequently than necessary.

Browne included in his reports figures from our teaching units and laid much stress on the low induction rate for "postmaturity" in our non-whites at St. Monica's, Groote Schuur, and Somerset Hospitals including the Peninsula Maternity Hospital and Howbray M.H.

He laid great stress on the high perinatal losses sustained at our non-white institutions, and maintained that this was not due to postmaturity per se, but to the type of difficult obstetrics encountered in our units. Despite the low incidence of induction for postmaturity in our non-white hospitals, the foetal losses were high as in other non-white hospitals as quoted by Potter(1954) in the United States, and reports from M.O.H. of Pretoria, Witwatersrand, Port Elizabeth, Durban.

Browne states "It will be evident that there is no reason to believe that the high foetal and neonatal mortality in these 3 hospitals(our units) was due to their low induction rates. In fact the evidence is against it."

"The higher mortality in "postmaturity" as compared with "term" babies can be adequately explained by the larger size of the baby in the former and the longer duration of labour. If because of the larger size of the baby there is disproportion, the case should be treated by trial of labour. Induction of labour is not the modern treatment for disproportion, at least in primigravidae."

A criticism of Browne's supposition that postmaturity was rarely practised in our non-white units because of its rarity is certainly not warranted. As noted previously, postmaturity was not recorded in our non-whites because of the inaccuracy of menstrual data furnished by these patients, and because postmaturity as a clinical entity was not recognized by our clinical staff until recent years. The true incidence of postmaturity in our non-whites cannot be estimated with any degree of accuracy, and therefore was not noted

in our records. It is unreasonable to state because postmaturity was not recorded in our units that it occurred so rarely.

It is seen that a large number of "unexplained Stillbirths" were noted, especially in our non-whites. Postmaturity as a contributory factor might be assumed to be a cause in these.

In whites too until recent years, postmaturity was not noted for the same reason that it was not recognized. The low still-birth and neonatal death rates following induction are recorded elsewhere.

#### SUMMARY

The existence of such an entity as postmaturity attended by a higher perinatal mortality is being more generally recognized. Especially when such pregnancy is prolonged to the 43rd week the foetal losses are certainly increased.

The reason for the increased foetal loss appears to be an increasing anoxia of the infant, probably due to increasing placental insufficiency, although other writers maintain difficulty with labour and injury to the foetus to be the important factor.

Management of pregnancy in postmaturity is controversial, although the majority of authors recommend artificial termination 10-14 days after the expected date.

In our units the incidence of postmaturity in the non-white cannot be determined with any degree of accuracy, mainly because of inadequate menstrual data in patients who on the whole were poorly educated. In only approximately 49% of instances in 1000 case records studied in this racial group, was there any significant accurate recording of menstrual data.

In white patients (Newbray N.H.) during the 4 year period 1953-56, induction of labour was carried out in 25.5% of cases for postmaturity, with a perinatal loss of 4.7%, which was higher than in "mature" white cases.

It was only in recent years that postmaturity was recognized as an entity carrying an increased foetal risk, in our units, because such an entity was not accepted by the majority of our staff.

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## FOETAL DISTRESS

### Perinatal Mortality.

Persistent slowing of the foetal heart sounds, with or without irregularity was recognized as an indication of distress in our units.

Similarly meconium staining of the liquor amnii, particularly in association with the above signs was deemed an indication for hastening delivery of the baby.

Although all writers do not agree with the alterations in foetal heart beats as indicative of foetal distress, the majority stress the significance of meconium stained liquor.

### IN OUR UNITS.

During the years 1953-55 our annual obstetrical units recorded 403 babies born with signs of foetal distress, i.e. incidence 2.0%.

In 168 of these cases, there were umbilical cord complications almost always prolapse of the cord, i.e. in 41.5% of cases.

Of 403 babies born, 228 (incidence 1.4%) were from "booked" cases, in which 38 babies were lost (21%), 36 being stillborn, and 2 neonatal deaths.

There were 175 "non-booked" cases (incidence 4.28%) with a perinatal mortality of 52 babies (29.7%), 40 being stillborn and 12 neonatal deaths.

The perinatal mortality in "non-booked" cases was therefore higher than in "booked", although the difference was not significant statistically. The stillbirth losses almost twice as many.

The perinatal losses for the 403 babies showing foetal distress

was 22.3%. of which 16.3% were stillborn and 7.1% neonatal deaths.

In the absence of complications of the cord there were 235(1.1%) cases of foetal distress, 29 babies being lost(12.3%). Of these 15(6.3%) were stillborn, and 14(6.4%) neonatal deaths.

Of 168 instances when prolapse of the cord was present with foetal distress there were 51 stillbirths(30.3%) and 10(8.5%) neonatal deaths. The perinatal mortality was 36.3% or almost a 3 times higher loss than when the cord was not implicated.

#### In white patients.

Foetal distress was reported in 56 babies during 1953-55 at the Howbray M.H. Of these 7 babies were lost(12.3%), 3 (5.3%) being stillborn and 4 neonatal deaths(7.5%).

If foetal distress due to cord prolapse were excluded from the above, then only 2 neonatal deaths were recorded in 46 babies delivered with simple foetal distress, i.e. a 4.6% perinatal loss.

#### In "booked" white cases.

Of 45 babies born 5 were lost (11.1%), 3(6.6%) being stillborn and 2(4.7%) neonatal deaths.

#### In "non-booked" whites.

There were 11 such babies born of which 2 were lost(18.1%), 1 being stillborn and the other neonatal death.

The difference in perinatal mortality not highly significant statistically.

#### In non-whites.

Of 326 babies born with distress there was loss of 83 babies (25.1%) of which 63(19.0%) were stillborn and 20(7.5%) neonatal deaths.

When prolapse of the cord was excluded as a cause of distress 27 babies were lost (16.0%), of which 8.9% were stillborn and 7.8% neonatal deaths.

In "booked" non-whites.

Of 238 babies born with distress there were 15 stillbirths (15.0%) and 13 neonatal deaths (6.1%), with a perinatal loss of 47 babies, or 19.9%.

In "non-booked" non-whites.

There were 88 such babies with distress, of which 35 (39.5%) were lost, 28 (31.8%) being stillborn and 7 neonatal deaths (11.6%).

It will be noted that in the non-whites perinatal mortality associated with foetal distress was higher than in the white patient by as much as almost 4 times. An explanation for this phenomenon was simple. In many of the non-whites, there had been a much longer delay before admission to hospital. Under these circumstances there were many foetuses in which grave foetal distress was present, with often barely heard heart sounds, and often meconium staining of the liquor. Despite resuscitative measures before and after delivery (nearly always operative) there was no response of the infant which was stillborn.

The lower perinatal mortality in the "booked" case noted above suggests that admission to hospital occurred sooner than in the "non-booked" case. However in the non-white even in the "booked" patient again a long delay often occurred before the patient sent for "the ambulance".

In the white patient, circumstances were very different, especially in the "booked" patient, with a much lower perinatal

mortality than in the non-white patient.

It is evident from the above statistical evidence that in patients with antenatal care, the perinatal losses were lower than in those who had no supervision during pregnancy, in cases of foetal distress. Particularly in the non-white who often delayed her entry into hospital until many hours in labour, foetal distress was more serious than those who were admitted early. In the "non-booked" non-white this delay was even more serious, with a subsequent higher foetal loss.

It was significant that the losses associated with stillbirths were much higher than in neonatal deaths.

The presence of meconium staining of the liquor amnii is recognized by most authorities as a "sure" sign of foetal distress, and it is noteworthy that in the absence of such meconium staining of the liquor, the perinatal mortality is lower in most instances: Bartholomew(1925); Freed(1927); Lund(1943) White(1955) and Ginsburg(1957).

Halsey and Douglas(1957) analysed cases of foetal distress over a period of 10 years(1945-54) and found that in "mature" infants there were 13.9% stillbirths, the commonest cause of which was cord complications in 45%, 1/3 of which occurred in "postmature" babies.

Resnick(1955) analysed 767 instances of foetal distress in babies delivered operatively with special reference to postmaturity. There were 61 babies lost(7.9%). Of 123 caesarean sections 4.9% of babies were lost, and in 644 forceps extractions 8.5% were lost. It was significant that in 570 babies without foetal distress 5% were lost(1.0% following caesarean section and 5.7% following forceps extraction), whereas with foetal distress 16.7% of babies were lost in 30 caesarean section and 17.0% following 167 forceps extractions.

It is apparent therefore that once distress occurs in the foetus during labour particularly when there is frank meconium staining of the liquor amnii, the perinatal mortality is higher than when meconium is absent.

Walker(1954) has indicated that meconium staining of the liquor amnii is more often than not present when prolongation of pregnancy was present, and that "postmaturity" was associated with an increased perinatal loss, especially in the primiparous patient. The dangers of such cases need not be further emphasized and requires very careful management and "preparedness" during labour.

#### SUMMARY

#### FOETAL DISTRESS.

The various definitions of foetal distress such as irregularities of the foetal heart sounds, especially when accompanied by meconium staining of the liquor amnii, are generally accepted by the majority of authors.

Foetal losses when such distress is present is higher than when no distress is present.

In our units during 1953-55, 403 instances of foetal distress were recorded in our annual reports, i.e. an incidence of 2.0%. In white patients the incidence was 1.8%, whereas in non-whites it was 3.2%.

If one were to exclude prolapse of the cord as a cause of foetal distress, then there were only 295 instances of distress, in which 29 babies were lost, i.e. a perinatal loss of 12.3%. Of these 15(6.3%) were stillborn, and 14(6.4%) neonatal deaths.

In white patients, apart from distress due to prolapse of the cord, there were only 2 neonatal deaths, i.e. a loss of 4.6%. With cord prolapse included the loss was 12.3%.

In non-whites, apart from cases of cord prolapse, the perinatal loss attending foetal distress, was 16.0%, of which 8.9% were stillborn, and 7.8% neonatal deaths. With cord prolapse the perinatal loss was 25.1%, 19.0% being stillborn and 7.5% neonatal deaths.

"Booked" cases showed a much lower perinatal mortality than in "non-booked", and a greater loss in non-whites than in whites. The reason for this phenomenon was that more often than not in non-whites attention was sought much later than in whites. Patients "booked" in our units too were admitted much earlier than in "non-booked" patients.

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### BIRTH TRAUMA AS A CAUSE OF PERINATAL MORTALITY

The part played by birth trauma in the causation of loss of life of the infant is well known, especially when intracranial haemorrhage occurs.

Premature babies are most commonly affected by haemorrhages into the cranial cavity, with evidence of damage elsewhere in the body of a similar nature.

Bound et al found that in 50% of premature foetuses showed some evidence of bady damage of some degree or other.

In 45% of this trauma group asphyxia was found usually in the form of surface haemorrhages on the lungs. Massive inhalation of meconium was seldom found. Every stillbirth with trauma showed asphyxia.

Clinically trauma was most likely in women of high maternal age, and multiple pregnancy, both in premature and mature babies. Labour lasting 24 hours and more in mature babies, and complications in vaginal delivery predisposed the infant to such accidents.

The advent of abnormal delivery in the premature baby was more frequently associated with a higher perinatal mortality than when a mature baby was so delivered (vide under "prematurity").

Macgregor(1946) in 453 autopsies found birth trauma to be the cause of stillbirth in 23%.

Drillien(1947) also from Edinburgh in a series of 373 autopsies found that trauma was the cause of stillbirth in only 3% of babies.

Potter and Adair(1943) and Potter and Dieckman(1938) in 2250 autopsies found trauma to be the cause of stillbirth in 4 and 5 per cent respectively.

Crosse and MacIntosh(1954) recorded an incidence of birth trauma of 21% from Scotland.

Baird, Walker and Thompson(1954) also from Scotland reported a stillbirth rate due to birth trauma of 18.8% of all their stillbirths

Many other authors report in the same vein, and it is evident that intracranial damage leads not only to a large number of stillborn babies, but also a large percentage of permanently incapacitated infants (Bobath).

It is apparent too that the greater the prematurity rate in any hospital, the larger will be the percentage of instances of birth trauma, because of the susceptibility of such infants to damage.

#### PERINATAL MORTALITY DUE TO BIRTH TRAUMA IN OUR UNITS.

It was unfortunately not possible to estimate with any degree of accuracy the role which birth trauma played in the causation of perinatal losses in our units because of the paucity of autopsies performed.

Especially was this the case in the stillbirth rate when it was noted that our autopsy rate was only 18.4%.

The reasons for such a low postmortem rate were numerous, but mainly because of the lack of facilities, and refusal of permission on religious grounds.

The majority of babies born as stillbirths in our units following the hazards of labour might be classified under the "birth trauma" group, although asphyxia played no small part in the causation of death. As great a percentage as 37.12 of all our stillbirths were found in the "hazards of labour" group.

As far as neonatal deaths were concerned no fewer than 211 of a total of 702 neonatal deaths occurring during

1952-55 inclusive, or 30% followed on the "hazards of labour".

Intracranial damage and asphyxia, with or without pneumonia, were the causes of death in the majority of these babies.

Again it was noted that the majority of babies which died in the early neonatal period were premature, including those with intracranial damage or asphyxia.

### SUMMARY

### "BIRTH TRAUMA"

Birth trauma as a cause of perinatal mortality is a well known factor in the causation of stillbirth and neonatal mortality.

Especially is this the case in premature babies.

In our units of the University of Cape Town no accurate estimate of the percentage of babies lost as stillbirths due to trauma could be given because of the paucity in numbers of autopsies performed. This was unfortunately beyond our control mainly because of the lack of facilities for performing postmortem examination, and refusal of permission on religious grounds.

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FOETAL MALFORMATION AS A CAUSE OF LOSS OF THE FOETUS.

In every maternity unit there is an inevitable loss of infant life due to malformation of the foetus, which is entirely unpreventable with the present state of our knowledge.

The causes of malformation have been listed as being due to (i) Genetic or environmental (ii) Those due to infections such as rubella, toxoplasmosis etc. (iii) Seasonal, in that it is believed that more anencephalic babies are born during the summer months.

INCIDENCE.

Carter(1950) discovered 219 malformations of the foetus in 14813 pregnancies for the years 1943-49, i.e. an incidence of 1.47 per thousand births. He further noted that the incidence of malformation was not greatly increased by previous birth of a malformed child in the family.

Stevenson, Worcester and Rice(1950) from the Boston Lying-In Hospital reported 787 stillbirths, 15.9% of which were malformed (79.2% with central nervous system defect and 27.4% with multiple deformity). One baby in 60 was abnormal, and 1/3 of the total stillbirths and neonatal deaths were malformed.

De Wetteville(1951) from the Women's Hospital, Zurich, found that among 16000 normal pregnancies, the incidence of severe malformation was 1.0%.

Davies and Potter(1957) found a constant incidence of foetal malformation for the last 20 years. For the period 1951-52 the incidence was 42 per 1000 livebirths. In 5000 births there were 9 stillbirths from malformation, and 23 neonatal deaths.

Daird, Walker and Thompson(1954) found an incidence of 15.6% of stillbirths to be due to foetal deformity.

Gibberd(1951) recorded that 2.4% of macerated foetuses were deformed.

Horison(1952) (Table 3) recorded 8% stillbirths with foetal malformation, and both Macgregor(1946) (Table 3) and Drillien(1947) (Table 3) reported 19% stillbirths malformation. Potter and Adair (1943) reported a stillbirth rate of 10% for malformation, and Potter and Dieckman(1948) 8%.

At University College, Ibadan(all non-white) the incidence of foetal abnormality was 1%. There were no mongal babies.

#### IN OUR UNITS.

During the years 1952-55(inclusive) 288 babies with malformation of varying degree were delivered in our departments out of 25930 babies born, i.e. an incidence of 1.1%.

The abnormalities encountered were briefly as follows:-

Those incompatible with extrauterine existence such as Anencephaly in 11(3.9%); Hydrocephaly in 26(9.0%); Meningocele in 5(1.7%); and other abnormalities in 62(26.5%).

Other deformities compatible with extrauterine existence were present in 174 babies. Of these 13 were mongols, all of which occurred in white patients.

#### In white patients.

During 1952-55 at the Howbray H.H. 61 deformed babies were delivered out of 4261 delivered, i.e. an incidence of 1.45%.

#### In non-whites.

Of 13193 babies born at the Somerset, Grootte Schuur and St. Monica's Hospitals during 1952-55, 162 were malformed, i.e. an incidence of 1.24%.

FOETAL MORTALITY IN OUR UNITS.

Of 288 malformed babies born 104 were lost (36.0%) 51 or 17.7% being stillbirths and 53 neonatal deaths or 22.3%. These included babies with anencephaly, hydrocephaly, meningococles and other abnormalities.

Of 13 mongols born at the Howbray H.H. 2 were stillborn, and 1 neonatal death.

Malformed stillbirths therefore were present in 4.3% of all stillbirths occurring in our units during 1952-55.

In white patients stillbirths due to malformation accounted for 13.1% of all stillbirths encountered during 1952-55, i.e. of 76 stillbirths during that period 10 were malformed.

In non-whites. Of 662 stillbirths noted in our units at the Somerset, St. Monica's and Groote Schuur Hospitals during 1952-55, only 26 were malformed, that is only 3.8% of all stillbirths.

This abnormal finding is difficult to explain because one would have expected a similar stillbirth rate due to similar incidence of malformation in both races. However it might be suggested that among the non-whites, in whom premature labour is twice as high as in whites, that the malformed foetus is expelled early in pregnancy as an abortion because of more common ill health and other factors which are much more frequent in the non-white.

Another explanation for this unexpected finding of low percentage of stillbirths due to malformation in the non-white, was that far too few postmortems were performed in this race for reasons beyond our control.

The entire absence of mongols born in the non-white similarly might be explained, or was it because of missed diagnosis?

Be that as it may, the incidence of malformation as a cause of stillbirth in our units generally was far lower than in other units mentioned previously.

THE INFLUENCE OF ANTENATAL CARE.

Obviously antenatal care cannot influence the incidence of abnormality in an obstetrical unit, apart from earlier detection in the antenatal period and earlier termination of pregnancy.

THE INFLUENCE OF INTRAUTERINE INFECTION AS A CAUSE OF FETAL ABNORMALITY.

There is acceptable evidence that certain virus infections might affect the foetus in its early months of growth and cause deformity such as cardiac abnormality, defects of the eyes resulting in visual abnormality, deafness and even microcephaly.

That infections may be severe enough for the child to die in utero, and thereby be a cause of maceration is not denied. Such evidence has been obtained from infections such as malaria, leptospirosis, toxoplasmosis, syphilis, tuberculosis, chickenpox, typhoid and smallpox, according to Schuman, Oppenheimer,  
(1939) (1944)

Marsden and Greenfield, and Kahn.  
(1934) (1933)

There is suggestive evidence that rubella is transferable to the foetus.

Insufficient evidence is available on the transferability of the following infections to the foetus such as abortus fever, cholera, pertussis and herpes zoster according to Roques(1928).

Hoore(1931) was unable to produce definite evidence of the transferability of influenza or mumps to the foetus.

Not sufficient evidence is yet available of the transferability of poliomyelitis according to Weaver and Steiner(1944) and Fox and Belfus(1950).

Pneumonia today is clearly recognized as a cause of stillbirth and was first described by Browne(1921) and Johnston and Meyer(1925).

Douglas and Stander(1943) reported the recovery of anaerobes by cardiac puncture from a very high proportion of infants born dead without obvious cause after long labour. This careful work however failed to prove the significance of these organisms as a cause of foetal death.

Kobak(1930) found 9% of anaerobic cultures taken in the 3rd stage of labour from the umbilical cord, grow one or more of a variety of organisms. There are highly suggestive associations between a positive blood culture, prolonged rupture of the membranes and the presence of an inflammatory reaction in the foetal membranes.

Kaye, Rosener and Stein(1953) carefully analysed 273 serious abnormalities of the foetus. A possible prenatal factor was found in only 90, of which only 14 cases were associated with viral infections. They investigated the literature on 340 viral diseases in pregnancy and found the followings:-

In 16.5% abnormalities occurred after mumps; 19.5% after measles; 11.5% after varicella; 5.9% after poliomyelitis and 3.2% after hepatitis.

The total incidence was 14.1%. It was therefore concluded that maternal virus infections per se accounted for relatively a small proportion of foetal abnormality.

From University College, Ibadan, foetal abnormality accounted for only 2.47% stillbirths, which was similarly low as in our units.

#### IN OUR UNITS.

An accurate estimation of the incidence of foetal death due to infection(other than syphilis and tuberculosis) in our units was not possible, particularly in our non-whites.

However, the following infections were noted:-

- (1) Pyelitis. Only 50 cases were noted in our annual reports which was associated with the loss of 3 infants, all being neonatal deaths.

- (ii) Bronchopneumonia. 8 babies were born of mothers who had bronchopneumonia (confirmed radiologically). Of these infants 4 were premature, 2 of which died in the early neonatal period.
- (iii) Pulmonary tuberculosis. From the records of our annual reports for the years 1952-55, 222 patients with pulmonary and other forms of tuberculosis were confined in our hospital units. Altogether 3 babies were lost (all stillborn). There was an associated antepartum accidental haemorrhage in one, pre-eclamptic toxæmia in another, and the third was macerated.

There was no evidence to show that premature labour was more common with tuberculosis, although Goodwin (1950) maintains "that there is a consensus of opinion that the incidence of prematurity is exceedingly high in the offspring of tuberculous mothers." She states that mothers with arrested or chronic tuberculosis have a 22% incidence of premature deliveries, whereas among those with active tuberculosis the incidence was as high as 64%. Prematurity was definitely related to the severity of the disease in the mother.

This was not confirmed in the patients admitted to our units, the majority of whom were sent from tuberculosis sanatoria, where treatment had been administered for some time beforehand.

### SUMMARY

Foetal malformation in our units during 1952-55 occurred at a rate of 1.1% of all babies born. In whites the recorded incidence was higher than in non-whites. Mongols were not recorded in our non-white patients.

The incidence of foetal malformation elsewhere was similar to our figures. Stillbirths due to foetal deformity in our units were only 4.3% of all stillbirths delivered. This figure was much lower than that recorded in other units elsewhere. In whites the percentage

was 13.1%, whereas in non-whites the figure was only 3.8%. The possibility of early abortion of the malformed foetus in the first 3 months of pregnancy in our non-whites because of chronic ill health in this race, cannot be excluded. The possibility that malformation was not diagnosed because insufficient autopsies were performed in our units is not excluded as a reason.

Intrauterine infection(viral and non-viral) as a cause of malformation is briefly noted. Intrauterine infections as a cause of loss of infant life in our units is mentioned. Few babies were lost as a direct result of infection according to our annual report figures.

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"FOETAL MALFORMATION"

(For literature on this subject see earlier)

ADDENDUM.

One case resulting in the delivery of a mongol baby in a non-white patient was discovered and not noted in our annual obstetric reports for the years 1952-55. This malformation was recorded in the record book for ward deliveries kept by the sister in charge.

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PERINATAL MORTALITY

A STATISTICAL ANALYSIS OF THE CAUSES OF DEATH OF 1933  
DADIES DUE TO STILLBIRTH AND NEONATAL DEATHS IN THE  
OBSTETRIC UNITS OF THE UNIVERSITY OF CAPE TOWN FOR THE  
YEARS 1952-55 INCLUSIVE, WITH PARTICULAR REFERENCE TO  
ANTENATAL CARE IN THE RACIAL GROUPS AND PREMATURE BIRTH.

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PART 2. THE CAUSES OF PERINATAL DEATH (STILLBIRTH AND  
NEONATAL DEATHS) WITH SPECIAL REFERENCE TO  
PREMATURE BIRTH.

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PREMATURITYITS INFLUENCE ON FOETAL MORTALITY.

Indivisibly linked with the causation of the loss of infant life, and almost certainly the most important factor predisposing to an increased foetal mortality, is the birth of a premature child.

The general concensus of opinion in all countries is that if prematurity as a factor in foetal loss could be excluded, the stillbirth rate would be halved immediately. This applies also to death in the early neonatal period.

Cross(1945) reported on 222 premature infants in 536 stillbirths in Birmingham. She maintains that the stillbirth rate was 10 times higher in premature babies as those weighing over 5½ lbs. In "booked" cases at Birmingham Maternity Home the corresponding figure was 5 to 1.

Similarly Dunham(1948) found a high ration of 10 to 1 of stillbirths in premature babies as in mature infants.

Browne(1950) reported a ration of 10 to 1 of premature stillbirths compared with mature stillbirths. In 50% of these premature babies no cause for the loss of life could be found.

Baird(1945) reported a stillbirth ratio of 10 to 1 of premature to mature foetuses in each of 2 series in hospital cases in Aberdeen which differed widely in social status.

Peckham(1938) studied the relation between the weight of an infant at birth and the stillbirth rate. He concluded that a steady decrease in the stillbirth rate from 600 per thousand in infants weighing 2 to 3 lbs. (1000 G.) to a constant level of about 25 per thousand for babies weighing approximately 6 lbs. or 2700 G. or more.

In a series of 7599 births Drillien(1947) showed a similar decrease in the stillbirth rate with increasing birth weight.

It would therefore be impossible to discuss the causation of loss of infant life without "speaking in the same breath as it were" of the premature child.

Consequently this close association of foetal mortality and prematurity impels a detailed and exhaustive investigation.

Much time and painstaking searching into the literature and annual reports of our obstetrical units of the University of Cape Town has been spent in an attempt to elucidate the problem of prematurity in our hospitals.

Much emphasis has been laid on this subject in the writing of this paper, because of the increasing efforts being made in many other centres to lower the unduly high loss of life among infants now that maternal mortality has decreased considerably.

Of considerable interest to the author has been the part played by antenatal care as a factor in minimising mortality, not only of the premature child, but also the baby weighing more than  $5\frac{1}{2}$  lbs.

It is with this object in view that much statistically calculated information is produced, unfortunately very boring to read but however essential in an analysis of the effects of antenatal care on foetal mortality. Mortality in the premature infant is compared throughout with that of the mature child particularly in relation to antenatal supervision. Because antenatal care in our units in the racial groups vary in degree, mainly as a result of inadequate facilities in the non-white, comparisons in these racial groups reveal different foetal losses, and varying degrees of prematurity incidence. This too will be revealed in the following chapters.

PREMATURITYDEFINITION.

As recommended by the International Committee at Geneva in 1937, and more recently by the World Health Organization (W.H.O.) in 1948, and now generally accepted by the majority of civilized countries, the following definition is generally acclaimed:-

"ANY INFANT WEIGHING 5½ LBS.(2500G.) OR LESS AT BIRTH, REGARDLESS OF THE DURATION OF THE GESTATION", IS TERMED A PREMATURE INFANT.

The length of the infant as an index of general value in deciding maturity of living infants is unsatisfactory because the measurements made in practice are often grossly inaccurate.

The disadvantages of the above definition using weight as an index are as follows:-

(i) Birth weights of full term infants from different countries and from areas within certain countries show wide variation. For instance from the French Sudan, according to Canivet(1947), birth weights and rate of growth of Negro infants show marked variation. The average birth weight at term in Negro infants was 6.19 lbs. or 2813 G.

Similarly also Alison, Schmitt and Barez(1947) found that the average birth weight of children from different areas of the French Sudan was 7.15 lbs. or 3242 G.

Heredith(1948) from North Africa reported an average full term birth weight of 3400 G.(7.48 lbs.) in 108,715 infants.

Salber and Bradshaw(1953) analysing the weights of infants born in hospitals and nursing homes in Durban, Pietermaritzburg and Cape Town found a mean weight of various races to be as follows:-

White babies	7.47 lbs.(3400 G.)
Coloured	6.85 lbs.(3113 G.)
Bantu	6.77 lbs.(3077 G.)
Asiatic(Indian)	6.46 lbs.(2936 G.)

Salber and Bradshaw also found that male children were on an average heavier than females. Increasing age in whites results more often than not in lower infant birth weights in whites generally, and on the whole higher birth weights in non-whites.

The incidence of prematurity, apart from multiple pregnancy according to these authors, and mean birth weights are generally influenced by economics, nutrition and cultural habits of populations.

At the University College, Ibadan, Nigeria during the years April 1953 to December 1954, according to Lawson and Lister, many apparently full-term mature infants are born weighing between 5 and 5½ lbs. Hence prematurity in this Institution does not conform to the generally accepted standard.

However, generally speaking, the International interpretation of prematurity is being accepted by the majority of recognized teaching centres.

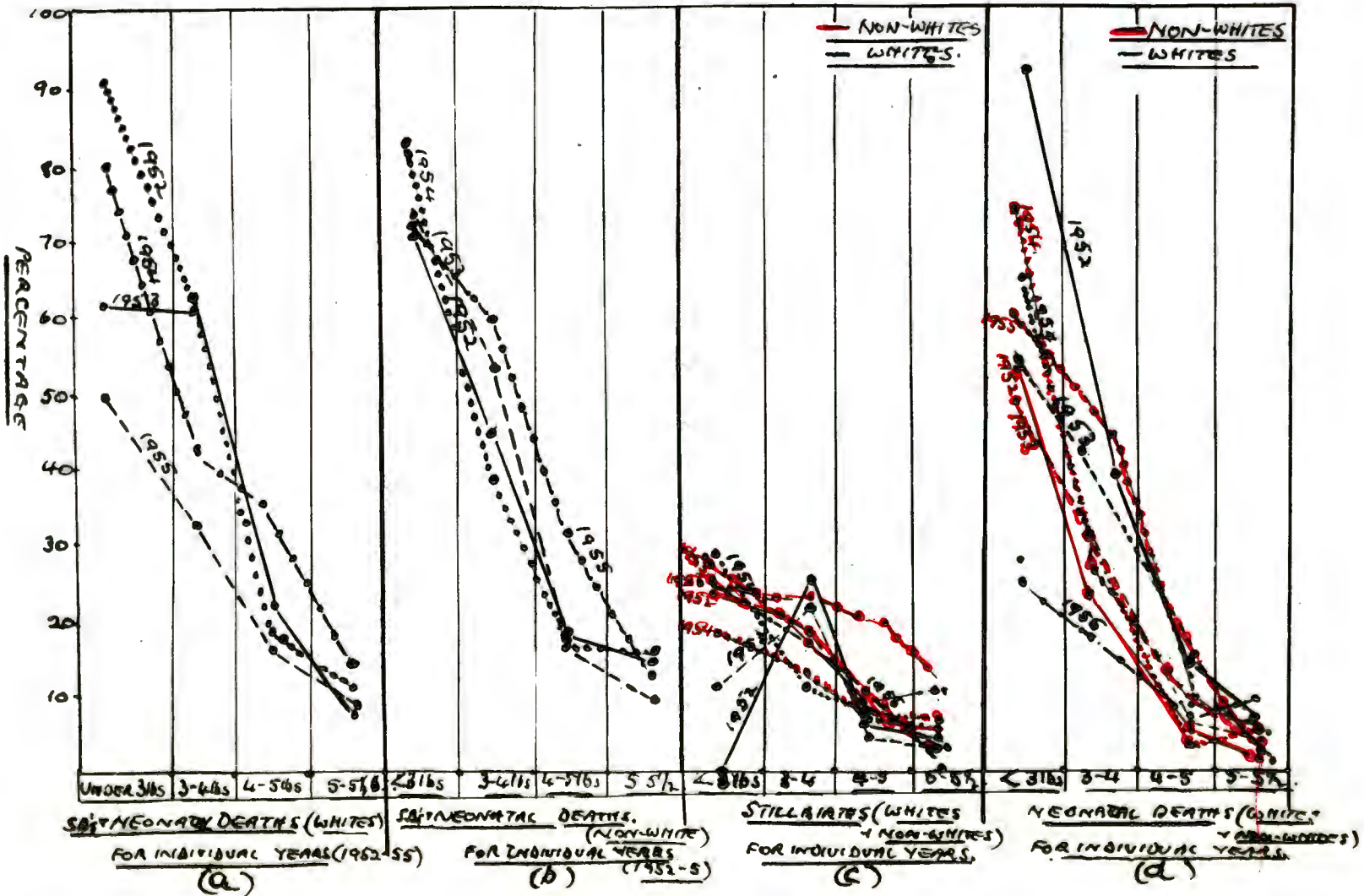
#### SUMMARY.

The accepted international definition of prematurity is the birth of a baby weighing 5½ lbs. (2500 G.) or less, irrespective of the duration of pregnancy, and other factors such as length.

Birth weights vary in different countries, or even in areas of the same country, as it does in the population of Southern Africa.

# PREMATURITY

GRAPHICAL PRESENTATION OF S.B.'s + NEONATAL LOSS (PERINATAL MORTALITY)  
(a) - (b), and stillbirths + neonatal loss (Whites + non-whites) for  
individual years 1952-1955 inclusive) per cent, (c) + (d). in  
respective weight groups. (GRAPH 7)



	<u>P.M.H.</u>				<u>N.S.H.</u>				<u>M.M.H.</u>				<u>ST. MONICA'S</u>				<u>G.S.H.</u>			<u>TOTAL</u>	<u>% LOSS</u>	<u>TOTAL PREMS</u>
<u>YEAR.</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	<u>1955</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>			
<u>LIVE-BORN</u> <u>UNDER 3 lbs.</u>	23	28	10	20	13	8	11	31	12	7	3	4	5	8	15	8	23	21	23	273		} 397 (11.8%)
<u>PREM. SBS.</u>	9	5	4	26	7	10	7	12	0	1	2	2	1	3	2	6	10	11	6	124	31.2 %	
<u>N.N.D.'s.</u>	19	9	7	15	8	6	11	20	11	4	2	1	4	6	11	3	11	8	15	181	66.3 %	
<u>LIVE-BORN</u> <u>3 - 4 lbs.</u>	28	33	32	42	20	30	27	29	13	9	6	12	11	23	21	20	20	23	28	437		} 596 (17.8%)
<u>PREM. SB's.</u>	10	15	14	21	6	9	9	15	8	4	1	3	4	9	2	7	12	5	5	159	26.6 %	
<u>N.N.D.'s.</u>	13	14	9	19	4	12	5	9	5	4	2	2	3	9	5	6	5	9	10	145	33.2 %	
<u>LIVE-BORN.</u> <u>4-5 lbs.</u>	71	84	74	90	67	64	78	63	20	29	26	31	21	40	47	43	47	51	61	1007		} 1157 (34.6%)
<u>PREM. SB's.</u>	15	10	3	19	6	9	10	15	1	2	3	4	2	5	9	7	11	6	13	150	12.8 %	
<u>N.N.D.'s.</u>	6	7	5	16	5	3	5	6	3	5	1	2	3	3	8	2	2	5	3	100	9.9 %	
<u>LIVE- BORN.</u> <u>5-5½ lbs.</u>	85	90	84	72	74	75	92	73	23	33	31	22	26	56	59	42	46	56	51	1090		} 1191 (35.6%)
<u>PREM. SB's</u>	4	4	8	5	11	5	13	12	1	2	3	0	7	3	7	6	6	2	2	101	8.4 %	
<u>N.N.D.'s</u>	4	4	2	5	1	4	5	1	2	1	2	2	2	3	1	1	1	4	5	50	4.6 %	
<u>TOTAL.</u> <u>LIVE-BORN</u> <u>PREMS</u>	245	235	200	224	174	177	208	196	68	78	66	69	63	127	142	112	136	151	189	2807	84.1 %	} TOTAL PREM BABIES. = 3341 (12.8%) Loss = 29.9%
<u>TOTAL PREM</u> <u>SB's.</u>	38	39	29	71	30	33	39	54	10	9	9	9	14	20	20	26	39	24	26	534	15.9 %	
<u>TOTAL</u> <u>N.N.D.'s</u>	42	44	23	55	18	25	26	36	21	14	7	7	21	21	25	12	19	26	33	466	16.6 %	

PREMATURES, LIVE-BORN STILLBIRTHS AND NEONATAL DEATHS ACCORDING  
TO WEIGHT GROUPS, UNDER 3lbs, 3 to 4 lbs, 4 - 5 lbs, and 5 - 5½ lbs.

(TABLE 49)

PREMATURITYINCIDENCE IN OUR UNITS COMPARED WITH OTHER CENTRES.

The incidence of premature birth was investigated by Salber and Bradshaw(1953) and the figures quoted by these authors from hospitals and nursing homes in Cape Town, Durban and Pietermaritzburg revealed the following:-

White patients	4.2%
Coloured	9.6%
Bantu	11.5%
Asiatic(Indian)	18.3%

IN OUR OBSTETRIC UNITS

(Tables 49 and 50)

(Graphs 7,8,9,10 and 11)

During the years 1952 to 1955(inclusive) 25930 babies were delivered in our units and no fewer than 3341 premature infants were born, that is an incidence of 12.8%.

Of these premature babies, 397 or 11.8% weighed under 3 lbs.

596 or 17.8% weighed between 3 and 4 lbs.

1157 babies or 34.6% weighed between 4 and 5 lbs.

1191 or 35.6% of premature babies weighed between 5 and 5½ lbs.

It will be noted therefore that 29.7% of all premature babies born in our units weighed below 4 lbs.

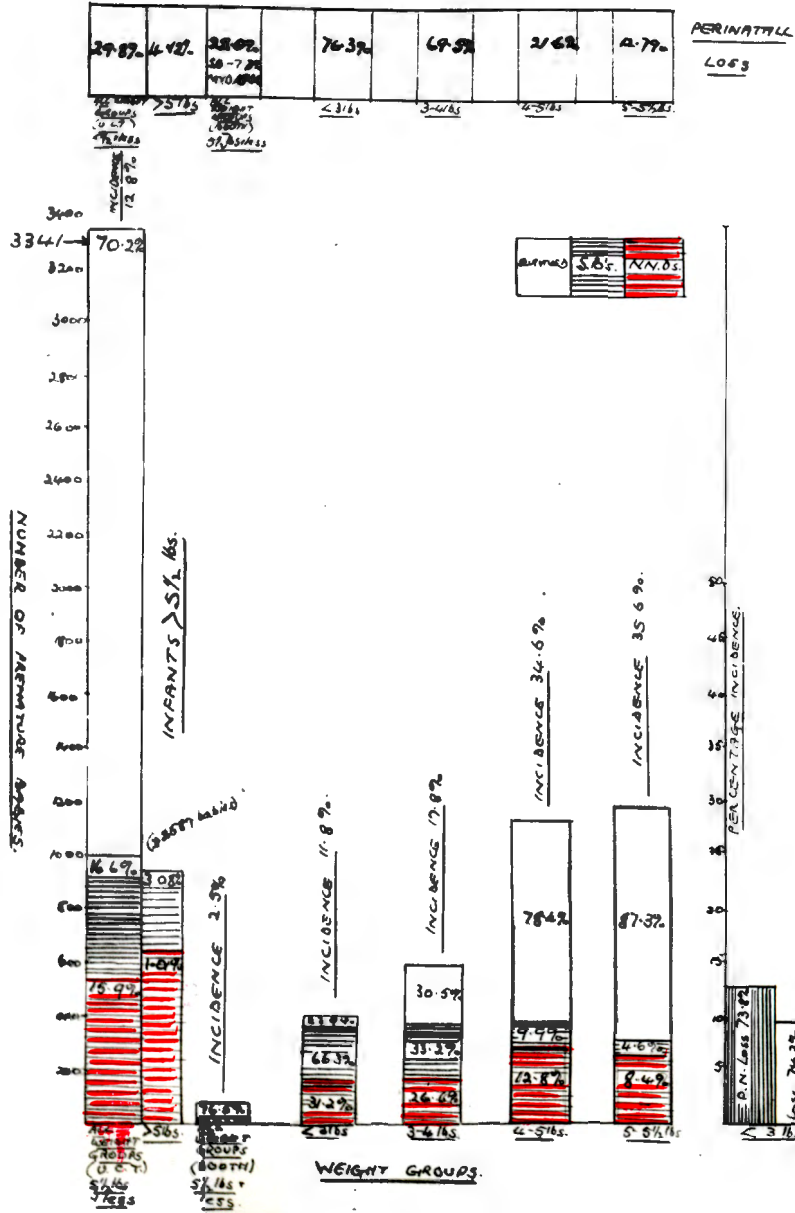
IN WHITE PATIENTS.

At the Howbroy Maternity Hospital(M.M.H.) 4261 white babies were born during 1952-55.

Of this number 318 were premature, or an incidence of 7.4% premature birth.

PREMATURITY. INCIDENCE, STILLBIRTH, NEONATAL & PERINATAL LOSSES IN RESPECTIVE WEIGHT GROUPS BY COMPARISON WITH BABIES WEIGHING > 5 1/2 LBS. (GRAPH 8)

PREMATURITY. (WHITES & NON-WHITES). INCIDENCE, AND PERINATAL LOSS IN RESPECTIVE WEIGHT GROUPS (UNIVERSITY UNIT & DANFORTH HOSPITAL) (GRAPH 9)



PERINATAL LOSS

PERCENTAGE INCIDENCE

WHITES

NON-WHITES

PERINATAL LOSS

INCIDENCE

WHITES

NON-WHITES

TOTAL

<u>WEIGHT.</u> <u>% AGE.</u>		<u>UNDER 3 lbs.</u>	<u>3-4 lbs.</u>	<u>4-5 lbs</u>	<u>5-5½ lbs</u>	<u>TOTAL</u>
		9.7 %	17.6 %	36.5 %	36.5 %	318 (7.4 %)
<u>WHITES.</u> <u>(MOWBRAY).</u> <u>M.H.</u>	<u>LIVEBORN.</u>	26	40	106	109	281
	<u>STILLBIRTHS.</u>	5 (16.1%) ✕	16 (28.5%)	10 (8.6%)	6 (5.6%) ✕	37 (11.6%) ✕
	<u>NEONATAL DEATHS.</u>	18 (69.2%)	13 (32.5%)	11 (10.3%)	7 (6.4%) ✕	49 (17.4%)
	<u>TOTAL LOSS.</u>	23 (74.1%)	29 (51.7%)	21 (18.1%)	13 (11.3%)	86 (27.0%)
<u>NON-</u> <u>WHITES.</u> <u>(N.S.H.)</u> <u>(ST. M.)</u> <u>(G.S.H.)</u>	<u>LIVEBORN.</u>	166	252	583	650	1651
	<u>STILLBIRTHS.</u>	75 (31.1%) ✕	83 (24.7%)	93 (13.7%)	74 (10.2%) ✕	325 (16.4%) ✕
	<u>NEONATAL DEATHS.</u>	103 (62.2%)	77 (30.5%)	45 (7.7%)	28 (4.4%) ✕	253 (15.3%)
	<u>TOTAL LOSS.</u>	178 (73.8%)	160 (47.7%)	138 (20.4%)	102 (14.0%)	578 (29.2%)
<u>WEIGHT.</u> <u>% AGE</u>		<u>UNDER 3 lbs.</u> (12.7%)	<u>3-4 lbs</u> (17.7%)	<u>4-5 lbs</u> (35.6%)	<u>5-5½ lbs</u> (38.2%)	1976 (14.8%)

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P R E M A T U R I T Y . I N C I D E N C E A C C O R D I N G T O W E I G H T G R O U P S  
I N W H I T E S A N D N O N - W H I T E S W I T H R E S P E C T I V E S T I L L B I R T H , A N D  
N E O N A T A L L O S S E S . ( T A B L E 8 0 )

Of 318 premature babies born to white patients 9.7% weighed less than 3 lbs.

17.6% of premature babies born weighed between 3 and 4 lbs.

36.5% of babies born prematurely weighed between 4 and 5 lbs.

36.5% of premature babies weighed between 5 and 5½ lbs.

Of all premature babies(white) born at the Howbray H.H. therefore 27.3% weighed under 4 lbs.

#### IN NON-WHITE PATIENTS.

Out of a total of 13293 babies born at our non-white hospitals(Somerset, St. Monica's and Groote Schuur) during 1952-55, as many as 1976 were premature. The incidence of prematurity in non-whites was therefore 14.8%.

Of the above babies 12.7% weighed less than 3 lbs.

17.7% of premature babies weighed between 3 and 4 lbs.

35.6% of premature babies weighed between 4 and 5 lbs.

38.2% of premature babies weighed between 5 and 5½ lbs.

No fewer than 29.4% of premature babies in our non-whites weighed less than 4 lbs.

It is significant therefore that there were no difference in the percentages of babies weighing less than 4 lbs. in whites and non-whites in our units.

The percentage of babies weighing less than 3 lbs. in whites and non-whites was however of some significance, although this was not striking.

The striking importance of the incidence of prematurity in whites and non-whites was however obvious.

Similarly in whites, in private patients the percentage

of premature babies born at the Booth Memorial Home during 1950-57 (inclusive) was low, at a low level of 2.5%.

Apart from socio-economic status therefore it was noted that in patients with satisfactory prenatal supervision (in white hospital patients and whites in private practice) the incidence of prematurity was lower than in non-whites in the ratio of 2.5:7.4:14.8 or 1 :3 :16.

In this respect it will be noted that the incidence of prematurity in patients with unsatisfactory antenatal care was almost double that of patients with adequate supervision (19.3% compared with 10.5%) (Table 61a) (vide infra).

Further analysis of prematurity revealed that during the years 1953-55 (inclusive) 2560 premature babies were born in our units. The incidence of prematurity during these years was therefore 12.8%, which was similar to the years 1952-53.

In white patients delivered at the Mowbray M.H. the incidence during 1953-55 was 7.2% compared with a non-white incidence of 14.2%.

In "booked" patients 1760 babies weighing less than 5½ lbs. were born, that is an incidence of 10.5%.

In "non-booked" patients 794 premature babies were delivered, which is an incidence of 19.3%.

In "booked" white patients the incidence of prematurity was 5.9%, compared with 18.6% in "non-booked" patients.

In non-white patients the incidence of prematurity in "booked" patients was 11.3% compared with an incidence of 26.6% in "non-booked" patients.

#### SUMMARY.

The incidence of prematurity in our units during 1952-55 was 12.8%, which was similar to the years 1953-55.

In white patients the incidence of prematurity was almost exactly half that of non-whites. The ratio of prematurity in white private patients was 1 : 3 of white hospital patients, and 1 : 6 of non-whites.

There was no striking difference statistically in the percentages of babies in the weight groups, with an exception in the under 3 lbs. group, where more such babies are born to non-whites.

In "booked" patients there was a smaller percentage of premature babies compared with "non-booked" in the ratio 10.5 : 19.3.

In the racial groups also there was a higher incidence of prematurity in "non-booked" whites compared with "booked" cases (18.6% : 5.9%). In non-whites the ratio was 26.6 : 11.3.

Therefore apart from socio-economic status antenatal care played an important part in the incidence of prematurity as a whole and in the racial groups.

INCIDENCE OF PREMATURE BIRTH IN OTHER CENTRES.

A comparison of the incidence of prematurity in our obstetric units with other centres reveals that particularly in our non-whites premature birth is a significant factor in maintaining our relatively high foetal mortality. A similar feature was encountered in other centres admitting non-white patients.

UNITED STATES OF AMERICA

	<u>YEAR</u>	<u>BIRTHS</u>	<u>PREMS.</u>	<u>PREMS (%)</u>
Charity Hospital, Louisiana, New Orleans (Allen and Wegman)	1951	11228	1174	10.46
John Hopkins, Baltimore, Maryland. (Eastman)	1926-49	38111	4459	11.7
Freedmen's, Washington, D.C., (Scott, Jenkins and Crawford)	1939-47	11818	1126	9.5
General Incidence (U.S.A.)	1954			7.4%
			Whites	7.0%
			Non-whites	9.7%

The above hospitals admitted a large percentage of "coloured" patients, the Charity and Freedmen's over 85% Negroes.

UNITED KINGDOM

Aberdeen Maternity Hospital, Scotland.	1941-42	3156	?	11.1
Sorrento Maternity Hospital, Birmingham, England. (Crosse)	1947-50	?	426	6.6
Coombs Lying-In, Dublin. (Feeney)	1950-51	3027	315	8.7

SWEDEN

	<u>YEAR</u>	<u>BIRTHS</u>	<u>PREIS.</u>	<u>PREIS (¢)</u>
Maternity Hospital, Stockholm. (Fralich, Lichtenstein and Monrads)	1936-38	9393	539	6.2

FRANCE

Baudelocque Maternity, Paris. (Lelong)	1949-50	3427	247	7.19
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NETHERLANDS

University Maternity, Utrecht. (Stroink)	1939-40	1024	41	4.0
	1944-45	628	54	8.6

FINLAND

Several Hospitals. (Parviainen)	1940-43	32283	1609	4.98
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JAPAN

Keio University Hospital, Tokyo. (Chipman)	1947-52	1301	149	11.5
Tohokee University Hospital, Sendai. (Chipman)	1950-52	1951	192	9.9

NIGERIA

University College, Ibadan, Nigeria. (Lawson and Lister)	1953-54	5809	1077	18.6
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SOUTH AFRICA

	<u>YEAR</u>	<u>BIRTHS</u>	<u>PREMS.</u>	<u>PREMS (%)</u>
Several hospitals, in Durban, Cape Town and Pietermaritzberg.				
(Salber and Bradshaw)	1953	?	? Whites	4.2
			Coloured	9.6
			Bantu	11.5
			Asiatic	18.3
University of Cape Town.				
(Present series)	1952-55	25930	3341	12.8
(i) Whites		4261	318	7.4
(ii) Non-whites		13293	1976	14.8
(iii) Whites(Private)	1950-57			2.5

It will be noted from the above table that in areas with mainly non-white patients the incidence of prematurity was on the whole higher than in whites. The exception to this was in Aberdeen where socio-economic conditions were in the main responsible for the high prematurity rate, coupled with inadequate antenatal care.

It is apparent also that in populations with poor socio-economic status the prematurity rate was also higher than in better class patients.

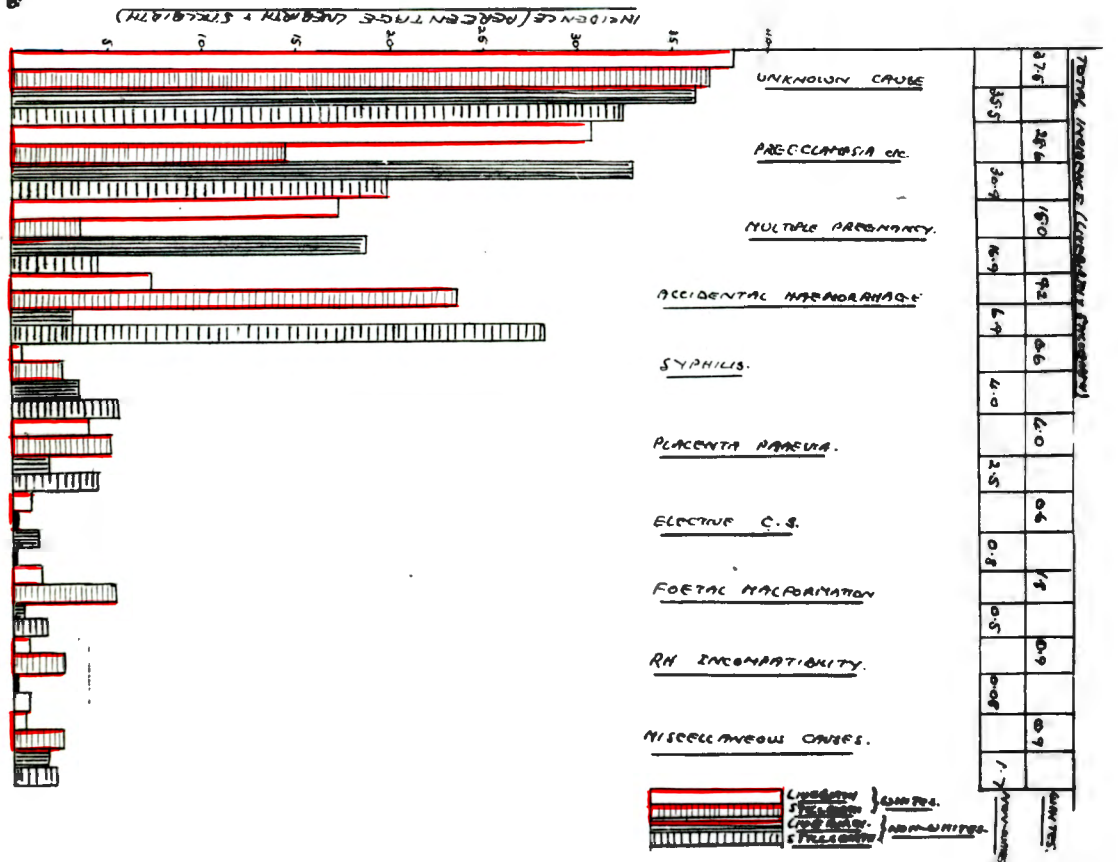
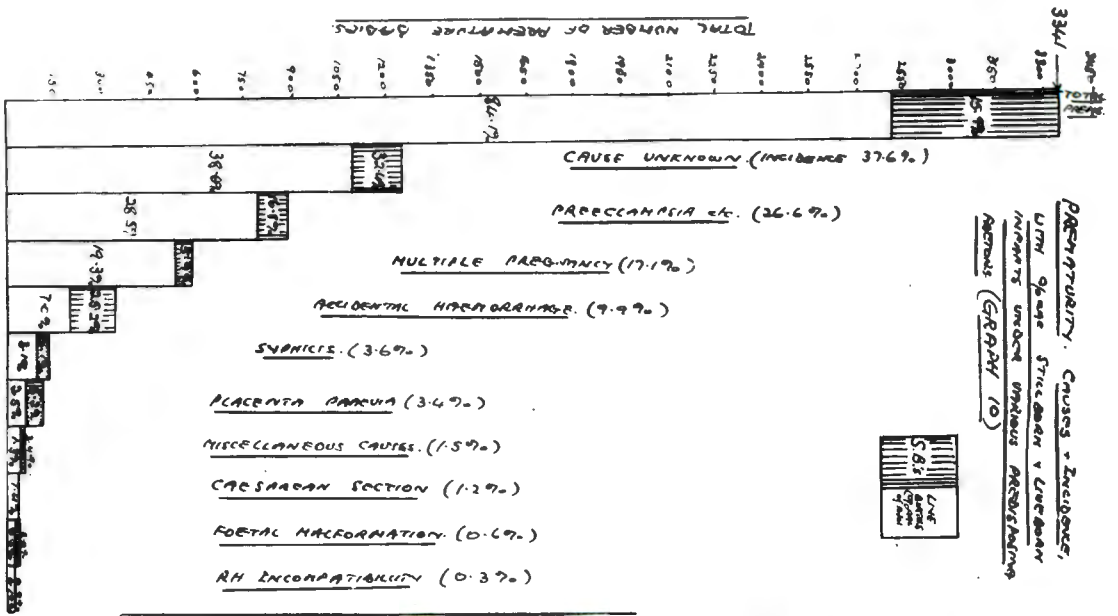
The effects of prematurity on foetal mortality rates will become apparent from a study of perinatal mortality rates in the various centres. The higher the prematurity incidence the almost constant higher perinatal mortality will be noted(vide infra).

Again the importance of antenatal care will become obvious in a later discussion on this subject in relation to prematurity in our units and particularly at the University College, Ibadan, Nigeria.

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PREMATURE DEATHS (WHITES AND NON-WHITES) WITH QUOTE STILLBORN + LIVERBORN INFANTS UNDER VARIOUS RESISTANCE FACTORS (GRAPH 11)

**CAUSES OF PREMATUREITY AND THEIR INCIDENCE.**

The cause of onset of premature labour with the birth of a child weighing 5½ lbs. or less can be briefly summarized under the following headings:-

(1) **MATERNAL CAUSES** viz. Preeclamptic toxæmia, hypertensive disease of pregnancy and chronic nephritis; antepartum hæmorrhage, including accidental hæmorrhage and placenta prævia; syphilis; diabetes; chronic infections; acute infections; and other conditions.

(2) **FOETAL CAUSES** viz. Multiple pregnancy; foetal abnormality; and the like.

(3) **UNKNOWN CAUSES**. In the majority of cases in which a premature baby is born no adequate reason can be given for the onset of premature labour. All authorities maintain that in the vast majority of cases babies which are premature at birth belong to this group. Labour in this group is often heralded by the premature rupture of membranes, often in association with non-engagement of the presenting part in a normal or abnormal lie. In other instances premature labour can often be traced to over-work, employment during pregnancy, undernutrition with deficiencies in diet, and similar causes.

(4) **MISCELLANEOUS CAUSES** viz. hydræmnia, rhesus incompatibility etc.

**INCIDENCE OF THE VARIOUS CAUSES OF PREMATUREITY.** (Tables 50,51,52)  
(Graph 10)

Crosse(1945) reporting on 925 premature births found the percentages of causes to be as follows:-

Unknown causes in 37% of instances; and preeclampsia in 29%.

Anderson, Browne and Lyon(1947) from the United States of America analysed a series of 13 papers from the opinions of different authors and reported as follows:-

In over 40% of cases there was no known cause for the onset of premature labour. Preeclampsia was found to be present in just less than 30%.

Multiple pregnancy was accorded a high figure of up to 20% or more. Placenta praevia was present as a cause in 2-3%; and hydramnios in 3%.

Diddle and Plass(1942) found syphilis to be responsible in as few as less than 1% of premature labours.

Macbeth(1955) from Australia found that 28% of their cases was associated with "no known cause". Preeclampsia and hypertension occurred in 33% of cases; multiple pregnancy in 9%; placenta praevia in 8%; and accidental haemorrhage in 5% of cases.

Schnoeneck(1955) noted that the "unknown factor" was as high as over 50% in the causation of premature birth followed by antepartum bleeding in 29.2%. Preeclampsia was uncommon and was noted in only 4.3%. Foetal abnormality associated with premature birth in 7.1%.

Eastman(1947) from the U.S.A. did not specifically mention an "unknown cause" for prematurity. He however found that in 4459 premature babies, twin pregnancy was a factor in 12.2%. Of 8323 babies born of mothers with preeclampsia and hypertension, and eclampsia, 666 were from chronic hypertension, 3126 with preeclampsia, and 115 with eclampsia. The incidence of prematurity in these 3 conditions was according the ratio of 21.8 : 15.9 : 25.2. In 107 cases of placenta praevia prematurity occurred in 40%, and in 174 cases of accidental haemorrhage prematurity occurred in 60%.

Drillien(1947) mentioned that prematurity rates in preeclampsia and hypertension were as high as 14%. She further noted that in cases of complications of labour the premature rate was 17.3%, whereas in the absence of such complications it was only 5.6%. The chances of survival of the baby improved with each  $\frac{1}{2}$  lb. rise in birth weight.

At University College, Ibadan, Nigeria where only non-whites were confined, as many as 430 premature babies were born from mothers with multiple pregnancy out of a total of 1077 premature babies delivered during 1953-54, i.e. in 40%. Preeclampsia and hypertension in twin pregnancy was very uncommon, only 10 sets of twins being complicated by this condition. In fact preeclampsia and hypertension in pregnancy was rare, compared with our units of the University of Cape Town, the incidence being no more than 1%. Yet the majority of the above women were underfed, with dietary deficiencies; chronic ill-health, such as anaemia; chronic infections such as bilharzia, dysentery and the like.

Antepartum haemorrhage due to accidental haemorrhage was an infrequent cause of prematurity at University College Ibadan(U.C.I.), because preeclampsia was rarely encountered, and hypertension in pregnancy was infrequently recorded.

Anaemia of pregnancy was often found in association with premature birth at U.C.I. with a haemoglobin level below 50%, the anaemia not being due to blood loss. In the majority of these women ascariasis, and ankylstomiasis was a complicating factor. Malaria, bilharzia, and amoebic dysentery were commonly among patients with anaemia at Ibadan.

Because of the lack of pathological laboratory facilities for confirmation of the causes of many conditions at Ibadan, the "unknown factor" as a cause of prematurity must have been fairly common, although not stated in a Clinical Report for this college.

<u>CONDITIONS ASSOCIATED WITH PREMATURITY.</u>	<u>L.B.</u>	<u>% AGE</u>	<u>S.B.</u>	<u>% AGE</u>	<u>TOTAL</u>	<u>% AGE</u>	<u>REMARKS</u>
1. <u>PRECLAMPSIA etc.</u>	801	28.5	90	16.8	891	26.6	S.B's with 2. and 3. 184
2. <u>MULTIPLE PREGNANCY (Including Toxaemia etc.)</u>	542	19.3	30	5.9	572	17.1	With TOXAEMIA S.B. 20
3. <u>ACCIDENTAL HAEMORRHAGE (Including Toxaemia etc)</u>	198	7.0	135	25.2	333	9.9	With TOXAEMIA 74 SBS's
4. <u>SYPHILIS</u>	89	3.1	33	6.1	122	3.6	
5. <u>PLACENTA PRAEVIA</u>	72	2.5	44	8.2	116	3.4	1 Accidental Haemorrhage. (SB.)
6. <u>ELECTIVE C.S.</u>	40	1.4	0	0	40	1.2	
7. <u>FOETAL DEFORMITY.</u>	11	0.3	11	2.0	22	0.6	
8. <u>RHESUS INCOMPATIBILITY</u>	5	0.1	5	0.9	10	0.3	
9. <u>MISCELLANEOUS. (Diabetes, Cardiac. Fibroids)</u>	37	1.3	13	2.4	50	1.5	
10. <u>UNKNOWN.</u>	1085	38.6	173	32.4	1258	37.6	
<u>T O T A L.</u>	2807	84	534	16	3341	100	

PREMATURES. (Live born and Stillborn). Conditions.  
associated with premature Births and their frequency  
with STILLBIRTH LOSS in each group. (TABLE 51)

Daird(1945) reported on 738 premature births from the Aberdeen Maternity Hospital and found that in 52% of cases the cause remained "unexplained". Preeclamptic toxemia was associated with premature birth of a baby weighing 5½ lbs. or less in 16%; foetal abnormality in 2.6%; placenta praevia in 2.7%; syphilis in 2.6%; and multiple pregnancy associated with preeclamptic toxemia in 3.4%.

Other writers noted similar high proportions of "unknown" causes for the onset of premature labour.

IN OUR OBSTETRICAL UNITS.

(Tables 50,51 and 52)  
(Graphs 7,8,9,10 and 11)

UNKNOWN CAUSES.

Of 3341 premature babies delivered in our units during 1952-55 there was no known cause for the onset of premature labour in 1258 cases, or 37.6%. Premature rupture of the membranes occurred in many instances. However such important factors such as overwork, insufficient rest, under-nutrition, dietetic insufficiency, biologic factors and similar conditions were not infrequently present. These factors will be considered later in more detail.

It was of interest to note that in a private maternity home in Cape Town(Booth Memorial) for the years 1952-55, as many as 51.8% of premature babies were born, for no "apparent reason".

IN WHITE PATIENTS.

As many as 37.5% of premature babies born at the Mowbray H.H. occurred for no "known cause".

IN NON-WHITES.

At the Somerset, St. Monica's and Groote Schuur Hospital, no fewer than 35.5% of premature babies delivered, were for no "apparent reason".

ANTEPARTUM HAEMORRHAGE AS A CAUSE OF PREMATUREITY.

Of all babies delivered of mothers with antepartum bleeding in our units during 1952-55, 449 were premature. The incidence of premature birth associated with antepartum haemorrhage was therefore 39.1%.

Of all premature babies delivered in our units during this period of time 13.4% were from mothers with antepartum haemorrhage.

ACCIDENTAL HAEMORRHAGE.

(Tables 50,51,52)  
(Graphs 7,8,9,10,11)

During the years 1952-55, 9.9% of all premature babies born in our units were from patients with abruptio placentae.

Of 842 babies delivered of women with this type of bleeding 333 or 39.5% were premature.

During the years 1953-55, the incidence of accidental haemorrhage in our units was 3.56%. In "booked" cases the incidence was 2.07% and in "non-booked" 9.44%.

In the presence of premature babies the incidence of accidental haemorrhage was 13.1%. In "booked" cases the incidence was 7.64% and in "non-booked" 25.3%.

With mature infants the incidence of abruptio placentae was 2.19%. In "booked" cases the incidence was 1.41% whereas in "non-booked" it was 5.61%.

In white patients.

32.1% of babies born to whites with accidental haemorrhage were premature.

9.2% of all premature babies born in our units to white patients were from cases of accidental haemorrhage.

In non-white patients.

35.1% of all babies born to non-whites with accidental haemorrhage were premature.

6.2% of all premature babies born in our units to non-whites were from cases of abruptio placentae.

PLACENTA PRAEVIA.

During the years 1952-55, 116 infants were premature out of a total of 305 delivered of women with low implantation of the placenta i.e. in 38.0%.

Of all premature babies born in our units during this period of time, 3.4% were from women with placenta praevia.

During the years 1953-55 the incidence of placenta praevia in our units was 1.23%. In "booked" cases the incidence was 0.55% whereas in "non-booked" it was 3.98%.

In the presence of premature babies the incidence of placenta praevia was 4.5%. In "booked" cases the incidence was 2.15% when premature babies were present, and 9.9% in "non-booked".

With mature infants the incidence of placenta praevia was 0.77%. In "booked" patients the incidence was 0.35% whereas in "non-booked" it was 2.62%.

In white patients.

40.5% of babies born to whites with placenta praevia were premature.

4.0% of all premature babies born in our units were from patients with low implantation of the placenta.

In non-white patients.

31.7% of infants born to non-whites with placenta praevia weighed less than but not more than 5½ lbs.

2.5% of all premature babies born in our units to non-whites were from women with placenta praevia.

SUMMARYANTEPARTUM HAEMORRHAGE

As many as 39.1% of babies born to patients with antepartum bleeding were premature in our units during 1952-55. In cases of accidental haemorrhage the percentage was 38.5%, whereas in placenta praevia it was 38.0%.

In the racial groups it was noted that the percentages of premature babies in accidental haemorrhage in whites and non-whites showed no striking statistical difference.

However, if one considered the incidence in relation to the total number of premature babies delivered in our units, there was a higher percentage of premature babies in the white patient in cases of accidental haemorrhage (9.2% : 6.9%).

In cases of placenta praevia more babies were born prematurely to whites in relation to the total number of premature babies delivered in our units. (4.0% : 2.5%).

In relation to the degree of antenatal care, it was noted that there was a higher incidence of both accidental haemorrhage and placenta praevia in "non-booked" compared with "booked" cases. This applied to when the baby was premature, when the incidence of antepartum haemorrhage was greatest, and to mature infants.

It can therefore be said that the incidence of prematurity was greater in patients with inadequate antenatal care in cases of antepartum haemorrhage, than in those in whom adequate antenatal care was present. The "conservative" management of placenta praevia will certainly in many cases produce a more mature baby than in cases in which radical treatment is instituted. This can be attained only with adequate prenatal supervision.

PREECLAMPTIC TOXAEMIA, ESSENTIAL HYPERTENSION AND  
CHRONIC NEPHRITIS(P.E.T.) (Tables 53,54)

The grouping together of the 3 conditions preeclamptic toxæmia, essential hypertension and chronic nephritis has been followed in our units for the years 1952-55.

Any patient who presents herself with a blood pressure of 140/90 and over, with or without cedema, and with or without albumenuria, was considered to have preeclampsia(P.E.T.).

Any of 2 of the above signs taken together was therefore considered to be of significance.

INCIDENCE OF PREMATUREITY IN P.E.T. IN OUR UNITS DURING 1952-55.

Of 4361 patients with toxæmia delivered during the 4 years 1952-55, no fewer than 891 premature babies were born, or an incidence of 20.7% prematurity.

Of this number of premature babies 292 weighed less than 4 lbs.

Of 3341 premature infants delivered in our units during the same period, no fewer than 26.6% were from mothers with P.E.T.

By far the greatest percentage of babies delivered from mothers with P.E.T. occurred at the Groote Schuur unit, where "special catering" was made for such types of patients.

However it was noted that because of the large numbers of patients with P.E.T. in Cape Town, the "overflow" was admitted to mainly the Peninsula Maternity and Somerset Hospital units.

IN WHITE PATIENTS.

At the Nowbray Maternity unit(all white) during 1952-55 13.5% of all babies delivered from mothers with P.E.T. were premature, of which 14.5% weighed less than 4 lbs.

UNIT & YEAR	BOOKED												TOTAL LOSS	age	NON-BOOKED												TOTAL LOSS	age	LOSS B and N-B.
	TOTAL BABIES	>54lbs.	Prem.	Total	>54lbs. No. SR's.	NND's.	Prem. No. SR's.	NND's.	SR's.	NND's.	SR's.	NND's.			TOTAL SR's.	TOTAL NND's.	TOTAL SR's.	TOTAL NND's.	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.			
P.M.H. 1953	389	328	61	284	247	5	3	37	1	6	7	9	5.6	105	81	23	3	24	13	6	36	9	42.8						
1954	272	220	43	232	198	11	0	34	5	3	16	3	8.1	40	31	6	0	9	5	3	11	3	35.0						
1955	380	281	99	295	226	8	1	69	14	5	22	6	9.5	85	55	8	2	30	10	6	18	8	30.5						
M.S.H. 1953	127	98	26	108	85	5	1	23	5	0	10	1	10.1	19	14	6	1	5	2	1	8	2	34.4						
1954	173	139	34	141	116	9	3	25	5	1	14	4	12.8	32	23	9	2	9	2	1	11	3	41.1						
1955	159	118	41	108	92	5	1	16	3	2	8	3	10.2	51	26	4	0	25	6	3	10	9	25.5						
M.W.H. 1953	270	223	47	234	201	3	1	33	2	1	5	2	2.9	36	22	1	2	14	0	4	1	6	19.4						
1954	227	206	21	199	179	1	3	20	1	0	2	3	2.5	28	21	1	1	7	1	1	2	2	14.2						
1955	332	291	31	296	274	1	2	22	4	4	5	6	3.7	38	27	1	0	9	0	2	1	2	8.3						
U.S.W. 1953	71	52	19	62	49	2	0	13	3	2	5	2	11.1	9	3	1	0	6	3	1	4	1	55.5						
1954	142	118	24	118	101	7	6	17	4	1	11	1	10.1	24	17	7	0	7	4	2	11	2	53.1						
1955	139	101	32	76	65	2	0	11	7	2	9	2	16.6	57	36	1	0	21	8	1	9	1	16.9						
O.S.H. 1953	411	296	116	192	142	8	1	50	5	8	13	9	11.4	219	153	13	8	66	7	9	20	17	16.9						
1954	398	296	100	216	161	2	1	25	4	13	6	14	20.0	180	95	10	8	75	9	11	19	19	21.1						
TOTAL	3482	2700	782	2561	2198	70	17	395	61	48	131	65	7.6	921	604	91	27	307	70	51	161	78	25.8						
% age		79.6	20.4	74.7	84.5	3.2	0.8	16.5	15.4	14.3	5.1	2.6		25.3	67.7	14.8	5.1	32.3	22.8	21.5	17.6	10.2	25.8						
						4.0	*		27.6	*	7.8	*				18.2	*		39.4	*	26.8	*							

PRECLAMPSIA, HYPERTENSION, etc. (TABLE 53) Foetal mortality in booked "babies" (premature and over 5 1/2 lbs.)

PRECLAMPSIA, HYPERTENSION, etc. (TABLE 54) Foetal mortality in non-booked babies. (Premature and over 8 1/2 lbs. (WHITE AND NON-WHITE))

RACE	WHITE	NON-WHITE	TOTAL	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.	age
WHITE	820	714	115	729	644	5	6	85	7	5	12	11	3.1	
% age		86	14	87.9		0.7	0.8	8.2	6.4	1.6	1.5	3.1		
						1.8	*	14.1	*					
NON-WHITE	1611	1212	399	1021	841	40	7	180	36	29	76	36	10.9	
% age		75.3	24.7	83.4		4.7	0.8	20.0	20.1	7.4	3.9	10.9		
						3.8	*	36.1	*					

RACE	WHITE <th>NON-WHITE <th>TOTAL</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>age</th> </th>	NON-WHITE <th>TOTAL</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>SR's.</th> <th>NND's.</th> <th>age</th>	TOTAL	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.	SR's.	NND's.	age
WHITE	70	3	3	30	1	7	4	10	14.0	4.4				
% age		4.2	4.4	3.3	24.1	4.0	16.4	14.0						
		8.5	*	26.6	*									
NON-WHITE	367	51	19	223	41	29	92	48	23.7	15.6				
% age		13.0	6.0	18.3	15.9	15.4	9.6	22.7						
		19.0	*	31.3	*									

PRECLAMPSIA, HYPERTENSION, etc. (TABLE 53a) Foetal mortality in booked "babies" (prematures and over 5 1/2 lbs. (WHITES AND NON-WHITES))

PRECLAMPSIA, HYPERTENSION, etc. (TABLE 54a) Foetal mortality in non-booked babies. (premature and over 8 1/2 lbs. (WHITE AND NON-WHITE))

IN NON-WHITE PATIENTS.

In our non-white units at the Somerset Hospital, St. Monica's and Groote Schuur during 1952-55, as high a percentage as 20.6 of all babies born of mothers with P.E.T. were premature. Of this percentage 38.3% weighed less than 4 lbs.

It was significant therefore that more than 2½ more premature babies weighing less than 4 lbs. were delivered in our non-whites as in white patients.

Of all premature babies born in our units from non-whites, 30.9% were from mothers with P.E.T. which was indicative of the important part played by P.E.T. in the causation of premature birth in our non-whites. The obvious conclusion is that P.E.T. plays a significant role in the high perinatal mortality losses sustained in this racial group.

The significance of antenatal supervision in the causation of premature birth, apart from socio-economic status of the patient, will I think show the benefits of hospital supervision in reducing early interruption of pregnancy. The reduction in the numbers of premature babies weighing 4 lbs. and less will certainly be one great advantage, and the numbers of severe cases of P.E.T. will be reduced.

THE EFFECT OF ANTENATAL CARE ON PREMATURITY RATES IN P.E.T.

(Tables 53 and 54)

An analysis of the babies delivered during 1953-55 from mothers with P.E.T. in relation to antenatal care was chosen because of the greater accuracy of the annual reports for these years.

Of 3482 babies of mothers with P.E.T. during that period, or an incidence of 17.03%, 2561 were from patients attending our antenatal clinics, and 921 were "non-booked".

The incidence of P.E.T. in "booked" patients was 12.8% and in "non-booked" 22.5%. It must however be stressed again that the majority of so-called "booked" patients were seen only on one occasion at our clinics and admitted either immediately (when hospital accommodation was available) or as soon as accommodation became available. In reality, therefore, these latter patients could be classified as "non-booked".

#### INCIDENCE OF PREMATUREITY. (Tables 53 and 54)

The incidence of prematurity during 1953-55 in babies delivered of women with P.E.T. was 27.4%.

In "booked" patients the incidence of prematurity was 22.3% and in "non-booked" 38.6%.

#### IN WHITE PATIENTS.

In "booked" patients with P.E.T. 10.2% of babies were premature at birth, whereas 89.8% were over 5½ lbs.

In "non-booked" cases of which only 100 were born 30% were premature. The significance of this figure was not of sufficient importance because of the small numbers of babies born of whites during 1953-55.

#### IN NON-WHITE PATIENTS.

In "booked" patients with P.E.T. 1611 babies were delivered of which 180 were premature, or an incidence of 11.1% prematurity.

In "non-booked" cases, of which there were 590, as many as 223 babies were premature, or an incidence of prematurity of 37.8%.

Again it was significant that the incidence of prematurity in patients with adequate antenatal care was much lower than in patients with poor or no supervision.

It should again be emphasized that the criteria for determining as to whether a patient was "booked" or "non-booked" in our units in cases of P.E.T. was not entirely satisfactory.

If those patients admitted directly from the clinic with P.E.T. at the first visit were classified as being "non-booked" then obviously the incidence of prematurity in "non-booked" patients with P.E.T. would be considerably higher.

If "outpatient treatment" of patients with P.E.T. could be classified as an inadequate form of antenatal care then of course the prematurity incidence in "non-booked" patients would be still further increased. This appertains particularly to the non-white, for whom there was a "frustrating" shortage of hospital accommodation for antenatal supervision.

The later admission of a patient with severe P.E.T. because of our inability to accommodate them earlier, especially in the non-white, often resulted in premature interruption of pregnancy, and a greater proportion of babies weighing less than 4 lbs.

As evidence of premature "interference" in the non-white in cases of P.E.T., it was noted that in the 41.3% of babies delivered in this racial group followed surgical induction.

In white patients only 19.8% of babies delivered from mothers with toxemia followed surgical induction.

Therefore more than twice the number of babies delivered in patients with P.E.T. were from non-whites compared with whites. (Table 58).

The proportion of babies weighing less than 4 lbs. was nearly 3 times greater in the non-white.

### IN NON-WHITE PATIENTS

At the Somerset Hospital, St. Monica's and Peninsula Maternity units during 1952-55, 20.6% of all babies born of mothers with P.E.T. were premature, of which 36.3% weighed less than 4 lbs.

It was significant therefore that more than 2½ times as many babies weighing less than 4 lbs. were born in the non-white units.

Of all premature babies born in our units from non-whites 30.9% were from mothers with P.E.T.

It was of interest to note that further analysis of cases of P.E.T. during 1953-55 (Tables 55 and 56) showed of all babies born of mothers with P.E.T., 19.3% weighed 8 lbs. or more.

In white patients, 30% of these 8 lb. babies were born, whereas in non-whites the percentage of 8 lb. babies was only 14.6%.

Apart from socio-economic factors it might be suggested that in non-whites there was a greater tendency for premature termination of pregnancy, surgically or otherwise, because of more severe types of P.E.T. On the other hand it might also be suggested that there were not sufficient facilities, particularly in relation to supervision in hospital because of inadequacy of accommodation for the non-white. This resulted not infrequently in "outpatient" treatment of patients with P.E.T. especially in the non-white. The frequent readmission of such patients in a more serious condition, with a high blood pressure or marked albumenuria, often hastened a premature termination of pregnancy by surgical means. The danger of accidental haemorrhage was another complication which subsequently occurred in many patients, especially in those with inadequate antenatal care i.e. hospital supervision.

PRECLAMPTIC TOXAEMIA, HYPERTENSION AND CHRONIC NEPHRITIS (1953-55)

(BABIES WEIGHING 8 lbs and over.) Loss according to method of delivery.

(TABLE 66)

UNIT. --- YEAR.	TOTAL.		E.	TOTAL LOSS			NORMAL DELIVERY		Loss	FORCEPS.		C.S.	OTHERS.	REMARKS:					
	TOX - AEMIA. BABIES	8 lbs B. & Over		SB	DB	NND	TOTAL.	Without. ARM.		With ARM.	TOTAL LOSS				TOTAL LOSS				
P.M.H. 1953	389	71	48	23	4	4	2	47	44	15b 2DB	3	1 NND	14	1NND	8	23B. +	CRANI- OTOMY 1/4 BE → SB	* Eclampsia I.U.D. +1. prolonged labour (I.U.D.) + prolonged labour.	
1954	272	48	41	7	5	2	0	32	29	3SB 1DB	5	0	10	0	5	0	1 Dest. Op	* I.U.D. Prolonged labour.	
1955	390	73	59	14	6	1	0	58	43	1SB 1DB	15	0	5	3SB +	8	25B +	Breech 2	+ 1 constriction ring - Lupus erythe- matosis. * constr. ring. Eclampsia 1/1ch.	
N.S.H. 1953	127	25	23	2	1	0	1	20	19	1SB	1	0	3	0	1	NND	* Breech 1	* Eclampsia. Prolonged labour.	
1954	173	30	24	6	2	2	0	16	16	1DB	0	0	4	1DB	5	0	Breech 5	* 1 hydrocephalus. Prolonged labour with I.U.D.	
1955	159	23	15	8	1	0	1	15	14	1SB	1	0	3	1NND	5	0	0	* 1 Failed forceps. 1 Prolonged labour	
M.M.H. 1953	270	66	63	3	1	0	0	54	44	0	10	0	9	1SB	3	0	0	* Accidental Haem.	
1954	227	86	80	6	2	0	1	72	56	0	16	1SB	5	1SB	8	0	Breech 1	* (Intra-uterine death. Prolonged labour Prolonged labour	
1955	332	97	91	6	2	0	0	82	73	1SB	9	0	8	0	5	0	Breech 2	* Prolonged labour I.U.D.	
ST.M. 1953	71	10	9	1	0	0	0	9	8	0	1	0	1	0	0	0	0	0	* 1 A.H. → Alive
1954	142	18	15	3	2	0	0	13	13	1SB (?)	0	0	1	0	4	0	1.IV BE	* Placenta praevia (A.H.)	
1955	133	14	10	4	0	0	0	12	8	0	4	0	1	0	1	0	0	0	
G.S.H. 1953	4111	65	37	28	7	0	2	44	31	3SB 1NND	13	1SB (?)	5	1NND	14	13B *	1/4 BE 1 Imp. shoulder.	SB SB	* Abnormal infant. * Weight 12 lbs 12 ozs. (not diabetic) * Placenta praevia * A.H. Eclampsic * Diabetic (A.H.)
1954	396	48	21	27	1	1	1	34	17	1SB	17	13B ⊙	3	0	10	0	Breech 1	* NND	
TOTAL.	4361 3492	674	526	148	32	10	8	508	415	12SB 6DB 1NND	93	3SB 2NND	72	5SB 3NND 1DB	77	55B 1NND	12Breech 3MV.BE 11 IME 3 Cranio	(7SB) (3DB) (1SB) (1NND)	
% AGE		18.4 (19.3)	78.1	21.9	4.4	1.5	1.2	75.3	81.7	2.1 1.05 0.2	18.3	3.0 2.0	10.7	6.9 4.4 1.3	11.2	6. 5 1.3	2.8	50.0 100.0	
% AOR LOSS.							7.4%							13.8		7.8		57.8	

5.8%  
with others.

WHITES.	TOTAL TOX.	TOTAL.	B.	E.	TOTAL LOSS.			NORMAL	DELIVERY.			FORCEPS.		C. S.		OTHERS.		
	BABIES.	8 lbs and over.			SE.	DE.	NND.	TOTAL.	WITH OUT.	LOSS.	WITH -ARM.	LOSS.	TOTAL.	LOSS.	TOT. -AL.	LOSS	TOT. -AL.	LOSS
WHITES. (MOWBRAY)	914	249	234	15	5	0	1	208	163	1SB 1NND	45	1SB 1NND.	22	2SB	16	0	Breech 3 1SB	
% AGE.		*30%	94%	6%	2	0	0.4	83.5	78.2	0.6	21.8	2.2	8.9	*9.0%	6.4	0	31.3%	
					2.4%*							2.2						
					Acc. H. 1 4 abnormal Labours.							4.4 1.4%						
NON-WHITE. G.S.H.		233	154	79	14	3	5	163	126	{6SB 1DB}	37	2SB	21	{1SB 1DB}	40	{1SB 7 1NND (2IV) .. 1 BE 1NND 2SB	Breech.	
ST. M.	2202									(1NND)				(2NND)			1IMP 1SB shoulder.	
N.S.H.	2202																	
		*14.6%	66.5	33.5	7.3%			2.3	69.9	77.3	{5.5 (0.8)}	22.7	5.4	9.0	{95 152}	17. .1	2.5 2.4	28.5 20.0
					9.4%*						6.2		5.4%	19.0		5%	42.8 2 100% 1- 1000	
					2DB- Eclampsia. 1AH. -													
					Rest-Abnormal Labour.													

PREECLAMPTIC TOXAEMIA Etc. BABIES 8 lbs and over. (WHITES AND NON-WHITES.)  
 Loss according to method of delivery (1953-55)

Of interest too was the larger proportion of babies weighing 8 lbs. or more born to white patients with P.E.T. as compared with non-whites. Although it might be argued that the birth weight of white babies on the whole was higher than in non-whites, it was noted that many more babies weighing 8 lbs. or more were born to mothers(white) than to non-whites.

During the years 1953-55, of all babies born to mothers with P.E.T. 19.3% weighed 8 lbs. or more.

In whites, the percentage of 8 lb. babies delivered of women with P.E.T. was as high as 30%, whereas in non-whites this figure was only 14.6%.

A Comparison of foetal losses in whites and non-whites with P.E.T. with babies weighing 8 lbs. or more shows that again the non-white is the greater sufferer, again due to lack of sufficient care in the antenatal period.

#### INCIDENCE OF PREMATUREITY IN A PRIVATE MATERNITY HOSPITAL.

Again apart from socio-economic reasons it will be noted that antenatal care played a not unimportant part in the incidence of prematurity, from the figures obtained at the Booth Memorial Home(white) during the period 1950-57. This hospital admitted patients who on the whole were much better off than whites delivered at the Howbray Maternity Hospital, in relation to individual attention by private specialists and general practitioners. The nursing care too was of the highest degree, mainly because this private hospital was a training school for pupil midwives.

During a period of 7 years, of 6588 babies delivered at the above institution there were 541 babies delivered from mothers with P.E.T., that is an incidence of P.E.T. of 8.21%.

Only 30 premature babies were born of mothers with P.E.T. in the above institution, which is an incidence of prematurity

of 5.6% in patients with P.E.T. Severe cases of P.E.T. were rare at this hospital, and the incidence of surgical induction for "toxaemia" was low. The consequence of such infrequent prematurity is reflected in the low perinatal mortality at the Booth Memorial Home.

SUMMARY

PREMATURITY IN P.E.T.

The incidence of prematurity in P.E.T. in our units during 1952-55 was 20.7%, of which 32.7% weighed less than 4 lbs.

In whites 13.5% of all babies delivered of mothers with P.E.T. were premature.

In non-whites 20.6% of all babies born of mothers with P.E.T. were premature.

Of all premature babies born in our units during 1952-55 no fewer than 26.6% were from mothers with P.E.T.

There were more than 2½ times more premature babies weighing less than 4 lbs. in non-whites with P.E.T. than in whites with the same condition.

Patients with adequate antenatal care, delivered of a smaller percentage of premature babies than in "non-booked" patients, both in whites and non-whites.

A greater proportion of premature babies were born to non-whites as whites. Inadequate facilities for antenatal supervision of the non-white cases of P.E.T. especially in relation to hospital accommodation played a not unimportant part in this variation of incidence of prematurity.

As a result of inadequate prenatal care more severe cases of P.E.T. occurred in non-whites, often resulting in premature induction of labour to a greater extent than in the white patient. Hence more than twice the number of non-white patients with P.E.T. as whites were induced surgically, with a greater proportion of premature babies.

Also as a result of inadequate supervision of P.E.T. in

the non-white, there was a smaller percentage of babies weighing 8 lbs. or more than in the white patient, apart from the fact that white patients tend to produce larger babies than the non-white as a rule.

The benefits of adequate care, apart from socio-economic status, can be further gauged in relation to the incidence of prematurity in P.E.T. in a private maternity hospital in Cape Town. The majority of these patients were cared for by specialists and general practitioners. Of an incidence of 8.2% P.E.T. at this home, there was a prematurity rate of only 5.6%.

It can therefore be concluded that prematurity in relation to P.E.T. is largely governed by the socio-economic status of the patient, with adequate antenatal care as a prerequisite.

**PREMATURITY ASSOCIATED WITH MULTIPLE PREGNANCY.** (Tables 57a and 57b)

The frequency with which multiple pregnancy is associated with P.E.T. and prematurity makes this a convenient place to briefly discuss this subject.

**INCIDENCE OF MULTIPLE PREGNANCY IN OUR UNITS.** (Tables 31,32 and 57)

During the years 1952-55 there were no fewer than 525 twin pregnancies delivered in our units of which 572 babies were premature i.e. 54.5% prematurity rate.

Of all premature babies born in our units during 4 years multiple pregnancy accounted for as much as 17.1%.

Of 33 infants born in 11 triplet pregnancies during the same time, all but 5 were premature i.e. in 84.7%.

Similarly during the period 1953-55, the incidence of prematurity in 836 babies born of multiple pregnancy was 57.5%.

**IN WHITE PATIENTS.**

(Table 57)

At the Howbray Maternity Hospital during 1952-55, no fewer than 122 babies were born of twin pregnancies. Of this number of babies 66 were premature, or a prematurity rate of 54.0%.

During 1953-55, the prematurity rate for twin pregnancy was 45%.

**IN NON-WHITE PATIENTS.**

During the years 1952-55, 324 infants of a total of 502 born from twin pregnancies were premature i.e. a prematurity rate of 64.5%. During 1953-55 the rate was 57.6%.

Of all premature infants delivered in our units during 1952-55, twin pregnancy accounted for 15.0% and 16.9% of all premature babies born to whites and non-whites respectively.

INCIDENCE OF PREMATURITY IN RELATION TO ANTENATAL CARE. (Table 57)IN "BOOKED" PATIENTS.

Of 631 babies delivered of "booked" patients with twin pregnancy during 1953-55, 318 were premature, or a premature birth rate of 50.4%.

IN "NON-BOOKED" PATIENTS.

Of 205 babies born of twin pregnancy during 1953-55, 164 babies were premature, or a prematurity rate of 80.0%.

This latter figure was similar to that occurring in twin pregnancy at the University College, Ibadan, Nigeria, where over 80% of babies were premature. The majority of these women had had inadequate or no antenatal care, owing to the desperate shortage of accommodation for the obstetric population and an inadequate obstetric service. Admission to hospital 6-8 weeks before delivery was "out of the question" because of this factor.

Similarly in our units, especially in our non-whites, there was on the whole inadequate bed accommodation for the admission of all twin pregnancies for a period of rest before delivery.

IN WHITE PATIENTS (Booked)

42.5% of babies delivered of twin pregnancies were premature.

WHITE PATIENTS (Non-booked)

55.0% of babies delivered of twin pregnancy were premature.

IN NON-WHITES.

In "booked" cases the prematurity rate was 50.7%, compared with an incidence of 73.7% in "non-booked" cases.

It was apparent therefore from this statistical evidence that the incidence of prematurity in twin pregnancy was higher in patients without adequate prenatal supervision than those who were adequately supervised.

This applied to both whites and non-whites, although the incidence of prematurity in the "non-booked" non-white was significantly very high.

A similar pattern of inadequate prenatal care and high prematurity rate at University College, Ibadan, was shown as in our non-whites.

The extraordinary high incidence of twin pregnancy at this latter hospital of 1 in 24 in "booked" cases, and of triplets of 1 in 1115, was associated with a high incidence of prematurity of 81.5%. In "non-booked" patients there was a similar high prematurity rate. The reason for this high figure was undoubtedly due to the almost entire absence of adequate antenatal care, apart from very poor socio-economic conditions.

It was therefore not surprising to find a very high perinatal mortality associated with multiple pregnancy at Ibadan. No less than 31.7% of babies were lost in "booked" cases, and 37.6% in "non-booked" cases.

Of 497 premature babies born of 305 twin pregnancies, 15.3% weighed less than 3 lbs., 9.9% between 3 and 3½ lbs., and 11.3% between 3½ and 4 lbs.

It might be of interest to note that in only 3.3% of babies born in twin pregnancies at Nigeria, was there P.E.T. in the mother. The general incidence of P.E.T. was only 1.1%.

The hazards of labour such as transverse lie, prolapse of the cord, locked twins, ruptured uterus were common.

Placenta praevia was more frequent than in single pregnancy as was accidental haemorrhage.

THE SIGNIFICANCE OF HYDRAMNIOS AS A CAUSE OF PREMATUREITY.

The more frequent association of twin pregnancy with the presence of excessive liquor amnii, makes this a convenient place for a brief discussion of this subject, in relation to the birth of a baby weighing 5½ lbs. and less.

As recorded in our annual reports for the 4 years 1952-55 from our units, 166 women with hydramnios were delivered of 120 babies. The incidence of hydramnios was therefore 0.46%.

Conditions found in association with hydramnios were as follows:-

(1) NO APPARENT CAUSE.

In 43 cases hydramnios was present for which no apparent cause could be given, that is in 40.5% of cases.

The ravages of hydramnios in this category are apparent when it was noted that 9 babies were lost (20.9%) 6 being stillborn and 3 neonatal deaths.

In 1 case a baby weighing 12 lbs. was born dead without obvious reason, the mother being non-diabetic or pre-diabetic.

Infection was present in another foetus.

Perhaps an explanation for the absence of reason for hydramnios was that so few postmortems were performed in our non-whites because of inadequacies of facilities for such investigation. In only 18.4% of cases was autopsy undertaken during 1952-55.

(2) MULTIPLE PREGNANCY.

In 13 cases of multiple pregnancy, 12 in twins and 1 in triplets, was hydramnios apparent. The incidence of hydramnios in twin pregnancy in our units was therefore 2.3% and in triplets 9.0%.

The disaster to the baby of hydramnios associated with multiple pregnancy may be assessed when it was noted that of 24 babies born

in twin pregnancy 12 were lost, or a perinatal mortality of 50%. Of these babies lost 7 were stillborn and 5 were neonatal deaths. Of the babies born in triplet pregnancy there was no survival because of extreme prematurity.

In our units therefore when hydramnios was present in twin pregnancy, the foetal loss was 3 times higher than the mortality in all twin pregnancies.

Bender(1952) from Liverpool recorded that as many as twice the number of babies were lost in the presence of hydramnios as when such a condition was absent, mainly due to prematurity and malformation.

Potter and Crunden(1941) similarly declared that hydramnios was associated with a greater foetal mortality.

### (3) ABNORMALITY OF THE FOETUS.

In 23 cases there was abnormality of the foetus in association with hydramnios. The incidence of hydramnios in this group was therefore 21.7%. Almost 50% of the foetuses born in this group were stillborn.

Macafee(1950) reported on 131 cases of hydramnios(with an incidence of 1.2%) and found chronic hydramnios in 13.8% of twin pregnancy. In 37% the foetus was abnormal and 58% of the foetuses were lost.

De Gouvêa(1949) from Brazil reported an incidence of chronic hydramnios in 1 in 794 pregnancies.

### (4) PREECLAMPSIA(including hypertension and chronic nephritis)

In 20 cases, or 18.8% was there hydramnios associated with this condition. A high perinatal mortality of 25% was noted, in which 3 babies were stillborn and 2 neonatal losses.

**(5) FOETAL HYDROPS.**

There were 3 such cases, or an incidence of 2.8% of all cases of hydramnios. All these babies were lost.

**(6) DIABETES MELLITUS.** There was only 1 such case, in which the child was alive.

**(7) SYPHILIS.** Only in 1 instance was hydramnios thought to be due to syphilis. The child survived.

**HYDRAMNIOS OCCURRING IN THE RACIAL GROUPS.****IN WHITE PATIENTS**

At the Howroy M.H. there were 32 instances in which hydramnios occurred, with the birth of 34 babies during 1952-55. The incidence of hydramnios was therefore 0.79%.

In 18 cases(56.2%) there was no apparent cause for excessive liquor.

Anencephaly was present in 3 babies, or in 9.4%.

In 9 instances P.E.T. was a factor in the causation of hydramnios, i.e. in 28.1%.

There were 2 sets of twins associated with hydramnios or an incidence of 6.2%.

The perinatal mortality in these babies was noted to be high as 26.4%, which was almost 10 times greater than the general mortality in white babies.

**IN NON-WHITES**

In our non-white units during 1952-55 hydramnios was recorded to have occurred in 44 cases, with the birth of 48 babies, which is an incidence of 0.36%(or half that occurring in whites).

There was no apparent cause for hydramnios in 29 cases, or in 65.9%.

In 10 instances abnormal infants were delivered in association with hydramnios(22.7%).

One set of triplets(2.2%) and 2 sets of twins(4.4%) revealed excessive liquor, and in yet another case syphilis was deemed to be the cause of hydramnios.

The perinatal mortality in cases with hydramnios in this group was 31.8%, which was again much higher than in the general mortality.

The gravity of hydramnios can therefore be appreciated when it is noted that 39.1% of infants were lost when this condition was present. Stillbirths accounted for 26 babies or 21.6% , and neonatal deaths 21 or 21.3%.

#### ABNORMAL PRESENTATION IN MULTIPLE PREGNANCY.

There is no doubt that premature rupture of the membranes in multiple pregnancy is an important cause of the birth of premature babies. What the cause of the premature rupture was not known. However the frequency of malpresentation such as breech presentation, high vertex presentation, transverse lie and the like, seems to suggest that maladaptation of the presenting part to be an important predisposing cause of such premature rupture. It has been my impression that with early engagement of the presenting part, premature rupture of the membranes does not occur as frequently as when there was no such engagement.

It is now also recognized that with adequate rest in hospital some weeks before the expected date, premature labour is less likely to occur than when the parturient is not admitted to hospital early.

The attendant danger of umbilical cord prolapse in twin pregnancy is also well known, again mainly due to maladaptation of the presenting part to the pelvic inlet.

TOTAL BABIES	NON-BOOKED								BOOKED							L Q. S.
	No. N.B.	TOTAL PREMS.		OVER 5½ lbs		TOTAL LOSS	No. B.	TOTAL PREMS.		OVER 5½ lbs.		L Q. S.				
	No.	SB	NND	No.	SB	NND		No.	SB	NND	No.		SB	NND		
836	205	154	24	28	41	3	1	27 SB 29 NND	631	318	30	40	313	16	5	46 SB 45 NND
% age	34.5	80%	14.6%	20%	20%	7.3%	2.6%	13.1 16.9 27.3%	65.5	50.4	9.4%	13.9%	49.6%	5.1%	1.7%	7.2% 7.5% 14.8%

MULTIPLE PREGNANCY (57a)

Incidence of prematurity in booked and non-booked cases, with respective mortality in premature and babies weighing over 5½ lbs. (1953-55)

<u>Non-Whites</u>	484	145	107	167	8	38	2	1	18 SB 9 NND	339	172	16	24	167	12	8	28 SB 32 NND
% age	30%	737	14.9%	8.8%	26.3%	5.2%	28%	12.4 7.1 18.8%	50.7	9.3%	5.4%	49.3%	7.1%	5.1%	8.2%	10.3%	17.7%
			*22.4%			*7.9%					*23.3%			*11.9%			
<u>Whites</u>	100	20	11	2	2	9	0	0	2 SB 2 NND	80	34	1	2	46	0	0	1 SB 2 NND
			55%	18.1%	22.2%	45%	0	0	10 11.1 20%		42.5	2.9%	6%	55%	0	0	8.2% 2.8% 3.7%
			*36.3%			0%					*8.8%			0%			

MULTIPLE PREGNANCY (Whites and Non-whites). Incidence of prematurity in booked and non-booked cases in premature and "mature" babies (1953-55)  
(Table 57b)

MULTIPLE PREGNANCYFOETAL MORTALITY IN PREMATURE AND "MATURE" BABIES IN RELATION  
TO ANTENATAL CARE (Table 57)

During the 3 year period 1953-55, 836 babies were born from twin pregnancies in our units.

Of these, 205 or 34.5% were "non-booked" and 631 or 65.5% from "booked" patients.

As many as 482 infants (57.7%) were premature, 164 or 80% being from "non-booked" patients and 318 or 50.4% from "booked".

Similarly also from the University College, Ibadan, where over 80% of babies born from "non-booked" twin pregnancies were premature.

FOETAL LOSSES IN OUR UNITSSTILLBIRTHS

IN "BOOKED" CASES. Of 631 babies born there were 46 stillbirths, or a stillbirth rate of 7.2%.

(a) In premature babies.

318 babies of 631 delivered were premature i.e. 50.4% prematurity rate.

Of these premature babies in "booked" cases there were 30 stillborn, or a stillbirth rate of 9.4%.

(b) In "mature" babies.

There were 313 babies weighing over 5½ lbs. delivered in "booked" cases of twin pregnancy, and of these 16 or 5.1% were stillborn.

IN "NON-BOOKED" CASES. Of 205 babies born there were 27 stillbirths, or a stillbirth rate of 13.1%.

Almost twice as many babies were therefore lost as stillbirths in "non-booked" cases of twin pregnancy as in "booked" cases.

(a) In premature babies. 164 babies of a total of 205 born of twin pregnancies in "non-booked" patients were premature. The prematurity rate in "non-booked" twin pregnancies was therefore 80%, which was much greater than in "booked" twin pregnancy.

Of these 164 premature infants 24 were stillborn i.e. a stillbirth rate of 14.6%, which was significantly higher than in "booked" twin pregnancies.

(b) In "mature" babies. Only 41 of a total of 205 babies born of "non-booked" patients with twin pregnancy were "mature" (20.0%). Of these "mature" infants 3 were stillborn, that is a stillbirth rate of 7.3%: a rate which was not significantly higher than in "booked" cases.

#### NEONATAL DEATHS IN TWIN PREGNANCY

(Table 57)

##### IN "BOOKED" CASES.

45 babies died in the early neonatal period out of a total of 631 born i.e. a neonatal mortality of 7.5%.

(a) In premature babies.

The neonatal mortality in "booked" cases was 13.9%, or 40 deaths of 288 premature livebirths in twin pregnancy.

(b) In "mature" babies.

There were 5 neonatal deaths of a total of 297 "mature" livebirths in "booked" cases of twin pregnancy, or a neonatal mortality of only 1.7%. Therefore 8 times as many neonatal deaths occurred in premature babies delivered of "non-booked" twin pregnancies as in "mature" babies.

##### IN "NON-BOOKED" CASES.

Of a total of 205 babies delivered of "non-booked" cases of twin

pregnancy, 178 were liveborn. Of these 29 died in the early neonatal period i.e. a neonatal mortality of 16.9%. There was therefore more than twice a greater neonatal loss in "non-booked" cases of twin pregnancy as in "booked" cases.

(a) In premature babies.

Of 140 premature liveborn infants delivered in "non-booked" cases of twin pregnancy, as many as 28 died in the early neonatal period i.e. a neonatal mortality of 20.0%. Although this loss was higher in "booked" cases of twin pregnancy, statistically the difference was not striking.

(b) In "mature" babies.

There was only 1 neonatal death out of 38 mature babies delivered of twin pregnancy in "booked" cases, or a neonatal loss of 2.6%. The greater loss of premature babies in this group as compared with mature babies was striking, and similar to that occurring in "booked" cases of twin pregnancy.

PERINATAL MORTALITY IN TWIN PREGNANCY

IN "BOOKED" CASES. Of 631 babies born there were 91 lost, or a perinatal mortality rate of 14.4%.

(a) In premature babies.

Of 318 premature babies delivered 70 were lost, or a perinatal loss of 22.0%.

(b) In "mature" babies.

21 out of a total of 313 "mature" babies born in "booked" cases were lost, or a perinatal loss of 6.7%.

There was therefore a significantly higher loss of life in premature babies born of "booked" cases of twin pregnancy, as compared with "mature" babies in the ratio of almost  $3\frac{1}{2} : 1$ .

IN "NON-BOOKED" CASES.

(Table 57)

The perinatal mortality rate in "non-booked" twin pregnancy was 27.3%, or a total of 56 babies lost out of 205 delivered. Therefore almost twice as many babies were lost in "non-booked" twin pregnancy as compared with "booked".

(a) In premature babies.

Of a total of 164 premature babies born in "non-booked" cases i.e. in 80% of all "non-booked" cases, as many as 52 babies were lost. The perinatal loss was therefore 31.7%, in comparison to 22.0% lost in "booked" premature babies.

(b) In "mature" babies.

Of 41 "mature" babies born only 4 were lost, or a perinatal mortality rate of 9.7%. This percentage loss was again greater than in "booked" cases, although not significantly.

When compared with premature babies lost in "non-booked" twin pregnancy there was a ratio of 1 : 3 loss in mature babies of the same group.

FOETAL LOSSES IN THE RACIAL GROUPS

(Table 57)

Apart from the higher incidence of multiple pregnancy and poorer socio-economic status in the non-white patient, it was evident that perinatal foetal losses in this race were higher than in the white patient.

The part played by inferior prenatal care in the non-white is evident from the analysis of the losses occurring in the two races.

IN WHITE PATIENTS. (Morbray M.H.)

(Table 57)

Although only the fate of 100 babies was analysed during the years 1953-55, there was a significantly smaller loss in this race.

Of 100 babies born of twin pregnancies 7 infants were lost, or a perinatal loss of 7.0%, of which 3 were stillborn(3.0%) and 4 neonatal deaths(4.1%).

IN "BOOKED" CASES.

80.0% of babies born were from "booked" cases, and 3 were lost, or a perinatal loss of 3.7%, of which 1 was stillborn(1.2%) and 2 neonatal deaths(2.5%).

(i) In premature babies.

Of 34 premature babies delivered 3 were lost, or a perinatal mortality of 8.8%.

(ii) In "mature" babies. There were no babies lost of 46 "mature" babies born.

IN "NON-BOOKED" CASES.

20.0% of babies delivered were from "non-booked" patients, of which 4 were lost, or a perinatal loss of 20.0%, of which 10% were stillborn and 11.1% neonatal deaths.

Although the numbers of babies analysed were small there was a significantly higher perinatal mortality in "non-booked" cases compared with "booked"(20.0% : 3.7%).

(i) In premature babies.

As many as 4 out of 11 premature babies delivered of "non-booked" white patients were lost, or a perinatal mortality of 36.3%. This figure was significantly higher than the 8.8% loss in "booked" premature babies.

(ii) In "mature" babies.

Again there was no loss of life in mature babies as in "booked" cases.

It is evident therefore from the above analysis of perinatal mortality in twin pregnancy in white patients that the premature baby was not as "good a risk" as the as the "mature" baby. In fact the entire loss of life in the infant occurred in the premature baby.

Again it was noted that the greatest loss of life occurred in the patients without adequate antenatal care, especially in the premature baby.

IN NON-WHITE PATIENTS (SOMERSET HOSPITAL, ST. MONICA'S AND  
GROOTE SCHUUR HOSPITAL)

(Table 57)

During the years 1953-55, 484 babies were delivered of twin pregnancies in the non-whites.

Of this number 87 were lost, or a perinatal mortality of 17.9%, of which there were 46 stillbirths (9.5%) and 41 neonatal deaths (9.3%).

There was therefore a significantly higher perinatal mortality in non-white twin pregnancy as compared with whites in the ratio of more than 2 : 1.

IN "BOOKED" CASES.

70.0% of babies delivered of twin pregnancy in non-whites were from "booked" patients.

Of 339 babies born in this group as many as 60 were lost, giving a perinatal mortality rate of 17.7%, of which 8.2% were stillborn and 10.3% neonatal deaths.

When compared with white "booked" cases it was noted that this latter perinatal loss was almost 5 times higher in the ratio 17.7 : 3.7.

Apart from socio-economic conditions which were poorer in the non-white, the significance of antenatal care in marked divergence of loss of life must be borne in mind.

**(i) In premature babies.**

Of 172 premature babies born of twin pregnancy in non-whites ("booked") no fewer than 40 or 23.3% were lost (9.3% stillborn and 15.4% neonatal deaths).

The perinatal mortality in this group was therefore much higher than in the white premature group (23.3% + 8.8%), both stillbirths and neonatal deaths showing a higher loss.

**(ii) In "mature" babies.**

Of 167 "mature" babies delivered in twin pregnancy of "booked" non-whites, 20 were lost or a perinatal mortality of 11.9%, a figure which was significantly higher in white patients.

**IN "NON-BOOKED" PATIENTS.**

Of 145 babies born, 27 were lost, or a perinatal mortality rate of 18.6%, of which 12.4% were stillborn and 7.1% neonatal deaths.

There was therefore no significant difference in the perinatal losses sustained by whites and non-whites in this group.

**(i) In premature babies.**

Of 107 babies born 24 were lost, or a 22.4% loss, of which 14.9% were stillborn and 8.8% neonatal deaths.

**(ii) In "mature" babies.**

Of 38 babies delivered 3 were lost, or a perinatal mortality rate of 7.9%, of which 5.2% were stillborn and 2.8% neonatal deaths.

The much higher losses of life in premature babies as compared with "mature" ones (as in "booked" cases) again signifies the "poorer" risk of the premature baby.

The importance of antenatal care in the prevention of loss of life was also noted in the unit of the University College, Ibadan, Nigeria, where only non-whites were admitted. It should be emphasized that at this institution antenatal care was poor because of primitive obstetrical services. This hospital was quite inadequate to cater for the obstetrical population of the region, with a result that attendance to clinics was very infrequent and opportunities for hospitalization prior to delivery in multiple pregnancy were non-existent.

During the period April 1953-December 1954, the incidence of twin pregnancy was quoted as 1 in 16 pregnancies!

#### FETAL LOSSES AT UNIVERSITY COLLEGE, IBADAN.

##### IN "BOOKED" CASES.

The perinatal mortality rate was 31.9%, of which 9.8% were stillbirths and 24.5% neonatal deaths.

##### (i) In premature babies.

Of 321 babies delivered of twin pregnancies in "booked" cases, no fewer than 120 or 37.4% were lost, of which 33 (10.2%) were stillborn and 87 neonatal deaths (30.2%).

##### (ii) In "mature" babies.

Of 69 "mature" babies born, 3 were lost (4.3%), of which 2.8% were stillborn and 1 neonatal death (1.5%).

The strikingly higher perinatal losses sustained by premature babies in "booked" cases as compared with "mature" babies (almost 9 times as much) was significant. In our units of the University of Cape Town there was also a much higher loss of premature babies in "booked" cases, although not to such a marked degree.

##### IN "NON-BOOKED" CASES.

The perinatal mortality rate in this group was 49.1%, of which 32.4% were stillbirths and 24.6% neonatal loss.

Although "booked" and "non-booked" perinatal mortality rates were different, with a higher rate in the latter, there was not the similar variance in our units in Cape Town.

This can be explained by the fact that not only was antenatal care at Ibadan much more primitive than in our units, but also a much larger percentage of premature babies were delivered at Ibadan.

(i) In premature babies.

Of 175 premature babies born of twin pregnancies in "non-booked" cases at Ibadan, 84 were lost, or a perinatal mortality of 48.0%, of which 34 were stillborn (19.4%) and 50 neonatal deaths (35.4%).

More premature babies were therefore lost in "non-booked" patients, although the difference was not striking.

(ii) In "mature" babies.

Only 24 babies were born in this group and 4 were lost, or a perinatal mortality of 20.8%, which was significantly higher than in "booked" mature babies.

Again it was significant to note that more babies were lost in twin pregnancy in mothers with inadequate antenatal care, as occurred in our Cape Town units.

Premature babies suffered much more severely in loss of life as compared with "mature" ones.

The influence of antenatal care at Ibadan was not so obvious as in our units, because of the much more primitive obstetrical services provided in this completely non-white population, in addition to the very poor socio-economic conditions and associated chronic ill health, and the rife nature of anaemia and infection.

The very much greater incidence of prematurity in twin pregnancy at Ibadan was proportionate to the much greater perinatal mortality rate in that region.

### SUMMARY AND CONCLUSIONS.

The incidence of twin pregnancy in our non-whites was higher than that of whites.

In non-whites it was noted that the incidence of prematurity in twin pregnancy was higher than in whites.

Similarly at Ibadan, Nigeria, the incidence of prematurity in twin pregnancy was high in relation to the extraordinarily high incidence of twin pregnancy of 1 in 18 pregnancies.

In our units "booked" patients were delivered of a larger percentage of "mature" babies than in "non-booked" patients, in twin pregnancy.

Perinatal mortality rates in "non-booked" patients were much higher than in "booked" patients. Similarly on the whole there were higher stillbirth rates and neonatal mortality rates in "non-booked". The reason for this marked disparity in loss of life was mainly because of the much greater loss of life in premature babies, of which there were smaller percentages in "booked" cases.

In comparing perinatal mortality rates in the racial groups, it was noted that the non-white suffered more severely. This was because, apart from poorer socio-economic conditions and much greater chronic ill-health, there was inadequate antenatal supervision afforded to this race. The inadequacy of hospital accommodation for supervision in the last 6 weeks of pregnancy in this race, and the greater numbers of "non-booked" patients with the higher prematurity rates accentuates the higher foetal losses as compared with white patients.

It is suggested that with improvement of obstetrical services

in the non-white, when more hospital accommodation will be provided, and with adequate supervision in hospital during the last 6 - 8 weeks of pregnancy, a significant reduction in perinatal mortality will be accomplished. The complications of twin pregnancy such as preeclampsia, abnormal labour, prematurity and the like will thereby be minimised to a greater extent, with a lower loss of infant life.

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**PRE-ECLAMPTIC TOXAEMIA (P.E.T.) WITH SPECIAL REFERENCE  
TO PREMATURITY AND MULTIPLE PREGNANCY.**

(Tables 53,54)

It is generally recognized that P.E.T. (including hypertension in pregnancy) is more common in multiple pregnancy than in single pregnancy.

Anderson (1956) from the United Kingdom reported an incidence of P.E.T. in 33% of twin pregnancies.

McClure (1937) reported a 40% incidence of P.E.T. with multiple pregnancy.

Bender (1952) recorded an incidence of 24% and Russel (1952) 20.4%.

Guttmacher (1939) from the U.S.A. noted an incidence of 35.3% P.E.T. in multiple pregnancy, and Potter and Crunden (1941) an incidence of 23.8%.

Hawker and Allen (1949) quote a frequency of 29.6% P.E.T. in twin pregnancy, and Potter and Fuller (1949) 21.0%.

Dulfin and Lawler (1957) similarly report a high incidence of 31.2% of P.E.T. in twin pregnancy.

Lawson and Lister (1954) from the University College, Ibadan, Nigeria, where only non-whites were admitted, recorded only 10 cases of P.E.T. in 305 twin pregnancies during an 18 months period (April 1953-December 1954). The incidence of P.E.T. at this institution was therefore only 3.2%, or 10 times less frequency than in our units in Cape Town. In no instance in triplet pregnancy was P.E.T. noted at Ibadan.

INCIDENCE OF P.E.T. IN TWIN PREGNANCY IN OUR UNITS.

During the years 1952-55 the incidence of P.E.T. in twin pregnancy was 30.6%. (Tables 31,32)

In white patients the incidence of P.E.T. in twin pregnancy was almost twice as high as in non-whites. It should however be noted that the numbers of twin pregnancies in non-whites was much greater than in whites.

PREECLAMPTIC TOXAEMIA IN RELATION TO PREMATURE BIRTH.

There is no doubt that the incidence of prematurity is markedly increased in the presence of P.E.T.(vide supra). In multiple pregnancy therefore a high incidence of premature birth would naturally follow.

In our units as many as 20.7% of babies delivered of women with P.E.T. were premature, and 1/3 of these weighed less than 4 lbs.

Of 3341 premature babies delivered in our units during 1952-55, no fewer than 28.6% were from patients with P.E.T.

IN WHITE PATIENTS.

At Howbray H.H. during 1952-55 13.5% of all babies delivered from "toxaemic" mothers were premature, and 14.5% of these weighed less than 4 lbs.

IN NON-WHITES.

As high a percentage as 20.6% of babies delivered of mothers with P.E.T. were premature, and 36.3% of these weighed less than 4 lbs.

THE EFFECTS OF ADEQUATE ANTENATAL CARE IN THE INCIDENCE  
OF PREMATURITY IN P.E.T.

This subject has been discussed previously under preeclamptic toxæmia and allied conditions

There is no doubt that with adequate facilities for supervision of the patient with P.E.T. in hospital that the incidence of prematurity would be diminished. Especially is this the case in the diminution in the numbers of babies weighing less than 4 lbs. in which the perinatal mortality is the highest.

FOETAL LOSSES IN P.E.T. WITH SPECIAL REFERENCE TO PREMATURITY.

(Tables 53,54)

A detailed analysis of foetal mortality in relation to prematurity, and the effects of prenatal care in reducing such mortality will be noted from the above tables.

During the years 1952-55 there were 891 premature babies delivered of which 184 were stillborn(see table 50), the still-birth rate therefore being 20.6%.

Similarly during the years 1953-55 (tables 53-54) out of a total of 702 premature babies delivered of mothers with "toxæmic" there were 131 stillbirths(18.6%) and 99 neonatal deaths(17.3%). The perinatal mortality rate was hence 230 or 32.7% in premature babies.

In "mature" babies for the same period, 2790 were born of mothers with P.E.T., and 205 were lost(or 7.3%).

The perinatal mortality rate for premature babies delivered of mothers with P.E.T. was therefore almost 4 times higher than

"mature" babies in women with a similar disease.

The stillbirth rate for "mature" babies delivered from mothers with P.E.T. was 5.7% (or 161 babies) which was more than 3 times less than in premature babies.

Neonatal deaths in "mature" babies in women with P.E.T. totalled 44 or a neonatal mortality rate of 1.6%, which was 10 times less than in premature babies.

It was significant therefore that premature babies delivered of mothers with P.E.T. are more exposed to loss of life as "mature" babies especially in relation to neonatal mortality.

FOETAL MORTALITY IN PATIENTS WITH P.E.T. IN RELATION TO ANTENATAL CARE. (Tables 53,54)

Of 3482 babies born of mothers with P.E.T. during 1953-55, there were 2790 "mature" and 702 (or 20.4%) premature.

IN PREMATURE BABIES.

"BOOKED CASES".

Of 395 premature babies there was a perinatal mortality rate of 27.6% or a loss of 109 babies. Of these 61 (or 15.4%) were stillborn and 48 neonatal deaths (14.3%).

"NON-BOOKED" CASES.

Of 307 premature babies, there was a loss of 121 babies or a perinatal mortality rate of 39.4%, of which 70 (22.8%) were stillborn and 51 neonatal deaths (21.5%).

There was a significantly higher mortality in "non-booked" cases compared with "booked", in all its aspects.

IN "MATURE" BABIES."BOOKED CASES"

Of 2176 "mature" babies there was a loss of 87 or a perinatal mortality of 4.0%, of which 70 or 3.2% were stillborn and 17 neonatal deaths(0.8%).

Compared with babies from "booked" premature cases there was an almost 7 times higher perinatal loss in babies weighing 5½ lbs. or less. Stillbirth rates were almost 5 times higher in the premature baby and neonatal mortality almost 18 times higher.

IN "MATURE" BABIES."NON-BOOKED" CASES.

(Tables 53,54)

There were 604 "mature" babies delivered during 1953-55 in women not attending our clinics with P.E.T.

Of this number 118 or 19.2% were lost, of which there were 91 stillbirths(14.8%) and 27 neonatal deaths(5.1%).

Compared with "booked" cases therefore the perinatal mortality in "non-booked" cases was significantly higher in the ratio of almost 4 : 1.

Stillbirths were 5 times higher in "non-booked" cases, and neonatal deaths almost 7 times greater.

The higher mortality in "non-booked" cases was therefore evident in the series of cases investigated in our units during 1953-55.

FOETAL LOSSES IN PATIENTS WITH P.E.T. ACCORDING TO RACE.

As mentioned previously, the obstetrical services in our units for non-whites were inferior especially in relation to prenatal care for cases of P.E.T. This was particularly so

because of inadequacy of bed accommodation for supervision of the P.E.T. patient. "Outpatient" treatment in these latter patients is frequently practised with the result that often patients are admitted in a more serious condition a week or more later.

In the white patient, therefore, antenatal care for cases of P.E.T. is far superior for these women.

A comparison of the foetal losses sustained by the white and non-white races should therefore show varying results in perinatal mortality.

FOETAL LOSSES IN WHITE PATIENTS WITH P.E.T. (Table 54)

IN "BOOKED" CASES.

Of 829 babies born during 1953-55 of mothers with P.E.T. 729 or 88.1% were "booked".

Of 729 babies born of "booked" cases 644 or 88.3% were "mature" and 11.7% premature.

The perinatal mortality in these babies was 3.1% or a total of 23 babies lost, of which 12(1.6%) were stillborn and 11 neonatal deaths(1.5%).

(i) In premature babies.

Of 85 premature babies delivered of women with P.E.T. in "booked" cases 12 were lost, or a perinatal mortality rate of 14.1%. There were 7 stillbirths (8.2%) and a neonatal loss of 5 infants(6.4%).

(ii) In "mature" babies.

Of 644 "mature" babies born in this group only 11 were lost(1.6%), 5 being stillborn(0.7%) and 6 neonatal deaths(0.8%).

Again the significantly higher loss in premature babies was noted as compared with "mature", in the ratio of almost 10 : 1. Stillbirths and neonatal deaths also showed a higher loss in the premature baby, as shown in table 54.

IN "NON-BOOKED" CASES (WHITES)

Of 100 babies delivered of white patients with P.E.T. during 1953-55, 30% were premature. The incidence of prematurity in this group was therefore almost 3 times more frequent than in "booked" cases.

The perinatal mortality rate in "non-booked" white cases was 14.0% or 14 babies lost, of which 4 were stillborn(4.0%) and 10 neonatal deaths(10.4%).

Compared with "booked" cases this perinatal loss was more than 4 times higher, especially neonatal deaths which were times greater than in "booked" cases.

(i) In premature babies.

(Table 54)

Of 30 premature babies delivered of white "non-booked" cases as many as 8(26.6%) were lost of which 3.3% were stillbirths and 24.1% neonatal deaths.

Compared with "booked" cases the perinatal mortality rate was therefore significantly higher by almost 2 : 1.

It was especially noted that neonatal mortality was significantly higher in "non-booked" cases.

(ii) In "mature" babies.

Of 70 "mature" babies born in "non-booked" patients with P.E.T. 6 or 8.5% were lost, 3 or 3.3% were stillborn and 3 neonatal deaths(4.4%).

The perinatal mortality in "mature" babies was therefore almost 3 times higher in "non-booked" patients, and 6 times less than in "non-booked" premature infants.

It was evident that from the above statistical analysis that perinatal mortality rates were much higher in premature than "mature" babies, higher in "non-booked" cases, and that the incidence of prematurity was higher in "non-booked" cases.

FOETAL LOSSES IN NON-WHITE PATIENTS WITH P.E.T. (Table 54)

IN "BOOKED" CASES.

Of 1611 babies delivered of non-whites with P.E.T. during 1953-55, 1021 were "booked" (63.4%). The frequency of "non-booked" cases was therefore 36.6% which was almost 3 times higher than in white patients.

Of the 1611 babies born to non-whites in this group 399 or 24.7% were premature compared with 14% in white patients.

It was of significance that the numbers of babies weighing less than 4 lbs. in the non-white was much greater than in the white patient.

In "booked" cases the frequency of prematurity in non-whites was 180 out of 1021 babies born, or 17.6%, compared with a prematurity rate of 11.7% in whites.

In "non-booked" cases the prematurity rate was 223 babies out of 590 born or 37.8% in non-whites with P.E.T. compared with a rate of 30% in whites.

The perinatal mortality in "booked" patients (non-whites) with P.E.T. was 10.9%, which was more than 3 times greater than in whites, stillbirths being almost 5 times higher and neonatal deaths just 2½ times more.

(i) In premature babies.

180 premature babies were born of non-whites with P.E.T. during 1953-55, as many as 65 or 36.1% were lost, 36(20.0%) being stillborn and 29(20.1%) neonatal deaths.

The perinatal mortality rate in non-whites for premature babies in "booked" cases with P.E.T. was hence more than 2½ times greater than in whites.

One explanation for this greater loss in non-whites was undoubtedly because of the greater percentage of premature babies born to the non-white, due to the fact that antenatal care was inadequate in the non-white. Hence not only were more seriously ill patients admitted but also induction (medical and surgical) was more frequent.

Of course the higher incidence of prematurity in twin pregnancy in the non-white with P.E.T. was another factor in the higher perinatal loss in this race.

(ii) In "mature" babies.

Of 1021 "mature" babies delivered in non-whites with P.E.T. in "booked" cases during 1953-55 no fewer than 47 were lost, or a perinatal mortality rate of 5.8%. Of these 40 or 4.7% were stillborn, and 7 were neonatal deaths.

Hence almost 4 times a greater perinatal mortality rate occurred in this group as in whites. Of significance was the much greater stillbirth rate in "mature" non-white babies, which was 6 times greater in the non-white.

Neonatal mortality was exactly similar to that occurring in whites (6.8%).

The higher stillbirth rate in the non-white was probably due to the higher incidence of abnormal labour in this race,

mainly because of the greater frequency of inadequacy of prenatal care. In other words although these non-white women were "booked" at our clinics, outpatient treatment was more commonly administered to them than in whites, and also irregularity of visitation to our clinics.

Again it is evident from the above statistical discussion that that a far greater number of premature babies were lost than "mature" in this group, in the ratio of almost 6 : 1.

IN "NON-BOOKED" CASES (NON-WHITES).

(Table 54)

During 1953-55, 590 babies were delivered of non-white patients with P.E.T. in this group.

The perinatal mortality rate was 23.7%, or 140 babies lost out of 590 delivered. Of these 92 (or 15.4%) were stillborn and 48 (9.6%) neonatal deaths.

More than twice as great a perinatal mortality rate therefore occurred in "non-booked" non-whites as in "booked" cases. Compared with whites the ratio was almost 2 : 1, stillbirths being more obvious, being almost 4 times greater. A similar percentage of neonatal deaths occurred in both races.

(1) In premature babies.

Of 223 babies born in this group 70 or 31.3% were lost, of which 41 were stillborn (18.3%) and 29 neonatal deaths (15.9%).

There was therefore no significant difference in the perinatal losses in premature babies born of mothers (non-white) with P.E.T. in "non-booked" and "booked" cases.

This finding was dissimilar to that occurring in white patients when 14.1% premature babies were lost in "booked" cases, and 26.6% in "non-booked". Again the reason for this disparity in

perinatal losses in the white patient can be found in the fact that more premature babies were born in "non-booked" cases.

Antenatal care of a much more satisfactory type in the white is another explanation for the better results in the "booked" patient, whereas in the non-white antenatal supervision was inadequate in both "booked" and "non-booked".

(ii) In "mature" babies (non-white "non-booked")

Of 367 "mature" babies delivered of non-whites with P.E.T. during 1953-55, 70 or 19.0% were lost, of which 51 (13.0%) were stillborn and 19 (6.0%) were neonatal deaths.

Almost 3½ a greater percentage of babies were lost in this group as in "booked" cases, and also very much less than premature babies of the same group.

Both stillbirth and neonatal mortality rates were higher in "non-booked" cases.

SUMMARY AND CONCLUSIONS.

The effects of antenatal supervision in patients with P.E.T. in our units during 1953-55 are discussed in relation to (i) The incidence of prematurity, (ii) Foetal losses (perinatal mortality, stillbirth rates and neonatal mortality) in "mature" and premature babies.

The findings briefly were as follows:-

(i) The incidence of prematurity in "non-booked" cases of P.E.T. was far higher than in "booked" cases.

Because of the poorer antenatal supervision in the non-white, the incidence of prematurity was higher in this race, both in "booked" and "non-booked" cases.

It was noteworthy that many more babies weighing 4 lbs. and under were born in non-whites, in whom the premature induction rate (medical and surgical) was higher, because of more seriously ill patients in this race.

(ii) Foetal losses. Perinatal mortality rates were higher in "non-booked" than in "booked" cases, mainly because of the higher losses in premature babies in the "non-booked".

Because of the antenatal care in the non-white being inadequate, and as a result therefore of the greater incidence of "non-booked" cases in the non-white, perinatal losses were greater than in the white patient.

Stillbirths and neonatal deaths were much more frequent in "non-booked" cases both in whites and non-whites, again mainly due to the higher frequency of prematurity in "non-booked" cases.

Prematurity carried with it a greater risk to the baby than in the "mature" baby, and this was more evident in the "non-booked" patient in whom prematurity was more frequent.

Finally one can conclude that it is the greater incidence of prematurity (especially in the non-white who delivered more babies weighing 4 lbs. and less than in the white) which makes that difference in the foetal losses suffered in "booked" and "non-booked" patients.

<u>TOTAL CASES</u>	<u>A.R.M.</u>	<u>PREMATURE</u>			<u>OVER 5½ lbs</u>			<u>TOTAL LOS S</u>	
		<u>TOTAL</u>	<u>S.B.</u>	<u>N.N.D.</u>	<u>TOTAL</u>	<u>S.B.</u>	<u>N.N.D.</u>	<u>S.B.</u>	<u>N.N.D.</u>
3482	1043	408	42	51	675	27	17	69	68
	30.0%	35.2%	*11.4%	15.6%*	64.8%	*4.0%	2.6%*	6.6%	6.9%
			25.3%*			6.5%*		13.1%	
<u>WHITES</u>									
829	234	49	5	4	188	2	5	7	9
	*25.9%	*20.8%	10.8%	9.7%*	*79.2%	1.0%*	2.7%•	*2.9%	*3.4%
			•19.5%			3.7%*		6.8%*	
<u>NON-WHITES</u>									
1611	544	255	26	34	309	14	9	40	43
	*33.9%	*45.2%	11.0%•	16.2%*	*54.8%	4.3%*	2.8%•	*7.6%	*8.5%
			•25.5%			7.1%*		15.2%*	

PREECLAMPTIC TOXAEMIA. (including eclampsia). SURGICAL INDUCTION (1953-55).

PERINATAL MORTALITY IN PREMATURE BABIES AND OVER 5½ lbs, AND IN WHITES AND NON-WHITES.

TABLE 58

**SURGICAL INDUCTION OF LABOUR AS A CAUSE OF PREMATUREITY**  
**IN PATIENTS WITH P.E.T.** (TABLE 58)

It must be obvious that termination of pregnancy before term, especially prematurely, must inevitably jeopardise the survival of a baby.

It is generally agreed that interference with pregnancy by the above manner the incidence of operative delivery is increased, as compared with a labour which commences normally.

As will be noted later, delivery of a premature baby by operative means is a more hazardous procedure generally than with spontaneous delivery, no matter how simple such delivery might be.

The effects of surgical, induction of labour in patients with P.E.T. on the eventual survival of the infant was analysed in the units of the University of Cape Town for the years 1953-55. The results are outlined with particular reference to "mature" and "premature" babies, in patients who had had adequate antenatal care and "non-booked" cases.

**INCIDENCE OF SURGICAL INDUCTION OF LABOUR FOR CASES OF P.E.T.**  
 (TABLE 58)

During the years 1953-55, 1043 surgical inductions were performed in 3469 cases of P.E.T.i.c. an incidence of induction of 30.0%. The number of babies delivered was 1083, which included 40 sets of twins, half of which were premature.

The number of premature babies was 408 or 35.2%, and 64.8% mature.

During the same 3 years(1953-55) surgical rupture of the membranes was performed in 1272 cases for all conditions, including antepartum haemorrhage, postmaturity etc. Therefore 81.8% of all surgical inductions performed were for preeclampsia, essential hypertension and chronic nephritis.

IN WHITES(NOWBRAY.M.H.)

Of 806 cases with P.E.T. during 1953-55, as many as 234 were induced by rupture of the membranes, or in 25.9% of cases, 237 babies being delivered of which 20.8% were premature, and 79.2% over 5½ lbs.

IN NON-WHITES( SOMERSET AND GROOTE SCHUUR HOSPITALS AND ST.MONICA'S)

Of 1612 cases with P.E.T. during 1953-55 as many as 544 were induced by rupture of the membranes, or in 33.9%, 564 babies being born of which 45.2% were premature and 54.8% "mature".

It was significant therefore that statistically a greater percentage of non-whites were induced surgically for P.E.T. than whites, and a statistically greater percentage of babies were premature in this race than in whites (more than twice).

Similarly a greater percentage of "mature" babies were born of mothers of the white race with P.E.T. when surgically induced.

PERINATAL MORTALITY IN CASES OF P.E.T. WITH SURGICAL INDUCTION.

(TABLE 58)

Of 1083 babies delivered during 1953-55 following surgical induction 13.1% were lost, of which 6.6% were stillborn, and 6.9% neonatal deaths.

(i) In premature babies. Of 408 delivered no fewer than 25.3% were lost of which 11.4% were stillborn and 15.6% neonatal deaths.

**(ii) In "mature" babies.**

Of 675 "mature" babies delivered of women with P.E.T. and who were induced surgically, 44 or 6.5% were lost, of which 27(4.0%) were stillborn and 17(2.6%) were neonatal deaths.

The perinatal mortality rate in "mature" babies in patients with P.E.T. who were surgically induced was therefore 4 times less than in premature babies from these patients. Stillbirths occurred almost 3 times less frequently, and neonatal mortality was exactly 6 times higher in premature babies.

**FOETAL LOSSES IN THE RACIAL GROUPS WITH P.E.T. SURGICALLY****INDUCED. (Table 58)**

As noted previously, of all surgical inductions performed in our units during 1953-55, 25.9% were for P.E.T. in whites and 33.9% in non-whites.

**IN WHITE PATIENTS.**

Of 237 babies born of white patients with P.E.T. who were induced surgically, 49 or 20.8% were premature.

The perinatal mortality rate in these was 6.8%, of which 2.9% were stillbirths and 3.9% neonatal mortality.

**(i) In premature babies.**

Of 49 premature babies born, 9 were lost or a premature perinatal mortality rate of 19.5%, of which 5(10.8%) were stillborn and 4 neonatal deaths(9.7%).

**(ii) In "mature" babies.**

Of 188 "mature" babies delivered 7 were lost, or a "mature" perinatal mortality rate of 3.7%, of which 2 or 1.0% were stillborn, and 5(2.7%) neonatal loss.

It was therefore evident that the losses sustained by premature babies delivered from women surgically induced for P.E.T. were much higher than in "mature" babies, in the ratio

of more than 5 : 1. Stillbirths were greater in the ratio of nearly 10 : 1, as compared with a ratio of almost 4 : 1 neonatal deaths. The reason for the greater stillbirth ratio was that more "mature" babies were delivered in the white. In the non-white, as will be noted later, the greater ratio in neonatal deaths occurred because of the greater numbers of premature babies delivered in that race.

IN NON-WHITE PATIENTS.

(Table 58)

During 1953-55, inclusive, 564 babies were delivered from women with P.E.F. surgically induced. As noted previously, this incidence of surgical induction was more than twice as frequent as in whites. The reason for this increased rate of induction has been mentioned before.

Of these 564 babies 235 were premature, or a prematurity rate of 45.2% which was 2 times higher than in whites.

The perinatal mortality rate in this group was 15.2% or 83 babies lost. Of these, 40 or 7.2% were stillborn and 43 or 8.5% neonatal deaths.

The perinatal losses in non-whites were therefore more than twice greater than in whites, both stillbirths and neonatal deaths being proportionately higher.

(1) In premature babies.

Of 255 premature babies born, 60 or 25.5% were lost, of which 26(11.0%) were stillborn and 34(16.2%) neonatal deaths.

It will be noted therefore that there was no significant difference in the perinatal mortality rates in premature babies delivered from women with P.E.F. who were surgically induced. Stillbirths were similar in rates, but neonatal mortality rates show a significantly higher loss(16.2% : 9.7%), although not

SUMMARY AND CONCLUSIONS."SURGICAL INDUCTION OF LABOUR  
FOR P.E.T."

The incidence of surgical induction of labour for P.E.T. was 30.0% of all cases of P.E.T. during the years 1953-55. Of all inductions performed in our units during the same period 81.8% were for P.E.T.

In white patients with P.E.T. 25.9% were induced surgically, compared with 33.9% in non-whites, statistically a significant difference.

In whites, of babies born following surgical induction 20.8% were premature, compared with 45.2% in non-whites in whom a greater percentage of infants weighing 4 lbs. and less were delivered.

The perinatal mortality rate in all patients with P.E.T. who were induced surgically was 13.1% of which 6.6% were still-born and 6.9% neonatal deaths. In whites the perinatal loss was 6.8%, compared with a loss of 15.2% in non-whites. Both stillbirth and neonatal mortality rates were much higher in the latter. Although perinatal mortality rates in premature babies in both races were not statistically different, losses in babies weighing more than 5½ lbs. were considerably higher in non-whites.

In premature babies, although stillbirth losses were similar in both races, neonatal losses were significantly higher in non-whites.

In "mature" babies however neonatal losses were similar in both racial groups, but stillbirth losses were considerably higher in non-whites.

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 } See earlier chapter on  
 } multiple pregnancy.  
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TOTAL	B.	PREMS			MATURE			TOTAL	N.B.	PREMS.			MATURE			TOTAL
		BARIES	NO.	NO.	SB.	NND.	NO.			SB.	NND.	LOSS.	NO.	NO.	SB.	
728	342	135	32	18	207	24	5	56SB. 23NND.	386	201	87	37	185	73	7	160SB 44NND.
Age	46. 9	39. 4	23. 6	15. 9	60. 6	11. 6	2. 7	16.3 8.0	53. 1	52. 0	43. 2	29. 9	48. 0	38. 9	6. 2	41.4 19.4
			37.0%*			14.0%*		23.1%*			61.6%*			43.2%*		52.8*

WHITES.

114	82	18	3	3	64	0	0	3SB. 3NND.	32	18	6	3	14	0	3	6SB. 6NND.
	72.6	22.2	16. 6	23. 0	77. 8	0	0	9.6 3.7 7.3*	27.4	58. 0	33. 3	23. 0	42.0	0	21. 4	187 23.0 37.5%*
			33.3%			0%					50.0%			21.4%*		

NON-WHITES.

368	157	80	20	7	77	14	3	34SB 10NND.	211	111	44	22	100	52	2	96SB 24NND.
	42. 6	50. 9	25. 0	11. 6	49. 1	18. 2	4. 0	11.6 6.3	59. 4	52. 6	39. 6	32. 8	47. 4	52. 0	4. 1	45.5 22.8
			33.7%			22.0%*		28.1%*			59.4%			54.0%*		56.8%*

ACCIDENTAL HAEMORRHAGE. Foetal loss in "booked" and "non-booked" cases,  
in prematures and matures (1953-55), whites and  
non-whites.

(TABLE 59)

**PREMATURITY ASSOCIATED WITH ACCIDENTAL HAEMORRHAGE. (TABLE 59)****INCIDENCE OF ACCIDENTAL HAEMORRHAGE.**

During the years 1953-55 there was an incidence of accidental haemorrhage of 3.56%. As many as 728 babies were born during this period of time. In "booked" cases the incidence was 2.07% and in "non-booked" 9.44%.

The incidence of prematurity in "booked" cases was 7.64% and in "non-booked" 25.31%.

In the presence of premature babies only the incidence was 13.1%, whereas with mature babies the incidence was 2.1%: in "booked" mature babies the incidence was 1.41% and in "non-booked" 5.61%.

46.9% of babies delivered in cases of abruptio placentae were from "booked" patients, and 46.1% were premature.

**FOETAL LOSSES IN ACCIDENTAL HAEMORRHAGE IN PREMATURE AND "MATURE" BABIES, AND IN RELATION TO THE DEGREE OF ANTENATAL CARE.**

During 1953-55, of 728 babies born of mothers with accidental haemorrhage 283 or 38.8% were lost, of which 216 or 29.6% were stillborn and 67 or 13.0% were neonatal deaths.

In "booked" cases, of 342 babies delivered the perinatal mortality rate was 23.1% or 79 babies lost, of which 56 or 16.3% were stillborn, and 23 or 8.0% neonatal deaths.

In "non-booked" cases, of 386 babies born from patients with this type of bleeding no fewer than 204 or 52.8% were lost, of which 41.4% were stillborn and 44 or 19.4% neonatal deaths.

Perinatal mortality rates in "booked" and "non-booked" cases were significantly different with a greater loss in the ratio

23.1% : 52.8%. Both stillbirths and neonatal deaths were statistically much higher in "non-booked" cases, but especially stillbirth rates.

FOETAL LOSSES IN "BOOKED" CASES.

(Table 59)

(i) In premature babies.

Of 342 babies born of women with accidental haemorrhage, 135 or 39.4% were premature, and of these 50 or 37.0% were lost, of which 23.6% were stillborn and 15.9% neonatal deaths.

(ii) In "mature" babies.

Of 207 "mature" babies 29 or 14.0% were lost, of which 11.6% were stillborn and 5 or 2.7% neonatal deaths.

The perinatal mortality rate in premature babies from mothers booked in our clinics was therefore significantly higher than in "mature" babies in the ratio 37.0% : 11.6%. Stillbirth rate was more than 3 times in premature babies, and neonatal rate was almost 6 times higher than in "mature" babies.

FOETAL LOSSES IN "NON-BOOKED" CASES.

(i) In premature babies.

Of 386 babies born of women with accidental haemorrhage, 201 or 52.0% were premature. Of these latter babies 124 or 61.6% were lost, of which 87 or 43.2% were stillborn, and 37 (29.9%) neonatal deaths.

Compared with babies born in "booked" cases the perinatal mortality for premature babies was very much higher in "non-booked" cases (61.6% : 37.0%).

Both stillbirth and neonatal mortality rates were almost twice higher in "non-booked" as "booked" cases.

(ii) In "mature" babies.

Of 185 babies born of mothers with accidental haemorrhage during 1953-55, 80 or 43.2% were lost, of which 38.9% were stillborn and 6.2% neonatal deaths.

Compared with perinatal losses in mature "booked" cases, "non-booked" mature babies showed a more than 3 times greater loss. Stillbirth losses were more than 3 times greater in "non-booked" cases, which accounted for the greater difference in the 2 groups.

It was hence evident from the above statistical analysis that a much greater perinatal loss occurred in "non-booked" as "booked" cases, in premature and "mature" babies.

There was a greater perinatal loss in premature babies compared with "mature", especially in "non-booked" cases.

FOETAL LOSSES IN THE RACIAL GROUPS.

(Table 59)

IN WHITE PATIENTS.

Of 114 babies delivered of white patients with accidental haemorrhage during 1953-55 at the Howbray M.H. 18 or 15.8% were lost, of which 7.9% were stillborn and 8.5% neonatal deaths. There were 31.5% premature babies.

(i) In "booked" cases.

Of 82 babies delivered 6 or 7.3% were lost, of which 3.6% were stillborn and 3.7% neonatal deaths. Of these babies 22.2% were premature.

In premature babies. Of 18 premature babies 6 were lost or 33.3%, of which 16.6% were stillborn and 23.0% were neonatal deaths.

In "mature" babies. Of 64 "mature" babies born of mothers with accidental haemorrhage at the Howbray M.H. during 1953-55, there were no losses.

(ii) In "non-booked" cases.

Of 32 babies born 18 or 58% were premature. Although the numbers of babies born in this group was small, there was a statistically higher percentage of premature babies born in "non-booked" cases in white patients.

In premature babies. Of 18 babies born 9 or 50% were lost, 33.3% being stillborn and 23.0% neonatal deaths.

Premature perinatal mortality was not significantly greater in "booked" and "non-booked" cases, although statistical analysis was not based on a sufficient number of cases.

In "mature" babies. Of 14 "mature" babies delivered in "non-booked" cases in whites, 3 or 21.4% were lost, all being neonatal deaths.

It was apparent however that in whites the perinatal mortality rate was significantly higher in "non-booked" than "booked" cases in the ratio of almost 15 : 1.

IN NON-WHITE PATIENTS.

(Table 59)

Of 368 babies delivered of non-whites with accidental haemorrhage during 1953-55 in our non-white units, 164 or 44.5% were lost, of which 130 or 38.0% were stillborn and 34 or 14.9% neonatal deaths. There was a percentage of 51.9 of premature babies.

It was striking that many more premature babies were born in non-whites as whites, and that the perinatal mortality was almost 3 times higher in the non-white. Stillbirths were 5 times more frequent.

**(i) In "booked" cases.****(Table 59)**

Of 157 babies delivered in this group 44 were lost or a perinatal loss of 28.1%, of which 11.6% were stillborn and 6.3% neonatal deaths.

It was therefore very apparent that in "booked" cases perinatal mortality was significantly higher in non-whites as whites in the ratio of nearly 4 : 1. Stillbirth rate was almost 3 times greater in non-whites.

**In premature babies.**

Of 80 babies born of non-whites in "booked" cases 27 or 33.7% were lost, of which 25.0% were stillborn and 11.6% neonatal deaths.

Perinatal losses in premature babies in whites and non-whites in "booked" cases were therefore similar, and indicative of the high losses sustained in accidental haemorrhage.

**In "mature" babies.**

Of 77 "mature" babies 17 were lost in non-whites or a loss of 22.0%, of which stillbirths accounted for 18.2% and neonatal deaths 4.0%.

Fewer "mature" babies were therefore lost in "booked" cases of accidental haemorrhage than premature.

**(ii) In "non-booked" cases.**

Of 211 babies delivered 111 were premature or 52.6%, a percentage which was similar to that occurring in white "non-booked" cases, and also in "booked" non-whites.

Of the 111 premature babies born in this group as many as 66 or 59.4% were lost, of which 39.6% were stillbirths and 32.8% neonatal deaths.

Significantly the perinatal mortality in "non-booked" premature babies was similar in both races.

In "mature" babies.

(Table 59)

Of 100 "mature" babies born of mothers with accidental haemorrhage in non-whites during 1953-55, 54 or 54% were lost, of which 52% were stillbirths and 4.1% neonatal deaths.

A greater perinatal mortality rate was therefore noted in non-whites as whites in a ratio of almost  $2\frac{1}{2} : 1$ .

It should however be noted that the number of babies born to whites in this group was very small, yet the statistical comparison was striking.

SUMMARY AND CONCLUSIONS."PREMATURITY ASSOCIATED WITH ACCIDENTAL HAEMORRHAGE"

INCIDENCE. The incidence of accidental haemorrhage in the years 1953-55 was 3.56%. In "booked" cases the incidence was 2.07% and in "non-booked" 9.44%.

Of 728 babies born of mothers with accidental haemorrhage there were 46.9% "booked" cases, and 46.1% of babies delivered were premature.

In "booked" cases 39.4% of babies were premature, whereas in "non-booked" 52.0% were premature.

In whites 31.5% of babies born of patients with accidental haemorrhage were premature, whereas in non-whites 33.7% were premature. In "booked" whites there was a percentage of 21.8% prematurity, and in "non-booked" the frequency was 55.5%.

In "booked" non-whites there was a frequency of prematurity of 50.9%, and in "non-booked" 59.4%.

FOETAL LOSSES.

A much greater perinatal mortality rate occurred in "non-booked" cases compared with "booked".

In whites and non-whites, "booked" cases showed a lower perinatal mortality than "non-booked".

Premature babies in whites in both "hooked" and "non-hooked" cases showed almost similar losses in their same groups.

However there was a greater loss in premature as "mature" babies, especially in the non-white.

It can be concluded that antenatal care of adequate quality produced much better results than when supervision in pregnancy was unsatisfactory.

Despite the fact that accidental haemorrhage was a very serious risk to the baby's life, premature babies were lost in greater percentages than "mature", especially as far as still-births were concerned.

TOTAL	PREMS.						TOTAL	TOTAL	PREMS.				MATURE			TOTAL
	BABIES.	B.	NO.	SB.	NND.	NO.			SB.	NND.	LOSS	N.B.	NO.	SB.	NND.	
253	90	38	7	7	52	4	2	11SB. 9NND.	163	79	31	20	87	10	1	41SB. 21NND.
% age	35. 5	42. 2	18. 4	22. 6	57. 8	7. 7	4. 4	12.2 11.4 22.2%	64. 5	48. 4	39. 2	41. 6	51. 6	11. 5	12. 9	25.1 17.2 38.0%
			36.8%*			11.8%*					64.5%*			12.6%*		

WHITES																
31	18	7	1	3	11	0	0	1SB. 3NND.	13	9	0	1	4	0	0	1NND.
% age	58. 0	38. 8	14. 2	50. 0	61. 2	0	0	5.5 17.6 22.2%	42. 0	69. 2	0	11.1	30. 8	0	0	7.7 7.7%
			55.7%			0%					11.1%*			0%		

NON-WHITES																
93	33	12	3	2	21	4	1	7SB. 3NND.	60	37	17	5	23	5	0	22SB. 5NND.
	35. 4	36. 3	25. 0	16. 6	63. 7	19. 0	5. 8	21.2 11.5 30.3%	64. 6	61. 6	45. 6	25. 0	38. 4	21. 7	0	36.5 13.1 45.0%
			41.6%*			23.8%*					59.4%*			21.7%*		

PLACENTA PRAEVIA. Foetal loss in "booked" and "non-booked" cases, and in premature and 'mature' babies, and in whites and non-whites.

PREMATURITY ASSOCIATED WITH PLACENTA PRAEVIA.

(Table 60)

INCIDENCE OF PLACENTA PRAEVIA.

During the years 1953-55, 253 babies were born in our units from women with placenta praevia. The incidence was 1.23%.

In "booked" cases the incidence of placenta praevia was 0.55% and in "non-booked" cases 3.98%.

In the presence of premature babies the incidence was 2.15% in "booked" cases, and 0.35% in "non-booked".

In "non-booked" cases the incidence of placenta praevia was 9.9% when only premature babies were born, and 2.62% with the birth of "mature" babies.

Of 253 babies delivered during the above period, 117 or 46.2% were premature and 163 or 64.5% were "non-booked".

FETAL LOSSES IN PLACENTA PRAEVIA IN PREMATURE AND "MATURE" BABIES, AND IN RELATION TO ANTENATAL CARE.

Of 253 babies born of women with placenta praevia 82 or 32.4% were lost, of which 52 or 20.5% were stillborn and 30 or 17.5% neonatal deaths.

IN "BOOKED" CASES.

Of 90 babies delivered, 20 were lost or a perinatal mortality rate of 22.2%, of which 12.2% were stillborn and 9 neonatal deaths (11.4%).

IN "NON-BOOKED" CASES.

Of 163 babies born, 62 were lost or a perinatal mortality rate of 38.0%, of which 25.1% were stillborn and 17.3% neonatal deaths.

It was therefore evident that a greater percentage of babies was lost in "non-booked" patients, although this was not strikingly significant. A greater stillbirth rate was noted in "non-booked"

as compared with "booked" cases, in the ratio of almost 2 : 1.

FOETAL LOSSES IN "BOOKED" CASES.

(Table 60)

(i) In premature babies.

Of 38 premature babies born of women with placenta praevia 14 or 36.8% were lost, of which 18.4% were stillbirths and 22.6% neonatal deaths.

(ii) In "mature" babies.

Of 52 "mature" babies born only 6 or 11.8% were lost, of which 7.7% were stillborn and 4.4% neonatal deaths.

Perinatal mortality in premature babies in "booked" cases was therefore almost 3 times greater than in "mature". Stillbirths occurred twice more frequently in premature babies, and 5 times more babies were lost as neonatal deaths.

FOETAL LOSSES IN "NON-BOOKED" CASES.

(i) In premature babies.

Of 79 premature babies born in this group no fewer than 51 or 64.5% were lost, of which 39.2% were stillborn and 41.6% neonatal deaths.

Hence premature babies from "non-booked" cases of placenta praevia showed a much higher perinatal mortality than in "booked" cases. (64.5% : 36.8%). Both stillbirths and neonatal deaths were almost twice more frequent in non-booked cases.

(ii) In "mature" babies.

Of 87 "mature" babies delivered of "non-booked" patients with placenta praevia, 11 were lost or a

perinatal mortality rate of 12.6%, of which 11.5% were still-born and 1.29% neonatal deaths.

The perinatal mortality rate in "mature" babies was therefore almost 5 times less than in premature in "non-booked" patients with placenta praevia, and almost identical with perinatal mortality in "booked" mature cases.

Both stillbirths and neonatal deaths in this group were almost 3 times less than in premature babies of "non-booked" patients with placenta praevia.

#### FOETAL LOSSES IN THE RACIAL GROUPS.

(Table 60)

##### IN WHITE PATIENTS.

Analysis of the cases of placenta praevia in white patients during 1953-55 at the Howbray M.H. revealed that only 31 babies were delivered from these cases.

No definite conclusions could be arrived at because of the paucity of material.

However it was significant that in premature babies in these cases there was a much higher perinatal mortality than in "mature" cases, in which no babies were lost.

##### IN NON-WHITES.

Of 93 babies born of patients with placenta praevia during 1953-55 in our non-white units 47 or 50.4% were lost, of which 22 or 23.6% were stillborn and 8 (11.2%) neonatal deaths.

Compared with the perinatal mortality rate in whites, the losses in non-whites were more than 3 times greater, especially as far as stillbirths were concerned.

Again it was noted that there was a higher perinatal mortality rate in premature babies as compared with "mature", in

the ratio 2 : 1. Neonatal deaths were strikingly more frequent in premature as in "mature" babies.

SUMMARY AND CONCLUSIONS.

"PLACENTA PRAEVIA"

During the years 1953-55 the incidence of placenta praevia in our units was 1.23% in "booked" cases it was 0.55% whereas in "non-booked" the incidence was 3.98%

As many as 46.2% of babies delivered were premature, and 64.5% of patients were "non-booked".

The perinatal mortality rate was 32.4% : in "booked" patients the rate was 22.2% and in "non-booked" 38.0%.

The stillbirth rate in "non-booked" cases was double that occurring in "booked" cases. Neonatal losses were similar in both "booked" and "non-booked" cases.

A significantly higher perinatal mortality occurred in premature babies as compared with mature, especially in "non-booked" cases. A high perinatal mortality rate occurred in non-whites as compared with whites especially in "non-booked" patients, mainly because of the larger numbers of premature babies born to non-whites.

The main reason for the higher premature birth rate in the non-white was the low rate of conservative treatment of placenta praevia in this race. Many of these women were often admitted to hospital in poor condition after a severe loss of blood, requiring termination of the pregnancy after urgent resuscitative measures. This was especially the case in "non-booked" patients of the non-white race, who had received little if any antenatal care. Perinatal mortality was hence significantly higher in the non-white as white patient.

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### PREMATURITY ASSOCIATED WITH FOETAL ABNORMALITY.

Included in this category were malformations which were primarily the cause of onset of premature labour whether induced or spontaneous. Not included were minor degrees of abnormality associated with conditions such as placenta praevia, diabetes etc. for which labour was prematurely terminated. These latter abnormalities were dealt with under the conditions which precipitated the premature onset of labour.

#### INCIDENCE.

Only 22 premature babies were born with abnormality(0.6%) of the total premature babies born in our units during 1952-55.

In white patients. 1.3% of all premature babies born were malformed compared with 0.5% in non-whites.

During the above 4 years 288 malformed infants were delivered out of a total of 25930 born i.e. an incidence of 1.11%. Therefore of all malformed babies delivered only about 7% were premature.

Carter(1950) found that out of a total of 14,183 babies born in a London hospital, 219 were abnormal i.e. 1.47%. Only pregnancies of 28 weeks and over were mentioned.

De Watteville(1951) from the Woman's Hospital, Zurich, recorded foetal abnormality in 1% of 16,000 pregnancies. Only severe abnormalities were included in this series.

Stevenson, Worcester and Rice(1950) from the Boston Lying-In Hospital found that out of 787 stillbirths, 15.9% were malformed. One baby in 60 was abnormal and 1/3 of the total stillbirths and neonatal deaths were in abnormal babies.

From the University College, Ibadan, Nigeria (all non-white) for the period 1953-54, there were 59 foetal monsters delivered out of a total of 5809 born i.e. an incidence of 1.0%.

IN OUR UNITS.

During a 4 year period the following types of malformations were recorded:-

- (1) Hydrocephaly in 26 babies. Of these 22 were stillborn, and 4 neonatal deaths.
- (2) Anencephaly in 11 babies. There were 9 stillbirths, and 2 neonatal deaths.
- (3) Menigocele in 5 babies. All of these were stillborn.
- (4) Multiple abnormality in 62 babies, of which 15 were stillborn and 47 neonatal deaths.
- (5) Other abnormalities compatible with extrauterine existence in 174 babies, 13 of which were mongels all occurring in white patients.

Two mongel babies were stillborn and 1 died in the neonatal period.

Altogether 53 stillborn malformed babies were encountered out of a series of 1231 stillbirths during 1952-55, that is 4.3% of all our stillbirths.

In white patients. At the Howray H.H. during the above period of time 61 abnormal babies were delivered out of a total of 4261 born, that is an incidence of 1.42%.

Only 10 malformed stillborn babies were delivered at the above hospital out of a total of 76 stillbirths born. The incidence of malformed stillbirths in whites was therefore about 13.1%, which was in keeping with other white teaching institutions.

In non-whites. At the Somerset Hospital, Groote Schuur Hospital and St. Monica's Home during a similar period, 162 malformed babies were delivered out of a total of 13293 babies

born. The incidence of abnormality in non-whites was therefore 1.21%.

However, of 662 stillbirths encountered at the latter hospitals in 4 years, only 26 were malformed. That is a stillbirth malformation incidence of only 3.8%, which was much lower than in white patients. The reason for this low incidence of stillbirth due to malformation might be found in the fact that in these socio-economically poor people probably abortion of the malformed foetus occurred in the early months of pregnancy, and remained unrecognized.

Similarly in the obstetric unit of the University College, Ibadan, Nigeria, there were only 20 stillbirths associated with malformation out of a total of 409 stillbirths in that hospital. The incidence of stillbirth with malformation here was therefore only 4.7%, which was not dissimilar to ours.

Baird et al(1954) found that 15.6% of their stillbirths were malformed.

Bound et al(1956) following autopsies on 185 stillbirths reported an incidence of 12.9% deformity of the baby.

Horison(1952) in 539 autopsies discovered malformation rate of 8.0%.

MacGregor(1946) from Edinburgh reported a 19% malformation in 453 stillbirths.

Drillien from the same centre in 1947 found a malformation rate also of 19% in 373 stillbirths.

Potter and Adair(1943) in 2250 autopsies found abnormality of the foetus in 10%, and Potter and Dieckman in 1948 a rate of 8% malformation.

Crosse and McIntosh(1954) reported 21% abnormality rate.

INCIDENCE OF PREMATURE INTERRUPTION OF PREGNANCY  
IN FOETAL MALFORMATION

The frequency with which pregnancy associated with foetal abnormality is terminated in the period before the 28th week of pregnancy has been recorded by many authors.

Hertig and Rock(1949) showed that there was evidence that about  $\frac{1}{2}$  of all early ova are malformed, and most of these abort even before they can be recognized as gestations.

Rock(1940) maintained that it was generally accepted that at least 25% of recognizable pregnancies terminate in abortions, spontaneous or induced or of therapeutic origin.

A similar high incidence of foetal death occurred in domesticated animals and wild animals. In the pig, ferret and wild rabbit abortion is frequent.

Randal and Birch(1952) similarly state that from  $\frac{1}{2}$  -  $\frac{1}{3}$  of conceptions which abort are lost because of defects that are irreparable by the time the woman suspects she is pregnant.

Rucker(1952) in a study of 1000 consecutive aborted specimens found that abortions and abnormalities increase with age of the patient. Hence at the age of 19 years and under the frequency of abortion was 3.8%. Between the ages 25-29 the frequency was 7.9%, and between 40 years and under 18%.

Javert and Barton(1952) found 104 abnormal umbilical cords in 297 available malformed fetuses. This 35% incidence is in contrast to one of 4.8% of a controlled group of therapeutic abortions. Most of the complications were those which affected the circulation of the foetus.

Abnormal umbilical cords exceeded pathological fetuses as an etiological factor of the abortion in the ratio 35 to 24%. In 24% of macerated, degenerated and mummified fetuses cord

complications were present, contrasted with an incidence of only 6% when the foetus was normal.

Burge (1951) also reported that 10% of human pregnancies end in abortion, and of these 61.7% had defective foetuses.

Dodds (1952) emphasized that there was no direct evidence that nutritional deprivation during early pregnancy might possibly cause malformation of the foetus.

It was evident therefore from the above literature that foetal malformation plays an important part in the causation of a not inconsiderable number of abortions and stillbirths, particularly in the white patient. In the non-white, although abortion might be a frequent result of defect in the foetus in the early months of pregnancy, many fewer stillbirths were noted as being due to such abnormality.

In our units during 1952-55 the incidence of malformation was 1.11%, which was similar to other centres.

However, the number of stillbirths in our non-whites was only approximately 1/3 of the percentage occurring in our whites and other teaching hospitals. It is within the realms of possibility to postulate that in our non-whites, in whom prematurity rates were twice as common as in our whites, abortion of the majority of defective foetuses occurs, and therefore do not show themselves as stillbirths. Another explanation for the low stillbirth rate due to malformation in our non-whites, is that such deformity was not ascertained because of the paucity in numbers of autopsies performed.

REFERENCES. For references on foetal abnormalities see previous chapter on the same subject

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**(5) PREMATURITY ASSOCIATED WITH SYPHILIS****(Tables 50, 51)****(Graphs 8,9,10,11)**

Venereal disease in Cape Town and outlying districts is rife, particularly in our non-white population. The true incidence rate for diagnosed cases of venereal disease for the year 1954-55 (i.e. the rate obtained by omitting those cases found not to have venereal disease and those remaining undiagnosed) was 6.5 per thousand population (1.4 whites and 9.8 non-whites). It should be noted that these rates are based on the number of individuals treated for venereal disease at municipal treatment centres only. As this disease is not notifiable, there is no record of the number of persons being treated by private practitioners or by other institutions.

The true incidence of syphilis therefore cannot be estimated with certainty in our units because of the large numbers of "non-booked" patients admitted to our hospitals, who have had treatment "outside" our units by municipal centres or private doctors. However it can be mentioned that from the statistics from a report from the Medical Officer of Health of Cape Town, for the year 1954-55, a decrease of 91.6% of congenital syphilis cases occurred since 1948-49. In other forms of syphilis, there was a diminution in the numbers of cases of as many as 70.4% during the same period (85.2% for whites and 69.4% for non-whites).

An investigation of the numbers of patients seeking antenatal care in our units at the Somerset Hospital for the years 1953-55, showed that routine Wasserman tests were performed on all patients attending. Of these women 5% showed positive Wasserman reactions, all of whom were referred to our venereal disease clinic administered by Dr. O'Malley.

It should be stressed however that although attempts are made

to treat the husbands in these women, there are so many illegitimate pregnancies among our non-whites that it is within the realms of possibility to suppose that many of the men are not treated.

Although the vast majority of our pregnant patients are adequately treated, it should be borne in mind that incomplete treatment is not infrequently encountered.

Sacks and Selesnick(1953) from the Transvaal, for a period of 5 years, found a more or less consistent syphilitic rate of 30% and they record that other urban areas give the same figures.

It is suggested that possibly not an inconsiderable number of our macerated infants born in our units in which there was "no cause" found might be the result of syphilitic infection.

During the years 1952-55, only 122 cases of prematurity associated with a positive Wasserman reaction were recorded in our annual reports, i.e. 3.6% of all premature babies born in our units. Practically all of these premature infants were born of mothers who had not had antenatal care in our hospitals.

In white patients at the Howbray Maternity Hospital, only 0.6% of the total premature infants born were from mothers with positive Wasserman reaction.

In non-whites, 4% of all premature babies born were from mothers with syphilis.

The stillbirth loss in non-whites due to syphilis in premature babies was 6.5% of the total premature stillbirth loss, whereas in the white patient this figure was only 2.6%.

#### COMMENT.

The incidence of syphilis in our units was higher in non-whites than whites. Again, although the treatment of syphilis

was excellent in both whites and non-whites in our venereal disease clinics, it was obvious that because of inadequacy of antenatal care "outside" and the high numbers of "non-booked" patients in the non-white, the stillbirth losses in our non-whites were higher.

PREMATURITY ASSOCIATED WITH OTHER CONDITIONS. (Tables 50,51)

Included in this group of conditions was heart disease; diabetes and prediabetes; fibroids and pregnancy; ovarian cysts and pregnancy; acute infections such as pyelitis and pyelonephritis, pneumonia, infectious hepatitis and other acute infections of "uncertain" etiology; chronic infections such as tuberculosis; epilepsy; bronchospasm and asthma; extrauterine pregnancy; carcinoma of liver; maternal jaundice of "uncertain" etiology; and a case of stab wound of the uterus.

(i) HEART DISEASE.

Although 18 babies were lost during 1952-55 in patients with heart disease, of which 11 were stillbirths and 7 neonatal deaths, only 10 babies were premature. Altogether 249 patients with heart disease were confined in our units during this period of time, with an incidence of prematurity of 4.0%. It should be stressed that in the majority of our "booked" patients with heart disease, were admitted to hospital for adequate hospital supervision for as long as 4-6 weeks before the "expected" date.

(ii) DIABETES AND PREDIABETES.

Prematurity, as internationally defined, occurred uncommonly in our units in patients with diabetes and prediabetes, because the majority of these babies were larger than normally and were "poorer infants" generally.

In our units during 1952-55, only 9 premature babies of this type were delivered, 3 being macerated and 6 alive, that is only about 0.27% of all premature babies born in our hospitals.

(iii) FIBROIDS AND PREGNANCY.

Prematurity associated with fibroids was rarely encountered in our units during 1952-55.

There were only 6 instances during the above period in which fibroids might have been the predisposing cause for premature labour. It should be mentioned however that there were not an inconsiderable number of patients with fibroids which played no part in the causation of prematurity.

In 5 cases fibroids were present, and obstructing labour or the engagement of the foetal head, necessitating caesarean section.

(iv) OVARIAN CYSTS AND PREGNANCY.

A careful search of the annual records for the years 1952-55 revealed no instance in which ovarian cysts might have been the cause of premature labour.

Caesarean section was performed in 1 case for an obstructed labour due to an ovarian cyst.

(v) ACUTE INFECTIONS IN PREGNANCY.(a) Acute pyelitis and pyelonephritis.

These conditions were recorded in 50 cases in our annual reports for the years 1952-55. In only 4 instances was this factor probably responsible for the onset of premature labour. In 2 of these 4 occasions there were symptoms and signs of pre-eclamptic toxæmia in addition.

There was a loss of 3 babies in the neonatal period in association with antepartum pyelitis.

(b) Infective hepatitis.

There were 8 instances in our annual records in which pregnancy was complicated by infective hepatitis,

followed by the birth of 4 premature babies, 2 of which died in the neonatal period.

(c) Pneumonia.

In only 1 case was bronchopneumonia recorded with the delivery of a premature baby which died soon after birth.

(d) Tuberculosis.

Altogether 222 babies were born of mothers with pulmonary tuberculosis (healed and active).

Of these babies only 6 were premature and 2 were lost, of which 1 was macerated and the other died soon after delivery.

It has not been our experience that pulmonary tuberculosis predisposes to premature labour in our obstetric units.

Although tuberculosis of the spine and other bones are recorded in our annual reports, no foetal death was attributed directly to the chronic infective state.

(vi) EPILEPSY.

During 1952-55 inclusive, there were 31 patients with epilepsy delivered in our units.

In only 2 cases was prematurity associated with epilepsy. One baby of the latter was stillborn.

(vii) BRONCHOSPASM AND ASTHMA.

In only 1 baby delivered of a mother with bronchospasm was prematurity noted in our reports. The child in this instance was stillborn.

(viii) EXTRAUTERINE PREGNANCY.

On 2 occasions following laparotomy extra-uterine pregnancy was diagnosed, with the birth of 1 premature living infant and a macerated foetus in another.

(ix) CARCINOMA OF LIVER.

In 1 case in which the mother was delivered of a premature baby, but which died soon afterwards, was carcinoma of the liver found in the mother.

(x) MATERNAL JAUNDICE.

A premature baby was born from 1 mother with jaundice of "uncertain origin".

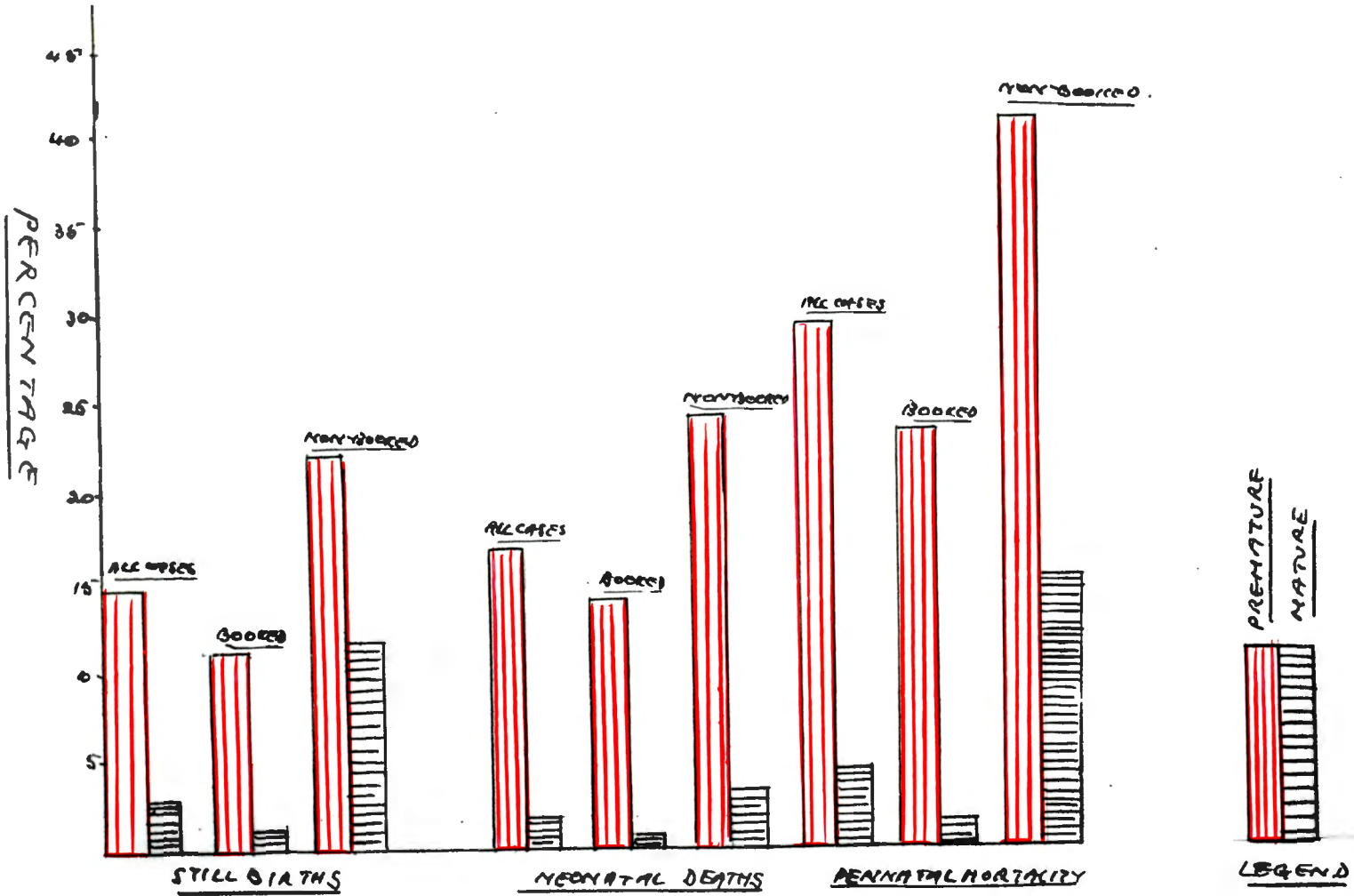
(xi) STAB WOUND OF THE UTERUS.

In 1 instance a mother was admitted with a stab wound of the abdomen which had penetrated the uterus. At laparotomy a wound of the fundus was discovered, and caesarean section was performed to deliver a premature child which died soon afterwards.

SUMMARY AND CONCLUSIONS.

Miscellaneous conditions which might have been responsible for prematurity are noted.

Altogether these conditions were associated with approximately 1.5% of all premature babies during 1952-55.



FOETAL LOSS.

A COMPARISON OF LOSS IN PREMATURE  
AND "MATURE" BABIES, IN "BOOKED"  
AND "NON-BOOKED" CASES. (1953-55)

(GRAPH 12)

PREMATURITY.THE INCIDENCE AND FOETAL MORTALITY IN RELATION TO ANTENATAL CARE.

It was noted earlier that the incidence of prematurity in our obstetrical units during 1952-55 and 1953-55 were similar, that is 12.8%.

A more detailed analysis of the cases of prematurity as occurring during 1953-55, revealed that in patients who attended our units during this period had a prematurity rate of 10.8%, compared with a rate of 19.3% in "non-booked" cases.

In white patients. At the Howbray M.H. during 1953-55 the incidence of prematurity was 7.2% compared with a non-white incidence of 14.2%.

In "booked" patients, 1766 babies weighing 5½ lbs. and less were born, which is an incidence of 10.5%, which was almost exactly ½ that occurring in "non-booked" cases who were delivered of 794 infants.

In "booked" white patients the incidence of prematurity was 5.9% compared with an incidence of 18.6% in "non-booked" cases.

In "booked" non-whites the incidence of prematurity was 11.3% compared with a "non-booked" incidence of 26.6%.

Apart from socio-economic influences, therefore, it will be noted that in "booked" cases the incidence of prematurity was almost twice higher in non-whites as in whites. The possible effects of a poor antenatal service in the non-white in causing this higher prematurity rate is evident.

In "non-booked" cases the prematurity rates in whites and non-whites were high, although there was no striking difference

<u>TOTAL BABIES.</u>	<u>INCIDENCE.</u>		<u>STILLBIRTHS.</u>			<u>NEONATAL LOSS.</u>			<u>PERINATAL LOSS.</u>		
	<u>B.</u>	<u>N.B.</u>	<u>ALL CASES. B.</u>	<u>NB.</u>		<u>ALL CASES. B.</u>	<u>NB.</u>		<u>ALL CASES. B.</u>	<u>NB.</u>	
2560	10.5%*	29.3%*									
<u>PREMATURE.</u>	2560		* 14.7%	* 10.9	* 22.9	* 17.0%	* 14.3	* 24.2	* 29.3%	* 23.7	* 41.7
<u>MATURE.</u>	17882		* 2.89%	* 0.95	* 12.2	* 1.24%	* 0.77	* 3.4	* 4.1%	* 1.71	* 15.0%

PREMATURITY. Incidence and foetal loss in premature and mature babies, in  
"booked and non-booked cases. (1953-55)

( TABLE 61a )

in the two races. The effect of inadequate prenatal care was obvious in these patients.

FOETAL LOSSES IN RELATION TO ANTENATAL CARE.

(Tables 61a and b)

PERINATAL MORTALITY.

During the years 1953-55, 2560 premature babies were born in our units.

Of this number 1766 were from "booked" patients and 794 from "non-booked".

Altogether 750 or 29.3% of these infants were lost, 419 or 23.7% in "booked" cases, and 331 or 41.7% in "non-booked".

In "mature" babies born during the same period of time, of which there were 17682, the perinatal mortality was 4.1%. Of these lost, 1.71% occurred in "booked" cases and 15.0% in "non-booked".

This statistical evidence appears to suggest therefore that perinatal mortality rates were much higher in "non-booked" as in "booked" patients, both in "mature" and premature babies.

The strikingly higher losses sustained by premature babies as compared with "mature" in the ratio of almost 7 : 1 is significant.

Similarly the effects of inadequate care is striking in premature and "mature" babies in the 13 times higher perinatal loss in "booked" cases, and almost 3 to 1 in "non-booked" patients.

IN WHITE PATIENTS.

Of 236 premature babies delivered at the Mowbray M.H. during 1953-55, 175 were from "booked" patients and 61 from "non-booked".

Altogether 54 babies were lost, that is a perinatal loss of 22.9%. 27 or 15.4% occurred in "booked" cases and a similar number or 44.2% in "non-booked".

RACE.	TOTAL BABIES.	B.	E.	STILLBIRTHS.		NEONATAL LOSS.		PERINATAL LOSS.	
				B.	NB.	B.	NB.	B.	NB.
WHITES.	236	175	61	15	12	12	15	27	27
% age.		74.2	25.8	8.5*	19.6*	7.5*	32.8*	15.4*	44.2*
				11.4*		12.9*		22.9*	
Incidence.	7.2%	5.9%	18.6%						
NON-WHITES.	1517	981	536	127	123	116	108	243	231
% age.		64.7	35.3	12.9*	23.0*	13.5*	23.7*	24.7*	43.2*
				16.4*		17.6*		31.2*	
Incidence.	14.2%	11.3	26.6						
TOTAL.	2560	1766 (69%)	794 (31%)	194 (10.9%)	183 (22.9%)	225 (14.3%)	148 (24.2%)	419 (23.7%)	331 (41.7%)
Incidence.	12.8%	10.5%	29.3%	14.7%		17.0%		29.3%	

PREMATURITY. Foetal loss in relation to "booked" and "non-booked" cases,  
and in whites and non-whites (1953-55).

(TABLE 61b)

The perinatal mortality rate in "booked" cases was hence almost 3 times less than in "non-booked", in white patients.

#### IN NON-WHITES.

Of 1517 premature babies delivered at the Somerset and Groote Schuur Hospitals, and St. Monica's Home during 1953-55, 981 were born in "booked" patients and 536 in "non-booked".

The perinatal mortality rate in this race was 31.2% or 474 babies. Of these 24.7% or 243 babies were lost in "booked" patients and 231 or 43.2% in "non-booked" cases.

It was therefore evident from the above information that perinatal losses in premature babies were similar in "non-booked" cases in both races.

In "booked" patients there was a significantly higher perinatal mortality among premature babies delivered from non-whites in the ratio of 2.5 : 1.5, as compared with whites.

#### STILLBIRTHS.

The premature stillbirth rate in our units during 1953-55 was 14.7%, or a total of 377 babies lost of 2560 delivered.

Of this number 194 or 10.9% were from "booked" cases compared with a stillbirth loss of 183 babies or 22.9% in "non-booked" cases.

A comparison of the stillbirth losses in "mature" babies with those in premature babies shows that 2.89% stillbirth rate occurred in the former, which was 5 times less than that occurring in prematures.

In "booked" cases with "mature" babies only 0.95% stillbirth rate was noted, which was more than 10 times lower than in premature babies from "booked" patients.

In "non-booked" cases the stillbirth rate was almost only half as high in "mature" as premature babies.

IN WHITE PATIENTS.

(Table 61a)

The stillbirth loss of 11.4% was noted during 1953-55 for premature babies, of which 8.5% occurred in "booked" and 10.6% in "non-booked" cases.

IN NON-WHITES.

Altogether 250 babies were stillborn out of a total of 1517 delivered in our non-white units, i.e. a stillbirth rate for premature babies of 16.4% ("booked" 12.8%, "non-booked" 23.0%).

This rate was not significantly higher than in whites.

NEONATAL MORTALITY RATES.

Of 2183 liveborn premature babies delivered in our units during 1953-55, 373 were lost. The neonatal mortality rate was therefore as high as 17.0%, of which 14.3% occurred in "booked" patients and 24.2% in "non-booked".

IN WHITE PATIENTS.

Only 27 premature babies or 12.9% out of a total of 209 babies were lost neonatally, of which 12 or 7.5% occurred in "booked" cases and 15 or 32.8% in "non-booked".

IN NON-WHITES.

Of 1260 liveborn premature babies delivered in non-whites during 1953-55, a total of 224 were lost in the early neonatal period, or a neonatal mortality rate of 17.6%. Of this percentage

PREMATURITY

FETAL MORTALITY ASSOCIATED WITH PREMATURITY IN OTHER CENTRES.

According to Crossé(1952) the perinatal mortality in premature babies from the Sorrento Hospital, Birmingham, was as follows:-  
(Table 62)

<u>WEIGHT</u>	<u>Number</u>	<u>Mortality (%)</u>
Up to 1000Gm(2lb.3oz.)	13	92.3%
1001-1500 Gm(2lb.3oz.-3lb.4oz.)	30	43.3
1501-2000 Gm(3lb.4oz.-4lb.6oz.)	87	17.2
2001-2500 Gm(4lb.-6oz.-5lb.-8oz.)	296	3.4

Miller and Walton(1954) give the following losses and survival rates from Newcastle and Birmingham as follows:-  
(Table 63)

	<u>Newcastle(1948-53)</u>			<u>Birmingham(1947-49)</u>		
	<u>No.</u>	<u>Survival</u>	<u>% Survival.</u>	<u>No.</u>	<u>Survival</u>	<u>% Survival.</u>
Under 2½ lbs.	52	4	7.7%	60	12	20.0%
2½-3½ lbs.	49	26	53.0%	130	96	73.8%
3½-4½ lbs.	183	146	80.0%	232	196	84.0%
4½-5½ lbs.	373	362	97.0%	161	157	97.5%

McKeown and Gibson(1951) showed the following losses:-  
(Table 64)

<u>No. of total births.</u>	55			94		187	
	16	16	23	50	44	76	111
<u>Mean weight (lbs.)</u>	2.75	2.78	3.18	3.63	3.89	4.37	5.31
<u>Perinatal loss</u>							
(%age)	93.7	81.3	73.9	68.0	53.2	42.1	18.9

From University College, Ibadan, Lawson and Lister reported:-

<u>Weight</u>	<u>No.</u>	<u>Losses</u>
3lb. and less	181	98.5%
3-4lbs.	284	55.4%
4-5 lbs.	612	18.5%

(Table 65)

13.5% occurred in "booked" cases and 23.7% in "non-booked" patients.

There was therefore a more striking loss in "non-booked" as in "booked" cases in a ratio of almost 2 : 1.

When neonatal losses are compared in whites and non-whites in relation to the birth of premature babies, it will be noted that in "booked" cases almost twice as many babies were lost in non-whites as whites. Again the inadequate care of our "booked" non-whites is suggested. In "non-booked" neonatal mortality rates there was no striking difference in the two races.

When losses in "mature" and premature babies were compared in relation to neonatal mortality, it was noted that 14 times as many premature babies were lost as "mature".

In "non-booked" cases the neonatal mortality in premature babies was nearly 7 times higher than in "mature", and in "booked" cases the ratio was nearly 20 : 1.

#### SUMMARY AND CONCLUSIONS.

#### "PREMATURITY".

#### FOETAL MORTALITY.

The incidence of prematurity in "non-booked" patients was almost twice that occurring in "booked".

In white patients the incidence of prematurity was  $\frac{1}{2}$  that occurring in non-whites.

In patients with adequate antenatal care ("booked") the perinatal mortality rate was almost  $\frac{1}{2}$  that occurring in "non-booked".

In "booked" white patients the perinatal mortality rate was almost 3 times less than in "non-booked" cases, and in the ratio 1.5 : 2.5 in comparison with non-whites.

In "non-booked" patients the perinatal mortality rate showed no striking difference in the two races.

Stillbirth rates in "booked" and "non-booked" cases showed a more than 2 : 1 greater loss in the latter.

Stillbirth mortality rates in white and non-white patients showed no striking difference.

Neonatal mortality rates revealed a higher loss in "non-booked" cases, although the difference from losses in "booked" cases was not remarkable (24.2% : 14.3%).

In whites the premature neonatal losses were more than 5 times higher in "non-booked" as "booked" cases.

In non-whites the difference in neonatal mortality rates was not as significant as in whites in relation to antenatal care. This was apparently due to the fact that antenatal care in our "booked" patients in non-whites was not adequate, mainly because of the lack of hospital facilities for supervision, and "outpatient" treatment of many patients with P.E.T.

When comparing perinatal losses, stillbirth rates and neonatal rates in "mature" and premature babies, the colossal losses suffered by the latter was significant.

Particularly was this the case in comparing those lost in "booked" and "non-booked" cases.

It was evident therefore that prematurity was a serious condition in our units, and the adverse effects of inadequate antenatal care as a whole, and especially in our non-whites plays no small part, apart from poorer socio-economic conditions in the latter.

By way of contrast the effects of antenatal care on foetal losses in prematurity was analysed from the figures supplied by the University College, Ibadan, Nigeria.

During an 18 months period (April 1953-December 1954) 1077 premature babies were born in the above institution and 440 were lost, i.e. a perinatal mortality rate of 41.8%.

Of this percentage lost 17.6% (or 186 babies) were stillborn, and 28.5% (or 254 babies) neonatal deaths.

In "booked" cases.

Of 1077 babies delivered, 738 or 68.5% were born of patients "booked" at the antenatal clinics, and 339 or 31.5% were "non-booked".

Of 738 babies from "booked" mothers 37.1% or 274 were lost, of which 96 or 13.0% were stillbirths and 178 or 27.7% were neonatal deaths.

In "non-booked" cases.

Of 339 babies delivered of mothers who were "non-booked" 166 or 48.9% were lost, of which 90 or 23.6% were stillborn, and 76 or 30.5% neonatal deaths.

As in our units at the Somerset Hospital, St. Monica's Home and Groote Schuur (all non-white), the perinatal mortality rate for premature babies at Ibadan, Nigeria, was high because, apart from very poor socio-economic conditions at both Universities, antenatal services were not satisfactory. Too many patients in both regions were admitted as "non-booked", and hospital accommodation was similarly quite insufficient for the obstetrical populations.

There was ample evidence of higher perinatal losses in "non-booked" as compared with "booked" patients, twice as many stillbirths occurring in "non-booked" cases, and a higher neonatal mortality rate in both Universities also in "non-booked" patients.

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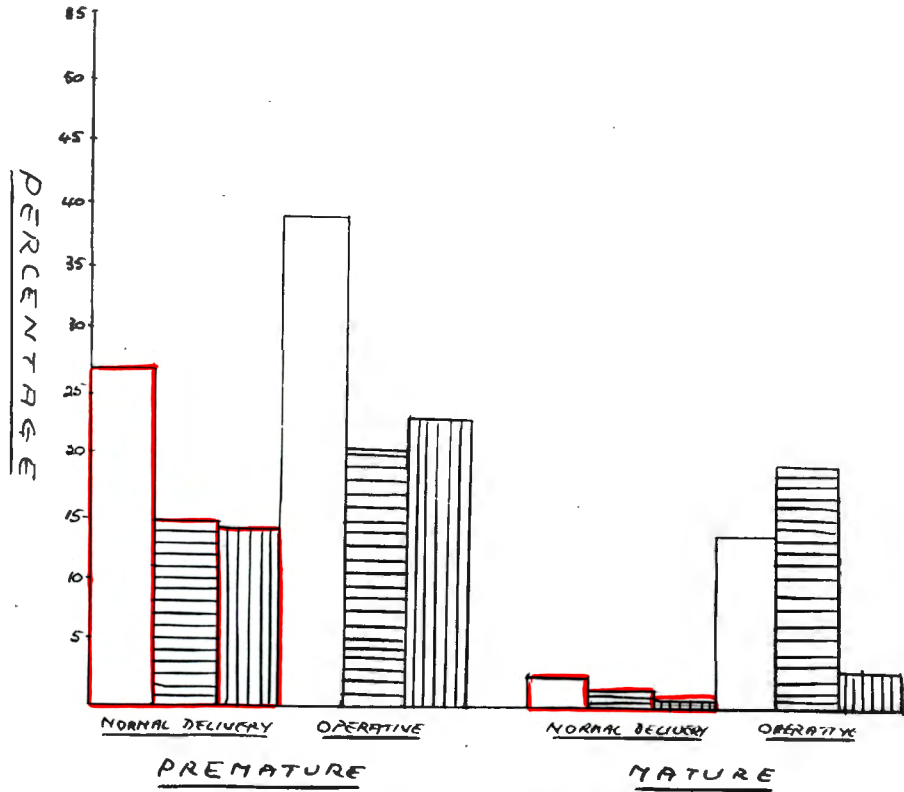
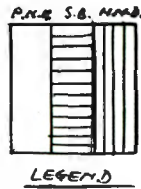
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	<u>PREMATURE.</u>						<u>MATURE.</u>						
	<u>NORMAL DELIVERY.</u>			<u>OPERATIVE DELIVERY.</u>			<u>NORMAL DELIVERY.</u>			<u>OPERATIVE DELIVERY.</u>			
	<u>TOTAL.</u>	<u>SB.</u>	<u>NND.</u>	<u>TOTAL.</u>	<u>SB.</u>	<u>NND.</u>	<u>TOTAL.</u>	<u>SB.</u>	<u>NND.</u>	<u>TOTAL.</u>	<u>SB.</u>	<u>NND.</u>	
<u>INCIDENCE. AND MORTALITY.</u>	2526	369	314	815	165	152	19487	358	137	3102	339	99	
		27.0%*			38.3%*			2.54%*			14.1%*		
<u>% age.</u>	75.6	14.6%*	14.5%*	24.5%*	20.2%*	23.4%	86.3%	1.83%	0.7%*	13.7	19.0%*	3.58%	
<u>TOTAL LOSS.</u>		3341	534 SB's (15.98%)* 446 NND's (16.6%)*				29.9%*	22589	697 SB's (3.08%)* 236 NND's (1.08%)*				4.1%*

FOETAL LOSS. A comparison of stillbirth and neonatal deaths in premature and mature babies, in normal and operative delivery. (1952-55).

(TABLE 66)



**FOETAL LOSS.** A comparison of stillbirth, neonatal deaths, and perinatal mortality in premature and mature babies, following normal and operative delivery (1952-55) (GRAPH 15)

430

FOETAL LOSSES IN NORMAL DELIVERY.

(Table 66)

(1) Premature babies.

Of 3341 premature babies born in our units during 1952-55, 2526 were born spontaneously (75.6%).

Of these latter infants 683 or 27.0% were lost, of which 14.6% or 369 babies were stillborn and 314 babies or 14.5% were neonatal deaths.

(ii) "Mature" babies.

Of 19487 "mature" babies delivered in a 4 years period without assistance 495 babies or 2.54% were lost, of which 358 or 1.83% were stillborn, and 137 (0.7%) neonatal deaths.

It will be thus noted that following spontaneous birth 11 times a greater perinatal mortality rate occurred in premature delivery as in "mature" birth.

Stillbirth rates in premature and "mature" spontaneous delivery showed a ratio of 8 : 1, whereas neonatal mortality a ratio of nearly 20 : 1.

The obvious advantages of spontaneous delivery in "mature" birth as compared with premature delivery were evident from the above statistical information.

FOETAL LOSSES IN OPERATIVE DELIVERY.(i) Premature babies.

Of 334 premature babies born in our units during 1952-55, 815 were delivered operatively (24.5%).

Of this latter number of premature babies 317 or 38.3% were lost, of which 165 or 20.2% were stillborn, and 152 or 23.4%

neonatal deaths.

In comparison with normal delivery, therefore, the perinatal mortality rate was higher in operatively delivered premature babies, although the difference was not striking (27.0% : 38.3%).

(ii) "Mature" babies.

Of 22589 "mature" babies born in our units during 1952-55, 3102 or 13.7% were delivered operatively.

Of this latter number 438 babies or 14.1% were lost, of which 19.0% or 339 babies were stillborn, and 99 babies or 3.58% were neonatal deaths.

It was therefore apparent from the above evidence that almost 3 times a greater perinatal mortality rate occurred in premature babies delivered operatively as in "mature" babies similarly born.

It was interesting to note that stillbirth rates were similar for premature and "mature" babies delivered operatively. However there was a significantly higher neonatal mortality in premature babies delivered operatively as in "mature" babies, in the ratio of almost 7 : 1.

It was also evident that "mature" babies delivered by operative means showed a much greater perinatal mortality than when spontaneous delivery occurred. Nearly 6 times as many babies were lost following operative delivery as when normal delivery took place. Stillbirth rates in "mature" babies delivered operatively were more than 10 times higher than when normal delivery occurred, and neonatal mortality was 5 times higher.

SUMMARY AND CONCLUSIONS.

Premature babies are delivered with greater risk both operatively and spontaneously as in "mature" babies.

With normal delivery perinatal mortality rate in premature babies was more than 10 times greater than "mature", but there is no strikingly greater perinatal mortality rate in prematures when delivered by operation or spontaneously.

Stillbirths and neonatal deaths in premature babies delivered operatively and normally are not remarkably different, although there was a slightly higher loss in the former.

In "mature" babies the perinatal mortality rates were much higher in those delivered operatively stillbirths being more than 10 times greater and neonatal deaths 5 times higher.

It can be concluded that premature babies when delivered either normally or operatively seriously increase the perinatal mortality rates. If prematurity can be excluded from the institutions under control of the University of Cape Town, then the perinatal mortality rate will be almost exactly halved.

This is in agreement with the findings of many other teaching centres.

**PREMATURITY ASSOCIATED WITH THE HAZARDS OF LABOUR.**

It has long been known that the hazards of labour are not infrequently preceded by the premature onset of labour, when such a confinement follows spontaneous or surgical rupture of the membranes. The time lag of the onset of uterine contractions following such rupture of the membranes will often predetermine the eventual outcome of the labour, be it spontaneous or operative in type. The longer the time of onset of labour pains, the longer or more complicated the delivery.

Complications of labour, frequently accompanied by non-engagement of the presenting part, such as breech, deflexed attitudes of the foetal head, transverse and oblique lies and the like, are often preceded by premature rupture of the membranes. And in its wake the often disastrous complication of prolapse of the umbilical cord forever threatens.

The premature onset of labour with non-rupture of the membranes is a less common occurrence.

Most authorities recognize the seriousness of delivery of a premature baby, be it spontaneous or operatively. The higher perinatal mortality rates associated with confinement of a premature baby have already been outlined.

As noted elsewhere in this paper several authors such as Crosse, Dunham, Browne, Baird, Peckham, Miller and Walter, McKeown and Gibson, Lawson & Lister, stressed the higher foetal losses in the delivery of premature babies.

The strikingly higher foetal mortality in premature birth in both normal and operative delivery as compared with the birth of a baby weighing more than 5½ lbs. has already been noted.

Drillien(1947) emphasized this danger in almost all of the hazards of delivery, and a comparison with foetal losses in our

units is briefly summarized as follows:-

<u>DELIVERY</u>	<u>Drillien</u>		<u>U.C.T.</u>	
	<u>Prem.</u>	<u>Mature.</u>	<u>Prem.</u>	<u>Mature.</u>
All deliveries.	33.8%	1.6%	29.9%	4.1%
Forceps(vertex)	33.3	3.8	13.9	3.9
Transverse lie.	70.0	40.9	70.0	41.9
Breech.	49.8	22.1	52.8	15.1
Caesarean section.	16.5	6.6	36.7	6.0

Table 67

There was hence a close resemblance in the risks entailed in the delivery of the premature baby in both the above series.

In the following chapters a detailed analysis of the hazards entailed in the delivery of premature babies as compared with "mature" will be outlined.

In addition the value of adequate antenatal supervision will be stressed in relation to almost all the hazards of labour.

The following hazards of labour will be discussed:-

- (1) Complications of the umbilical cord.
- (2) Breech delivery(complicated and uncomplicated).
- (3) Forceps extraction(vertex presenting).
- (4) Caesarean section.
- (5) Transverse and oblique lie.
- (6) Normal(vertex) delivery.

TOTAL BABIES.	B.	PREMS.			MATURE			TOTAL LOSS.	N.B.	PREMS.			MATURE			TOTAL LOSS
		No.	SB.	NND.	No.	SB.	NND.			No.	SB.	NND.	No.	SB.	NND.	
184	96	8	3	0	88	41	1	44SB 1 NND.	88	15	11	0	73	53	3	64SB. 3 NND
%age	52. 3	8. 3	35. 0	0	91. 7	46. 4	2. 5	45.7 1.9	47.7	17. 0	73. 3	0	83. 0	72. 6	15. 0	72.7 15.0
			35%*			48.4%*		46.7%*			73.7%*			76.7%*		76.1%*
<u>WHITES</u>																
10	8	1	1	0	7	2	2	3SB	2	0	0	0	2	1	0	1SB.
	80. 0	12. 5	100. 0	0	87. 5	28. 5	40. 0	2NND. 11.1	20. 0	0	0	0	100. 0	50. 0	0	50.0
			100%			55.5%		62.5%			0%			50%		50%
<u>NON-WHITES.</u>																
106	68	4	1	0	59	26	4	27SB. 4NND	43	8	7	0	35	20	2	27SB. 2NND
	59. 4	6.3	25. 0	0	93. 7	44. 0	15. 1	42.8 11.1	40. 6	18. 6	87. 5	0	81. 4	57. 1	13. 5	62.7 12.5
			25%*			50.9%*		49.2%			87.5%*			62.5%*		67.4

UMBILICAL CORD COMPLICATIONS. Foetal loss in "booked" and "non-booked" cases, in premature and "mature" babies (1953-55)

(TABLE 68)

THE HAZARDS OF LABOUR.**(1) COMPLICATIONS OF THE UMBILICAL CORD.**

(Table 68)

(Graphs 4,5,6)

INCIDENCE.

Of 248 babies delivered with complications of the umbilical cord during 1952-55, 45 babies were premature i.e. an incidence of 18.1%.

The incidence of babies born as vertex presentation was 49.1% of the total; breech presentation occurred in 22.1% of babies; transverse lie in 22.5%; and in 10.0% of babies born the presenting part was not noted ("unknown").

Further detailed analysis of the incidence of cord complications, the majority of which had prolapsed, was investigated during the years 1953-55. During this period 184 babies were delivered with cord complications, in which 96 babies were born from mothers not supervised in our antenatal clinics (52.3%). There were 88 babies born (or 47.7%) from mothers "booked" in our clinics.

Prematurity was almost twice as common in "non-booked" as in "booked" cases in the ratio 17.0% : 8.3%.

In non-whites prematurity was almost exactly 3 times more common as in white patients, in the ratio 18.6% : 6.3%.

The incidence of umbilical cord complications in relation to all deliveries in our units during 1953-55 was 0.89%. Of this there was an incidence of 0.58% in "booked" cases, and 2.15% in "non-booked".

CORD COMPLICATIONS IN RELATION TO THE BIRTH OF PREMATURE BABIES.

The incidence of cord complications with the birth of premature babies was 0.89%; in "booked" cases 0.45% and

in "non-booked" cases 1.88%.

The incidence of cord complications in the presence of "mature" babies was 0.90%, which was almost exactly the same as when premature babies were born. In "booked" cases the incidence of cord complications with delivery of "mature" babies was 0.60%, and in "non-booked" cases 2.21%.

Cord complications therefore occurred with a greater incidence in "non-booked" cases, with "mature" babies.

FOETAL MORTALITY IN RELATION TO PREMATURE AND MATURE BABIES  
IN RELATION TO ANTENATAL CARE IN CASES OF CORD COMPLICATIONS.

(Table 68)

Analysis of foetal losses associated with cord complications during 1953-55 was undertaken from the records of our annual reports.

Almost similar percentages of cases with cord complications were noted in "booked" and "non-booked" patients during the above period of time. Of 184 babies delivered under these circumstances 52.3% had attended our antenatal clinics.

PERINATAL MORTALITY

(Table 68)

(i) Premature babies.

Of 184 babies delivered with cord complications during 1953-55, 23 or 12.5% were premature, 14 of which were lost. The perinatal loss of premature babies was hence 60.8%, all of which were stillborn.

In "booked" cases.

Of 8 premature babies born with cord complications, 3 or 35% (all stillborn) were lost.

In "non-booked" cases.

Of 15 premature babies born of women with cord complications 11 were lost, or a perinatal mortality rate of 73.7%,

all of which were stillborn.

(ii) "Mature" babies. (Table 68)

Of 184 babies born of mothers with cord complications 161 or 87.5% were "mature", 98 of which (60.8%) were lost. This perinatal loss was exactly similar to that occurring in premature babies.

In "booked" cases.

Of 88 "mature" babies delivered with cord complications 42 or 48.4% were lost, of which 41 or 46.4% were stillborn, and 1 neonatal death (2.5%).

There was therefore no significant difference in perinatal mortality rates between "mature" and premature babies with cord complications, in "booked" cases.

In "non-booked" cases.

Of 73 "mature" babies born with cord complications 56 or 76.7% were lost, of which 53 or 72.6% were stillborn, and 3 (15.0%) neonatal deaths.

As in "booked" cases, there was no significant difference in perinatal mortality rates in premature and "mature" babies delivered of "non-booked" patients, although a greater percentage of infants were lost in "non-booked" cases.

The total perinatal mortality rate in "booked" patients with cord complications was 46.7% compared with a rate of 76.1% in "non-booked" cases, which was indicative of the benefits of antenatal supervision.

"Booked" premature delivery with cord complications was significantly lower than "mature" delivery with similar complications, as was the case in "non-booked" cases.

UMBILICAL CORD COMPLICATIONS IN THE RACIAL GROUPS. (Table 68)FOETAL MORTALITYPERINATAL LOSSES IN NON-WHITES.

Of 106 babies delivered of women with cord complications during 1953-55, 63 or 59.4% were from "booked" cases and 12 or 11.3% were premature.

Of 106 babies delivered 60 or 56.4% were lost, of which 54 or 50.9% were stillborn, and 6 babies or 11.1% neonatal deaths.

In "booked" cases. The perinatal mortality rate was 49.2% or the loss of 31 babies, 27 or 42.8% being stillborn and 4(11.1%) neonatal deaths.

(i) In premature babies. Of 4 premature babies delivered with cord complications in non-whites, 1 was lost(25%) as a stillbirth.

(ii) In "mature" babies. Of 59 "mature" babies born with cord complications, 30 or 50.9% were lost, of which 44.0% were stillborn and 4 or 15.1% neonatal deaths.

In "non-booked" cases. The perinatal mortality rate was 67.4%, of which 62.7% were stillborn and 12.5% neonatal deaths.

(i) Premature babies. Of 8 premature babies delivered in this group, 7 were lost, or a premature perinatal mortality rate of 87.5%, all of which were stillborn.

(ii) "Mature" babies. Of 35 "mature" babies born with cord complications in "non-booked" cases, 22 or 62.5% were lost. Of this percentage 57.1% were stillbirths and 13.5% neonatal deaths.

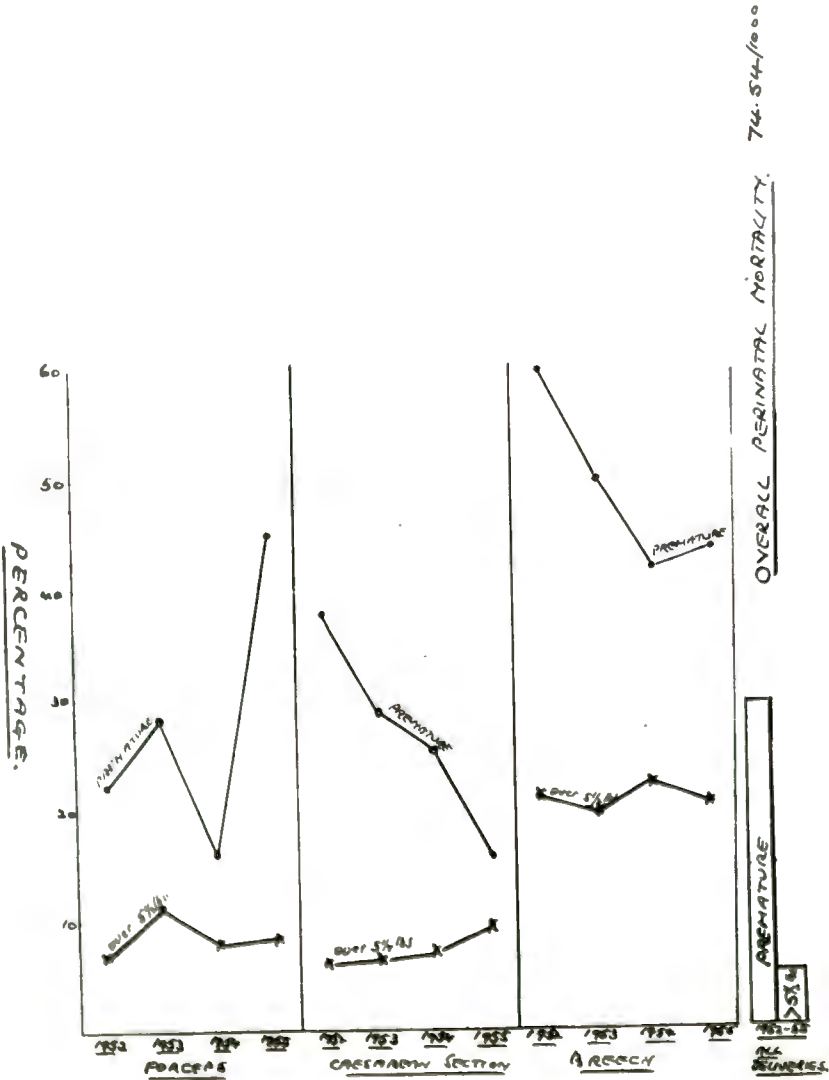
Although the numbers of premature babies were small, there was a significantly higher loss of infants than in "mature" babies, especially in "non-booked" cases.

Among white patients, there was not sufficient cases of cord complications to come to any conclusions in relation to foetal mortality in "booked" and "non-booked" cases.

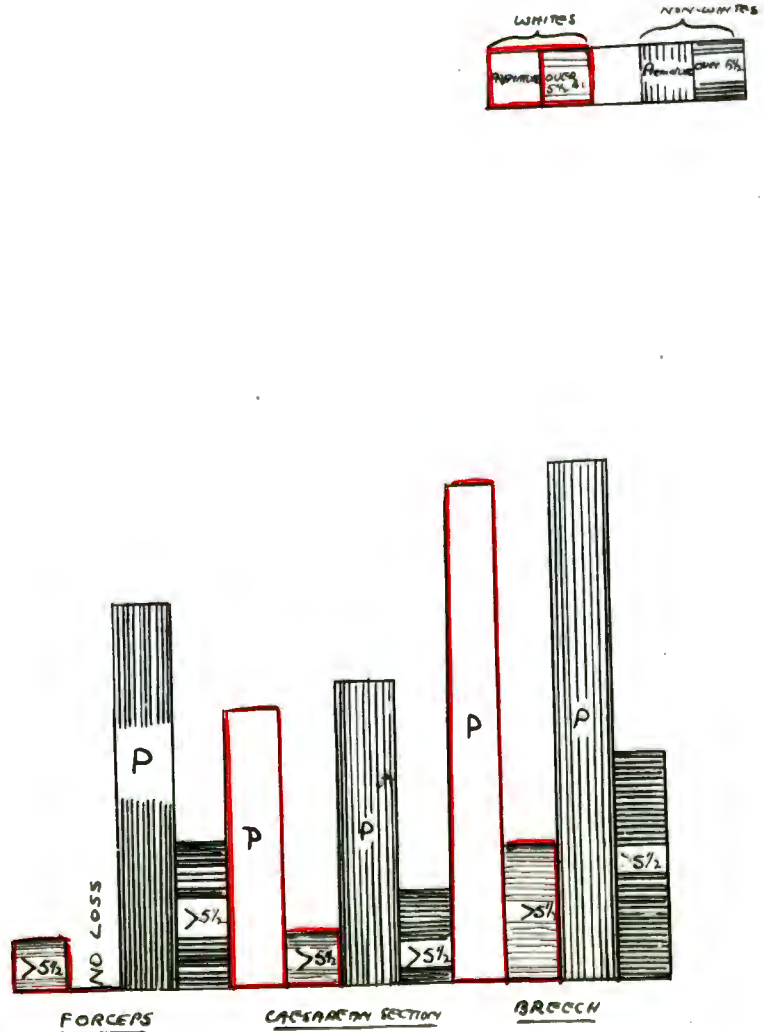
It was apparent however that because umbilical cord complications are of such serious consequence to the infant, that foetal losses in both premature and "mature" babies would be high. The effects of antenatal care, although probably reducing the losses in "booked" cases, will not be so evident in reducing the foetal mortality as in other less serious labour hazards. In "non-booked" cases, it was apparent that perinatal mortality rates were higher than in "booked" cases, although the differences were <sup>not</sup> remarkably significant.

# PREMATURITY.

Perinatal mortality in premature infants & over 5 1/2 lbs. in respective years (1952-1955), in forceps extraction, caesarian section, & breech delivery. (GRAPH 14)



Perinatal mortality (in whites & non-whites) in premature infant & over 5 1/2 lbs. in forceps extraction, caesarian section, & breech delivery (GRAPH 15)



(2) BREECH DELIVERY.(Tables 69,70)  
(Graphs 14,15)FOETAL MORTALITY IN PREMATURE AND MATURE BABIES,  
IN RELATION TO ANTENATAL CARE.Incidence of prematurity in breech delivery.

During the years 1952-55, in our units, 1140 babies were delivered by the breech. Of this number 462 or 40.4% were premature.

In white patients 38.4% of babies born by the breech were premature, whereas in non-whites the incidence of prematurity was 41%.

The incidence of breech presentation during the years 1953-55 was 4.43%. In "booked" cases the incidence was 3.57%, whereas in "non-booked" it was 7.85%.

In "booked" cases the incidence of prematurity was 13.1% and in "non-booked" cases 19.5%. The total incidence of prematurity in breech presentation during 1953-55 was 14.7% of all premature babies delivered in our units.

In "mature" babies delivered by the breech, in "booked" cases the incidence was 2.4%, whereas in "non-booked" cases the incidence was 5.05%. The total incidence of "mature" babies delivered by the breech of all "mature" babies born in our units during 1953-55, was 2.9%.

It is evident from the above analysis that the incidence of prematurity in breech presentation is higher in "non-booked" than "booked" patients. Altogether 40.0% of babies delivered as breech presentations were premature, but in the racial groups almost the same percentages were noted.

TOTAL BABIES	B.	PREMS.			MATURE			Total	N.B.	PREMS.				MATURE			Total
		No.	SB.	NND.	No.	SB.	NND.	Loss.		No.	SB.	NND.	No.	SB.	NND.	Loss	
906	885	223	45	37	362	44	13	89SB. 50NND	321	155	53	32	166	54	5	107SB. 37NND	
% age	64. 5	38. 1	20. 1	20. 5	61. 9	12. 1	4. 1	15.2 10.0	35. 5	48. 3	34. 2	31. 3	51. 7	32. 24	4. 4	33.3 17.3	
			36.8%*			15.7%*		23.7%*			54.8%*			35.5%*		44.8%*	
<u>WHITES</u>																	
95	90	25	8	2	45	1	3	9SB. 5NND	25	11	3	3	14	3	1	14SB. 4NND	
% age	73. 6	35. 7	32. 0	11. 7	64. 3	2. 2	6. 9	12.8 8.2	26. 4	44. 0	27. 2	37. 5	56. 0	21. 4	9. 0	56.0 36.3	
			40%*			8.8%*		20.0%*			55.5%*			28.6%*		32.0%*	
<u>NON-WHITES</u>																	
453	286	205	20	17	181	22	5	42SB. 22NND	107	83	24	21	84	31	2	55SB. 23NND	
% age	63. 1	36. 7	19. 0	20. 0	63. 3	12. 1	13. 1	14.6 9.0	36. 9	49. 6	28. 9	35. 5	50. 4	36. 9	3. 7	32.9 20.5	
			35.2%*			14.9%*		22.3%*			*51.8%			*39.2%		46.6%*	

BREECH DELIVERY. Foetal loss in "booked" and "non-booked" cases, and in premature and "mature" babies. (1953-55)

(TABLE 69)

YEAR. and UNIT	NO	1952 PREMS OVER 5½lbs.				NO	1953 PREMS OVER 5½lbs.				NO	1954 PREMS OVER 5½lbs.				NO	1955 PREMS OVER 5½lbs.								
		SB.	NND.	SB	NND		SB	NND	SB	NND		SB	NND	SB	NND		SB	NND	SB	NND					
P.M.H.	94	14	(33)	11	(61)	1	89	9	(33)	10	(56)	1	107	5	(35)	3	15	(72)	5	162	29	(86)	14	(76)	1
N.S.H.	61	8	(24)	3	(37)	1	65	2	(22)	3	(43)	1	86	9	(34)	6	12	(52)	2	76	5	(33)	6	(43)	1
M.M.H.	18	2	(9)	2	(11)	1	29	4	(13)	4	(16)	1	37	3	(8)	1	1	(29)	1	29	4	(15)	0	(14)	2
ST. M.	32	2	(12)	4	(20)	0	44	6	(17)	4	(27)	0	46	3	(20)	7	6	(26)	1	49	5	(18)	4	(61)	1
C.S.H.	29	6	(13)	1	(16)	0	54	8	(30)	6	(24)	1	33	7	(14)	3	3	(19)	1	UNIT DISCONTINUED.					
TOTAL			(89)		(145)			(115)		(166)			(111)		(198)			(152)			(164)				
TOTAL	234	32	21	29	3	281	29	27	30	4	309	27	20	37	10	316	43	24	31	5					
% AGE LOSS		35.9	36.6	20	2.6		25.2	31.4	18	3.0		24.3	23.8	19	6.2		28.1	22	18.9	3.8					
LOSS			59.5%*		22.0%*			48.6%*		20.4%*			42.3%*		23.7%*			44.0%*		21.7%*					

BREECH DELIVERY.

A COMPARISON OF FOETAL LOSS IN PREMATURE AND INFANTS OVER 5½lbs.

	NUMBER	PREMATURES		OVER 5½lbs	
WHITES	113	S.B. (43) 13	N.N.D. 7	S.B. (70) 4	N.N.D. 5
% AGE LOSS		30.2% 23.3% 46.5%*		5.7% 7.1% 12.8%*	
NON WHITES	577	S.B. (239) 65	N.N.D. 47	S.B. (335) 66	N.N.D. 9
% AGE LOSS		27.4% 27.3% 48.1%*		19.5% 3% 22.1%*	

BREECH DELIVERY. A COMPARISON OF FOETAL LOSS IN PREMATURES AND INFANTS OVER 5½ lbs. (WHITES AND NON-WHITES.)

TABLE 70

FOETAL LOSSES IN BREECH DELIVERY IN PREMATURE AND MATURE  
BABIES IN RELATION TO ANTENATAL CARE.

(Tables 69,70)

As indicated elsewhere the risk of loss of life in the premature baby when delivered by the breech was a very serious one as compared with "mature" babies.

In our units during the years 1952-55, the following comparisons in foetal losses were noted in relation to variations in foetal weight:-

<u>WEIGHT(lbs)</u>	<u>Total</u>	<u>% age</u>	<u>S.R.'s</u>	<u>N.N.D.'s</u>	<u>P.N.M.(%)</u>
5½ lbs. and less.	467	40.9	131(28%)	92(27.1%)	223(49.8%)
5½ - 7lb.15oz.	565	49.5	97(17.1)	20( 4.2%)	117(20.7%)
8lb. and over.	108	10.5	30(27.7)	2( 2.5%)	32(29.6%)

Table 71.

From the above table it was evident that the premature baby stood the greatest risk of losing its life when delivered by the breech.

Breech delivery in the weight group between 5½ lb. and 8 lb. showed the best results.

Babies weighing over 8 lbs. showed as high a stillbirth rate as premature babies, but a very much smaller neonatal mortality rate.

A study of foetal losses in Table 67 shows the recurrently higher perinatal mortality rates in premature babies compared with "mature" ones, over the years 1952-55, the ratio being almost consistently 2 : 1.

In white patients premature perinatal mortality rate was almost similar to that occurring in non-whites. In "mature" babies the perinatal mortality in whites was slightly less than in non-whites.

Table 68 is an analysis of the foetal losses sustained in premature and "mature" babies, in "booked" and "non-booked" cases for the years 1953-55.

(i) Premature babies.

(Tables 69,70)

Of 906 babies delivered by the breech during 1953-55, 378 or 41.7% were premature, and 585 or 64.5% were "booked".

Of 378 premature babies as many as 167 or 44.0% were lost, of which 98 or 25.9% were stillborn and 69 or 24.6% neonatal deaths.

In "booked" cases. Of 223 premature babies delivered by the breech no fewer than 82 or 36.8% were lost, of which 20.1% were stillborn and 20.5% neonatal deaths.

In "non-booked" cases. Of 155 premature babies delivered by the breech as many as 85 or 54.8% were lost, of which 34.2% were stillborn and 32 or 31.3% neonatal deaths.

The perinatal mortality rate in "non-booked" premature babies delivered by the breech was therefore higher than in "booked" cases. Both stillbirths and neonatal deaths were higher in "non-booked" by as much as 1½ times.

(ii) "Mature" babies.

Of 906 babies delivered by the breech during 1953-55 there were 528 "mature" babies or 58.3%, of which 362 or 68.5% were "booked".

Of 528 "mature" babies as many as 116 or 21.9% were lost, of which 98 or 18.5% were stillborn and 18 or 4.2% were neonatal deaths.

Therefore there were twice as many premature babies lost as "mature" babies when delivered by the breech in both the 4 year period 1952-55 and the 3 year period 1953-55.

Although stillbirth rates in "mature" and premature babies do not show a striking difference, neonatal deaths were much higher in premature breech delivery.

In "booked" cases. Of 362 "mature" babies delivered by the breech during 1953-55 as many as 57 or 15.7% were lost, of which 12.1% were stillbirths and 4.1% neonatal deaths.

Compared with premature babies in "booked" cases the perinatal mortality rate in "mature" cases delivered by the breech was more than  $\frac{1}{2}$  less. Especially as far as neonatal deaths were concerned, the loss was exactly 5 times higher in premature babies.

In "non-booked" cases. Of 166 "mature" babies delivered by the breech 59 or 35.5% were lost, of which 32.4% were stillborn and 5 or 4.4% neonatal deaths.

Compared with premature babies, the loss in this group in "non-booked" cases was almost  $1\frac{1}{2}$  times less, especially as far as neonatal deaths were concerned, when almost 8 times more premature babies were lost.

#### TOTAL PERINATAL MORTALITY (i.e. "booked" and "non-booked" cases)

Table 69 showed that almost twice as many babies were lost in "non-booked" as "booked" cases when delivered by the breech (i.e. 44.8% : 23.7%).

#### FOETAL LOSSES IN THE RACIAL GROUPS.

(Tables 69,70)

##### (a) In white patients.

Of 95 babies delivered by the breech, 70 or 73.7% were from "booked" patients and 38 babies or 37.8% were premature. Of these 95 babies, 32 were lost or a perinatal mortality of 33.6%, of which 23 or 24.2% were stillborn and 9 or 12.5% neonatal deaths.

(i) In premature babies. Of 36 premature babies born by the breech in white patients during 1953-55, 16 or 44.4% were lost, of which 11 or 30.5% were stillborn and 5 or 20% neonatal deaths.

In "booked" cases. Of 25 babies delivered by the breech 10 or 40% were lost, of which 8 or 32.0% were stillborn and 2(11.7%) neonatal deaths.

In "non-booked" cases. Of 11 premature babies born by the breech 6 or 55.5% were lost, of which 3 or 27.2% were stillborn and 3(37.5%) neonatal deaths.

The perinatal mortality in "non-booked" premature babies delivered of white patients was therefore greater than in "booked" cases, especially as far as neonatal deaths were concerned in the ratio of more than 3 : 1. Stillbirths were almost on a par.

(ii) In "mature" babies. Of 59 "mature" babies born by the breech in white patients 8 babies were lost(13.5%) of which 4 or 6.7% were stillborn and 4(7.2%) neonatal deaths.

Again it was significant that a greater perinatal mortality rate occurred in premature babies as "mature", in the ratio of more than 3 : 1. Both stillbirths and neonatal deaths showed a significantly higher rate in premature babies.

In "booked" cases. Of 45 "mature" babies born of whites only 4 or 8.8% were lost, of which 1(2.2%) was stillborn and 3 neonatal deaths(6.9%).

Compared with white premature babies in "booked" cases delivered by the breech, "mature" losses in this group were significantly almost 5 times lower. Stillbirths were almost 15 times more in prematures and neonatal deaths not significantly higher.

In "non-booked" cases. Of 14 "mature" babies delivered of white patients with breech presentation 4 or 28.6% were lost, of which 3(21.4%) were stillborn and 1(9.0%) neonatal deaths.

There was again a significantly higher loss in this group as compared with "booked" cases, the ratio being more than 3 : 1. Stillbirth rates in "booked" and "non-booked" cases delivered by the breech in "mature" babies showed a much higher loss in the latter in the ratio of almost 10 : 1. Neonatal mortality rates were not significantly different.

This group also revealed  $\frac{1}{2}$  the perinatal mortality of that occurring in "non-booked" premature babies, with a significantly higher neonatal mortality in premature babies in the ratio of more than 4 : 1.

**(b) IN NON-WHITE PATIENTS.**

(Table 69)

Of 453 babies delivered in our all non-white units during 1953-55 as "breeches", 286 or 63.1% were born in "booked" cases and 42.6% were premature.

There was therefore a larger number of "non-booked" patients delivered by the breech in non-white patients and a much larger percentage of premature babies in this race(63.1% : 37.8%).

Of the 453 babies delivered of non-whites 142 or 31.3% were lost, of which 97 or 21.4% were stillborn and 45(12.6%) neonatal deaths.

Perinatal losses in both races were therefore on a par for the 3 years(1953-55) when delivered by the breech.

For the years 1952-55 however(table 69) the mortality associated with breech delivery in whites revealed only a slightly better result than in non-whites, the difference not being statistically significant.(25.6% : 32.4%).

(i) In premature babies. Of 193 premature babies born in non-whites by the breech 82 or 42.4% were lost, of which 44 or 22.7% were stillborn and 38(25.5%) neonatal deaths.

Perinatal mortality rates for premature babies delivered by the breech were almost identical in both racial groups. Both stillbirth and neonatal mortality rates were statistically similar.

In "booked" cases.

Of 105 premature babies born of non-whites by the breech 37 or 35.2% were lost, of which 20 or 19.0% were stillbirths and 17(20.0%) neonatal deaths.

Compared with white patients, this group shows no significant difference in perinatal mortality.

In "non-booked" cases. Of 83 premature babies born by the breech in non-whites, 45 or 51.8% were lost, of which 24 or 28.9% were stillborn and 21(35.5%) were neonatal deaths.

Therefore the perinatal losses in this group compared with white patients of the same category showed a very similar mortality, both stillbirth and neonatal mortality rates being almost identical.

It can thus be concluded from the above statistical analysis in premature babies delivered by the breech, that perinatal mortality rates were similar in both races, and in "booked" and "non-booked" cases, although there was a significantly higher mortality in the patient without adequate antenatal care.

(ii) In "mature" babies.

Of 265 "mature" babies delivered by the breech in non-whites during 1953-55, 60 or 22.6% were lost, of which 53 or 20.0% were stillborn and 7(3.3%) neonatal deaths.

Perinatal mortality in non-whites delivered by the breech was therefore only slightly higher than in whites(22.6% : 13.5%).

In "booked" cases. Of 181 "mature" babies delivered by the breech in non-whites 27 or 14.9% were lost, of which 12.1% were stillborn and 3.1% neonatal deaths.

Compared with whites in the same category perinatal losses were greater in the non-white, especially as far as stillbirths were concerned, in the ratio of nearly 6 : 1. There was a higher neonatal loss in whites than non-whites.

In "non-booked" cases. Of 84 "mature" babies delivered in this group 33 or 39.2% were lost, of which 36.9% were stillborn and 2(3.7%) neonatal deaths.

Again comparing perinatal losses in the racial groups, it will be noted that there was no remarkable difference in whites and non-whites in "non-booked" cases. Neonatal deaths certainly showed a higher loss in the non-white.

Compared with losses in "non-booked" premature babies in non-whites, there was a greater loss in premature babies than "mature", because of the very much higher neonatal mortality in the prematures of nearly 10 : 1.

SUMMARY AND CONCLUSIONS.FOETAL LOSSES IN BREECH PRESENTATION  
IN RELATION TO ANTENATAL CARE, IN  
PREMATURE AND MATURE BABIES.

An analysis of the foetal losses in our units for the 4 year period 1952-55, and for the 3 year period 1953-55, showed that about 40% of the babies born were premature, and that 32.5% were lost.

In White patients during 1953-55, 38.4% of babies born by the breech were premature whereas in non-whites 41.0% were premature.

The incidence of breech presentation during 1953-55 in our units was 4.43%.

In "booked" cases the incidence was 3.57% whereas in "non-booked" it was 7.85%. In the former the incidence of prematurity was 13.1% of all cases of prematurity occurring in our units. In the latter the incidence was 19.5% of all cases of prematurity.

FOETAL MORTALITY.(i) In relation to weight of baby.

The highest perinatal losses occurred in premature babies (49.8%) and the lowest in those weighing between 5½lb. and 7lb.15oz., i.e. 20.7%.

In babies weighing 8 lbs. or more the perinatal mortality was 29.6%.

Neonatal mortality rate in premature babies showed a very significantly higher figure than in larger babies.

Premature babies. Perinatal mortality rate in premature babies was significantly higher than in "mature" babies.

In whites and non-whites the perinatal mortality rates were not significantly dissimilar in premature babies delivered by the

breech. In "mature" babies there was a slightly lower perinatal mortality in whites as compared with non-whites.

(ii) Foetal losses in relation to antenatal care.

Babies delivered by the breech from "booked" patients showed a constantly lower perinatal mortality than in "non-booked" patients.

Premature babies born of "booked" mothers invariably showed a lower perinatal mortality than in "non-booked", but the difference was not statistically significant.

However, when compared with "mature" babies born of "booked" cases, premature perinatal mortality rates were very significantly higher. In whites and non-whites this was also the case.

"Mature" babies delivered from "booked" cases similarly revealed lower perinatal mortality rates than in "non-booked" cases.

It was significant that in "mature" cases the neonatal mortality rates were always much lower than in premature babies.

In whites and non-whites. Perinatal mortality rates among premature babies were similar in "booked" and "non-booked" cases. In "mature" babies perinatal mortality rates were lowest in "booked" cases.

Neonatal mortality rates in "mature" babies were strikingly lower than in premature in both "booked" and "non-booked" cases.

It can be concluded that the primary cause of the high perinatal losses in our units following breech delivery was the high percentage of premature babies born, both in whites and non-whites.

With better antenatal supervision, including routine external cephalic version, the perinatal mortality can be reduced.

YEAR UNIT	NO	1952				1953				1954				1955				TOTAL			
		PREMS SB	NND.	OVER 5½ lbs SB	NND.	NO.	PREMS SB	NND	OVER 5½ lbs SB	NND	NO	PREMS SB.	NND	OVER 5½ lbs SB	NND	NO	PREMS SB		NND	OVER 5½ lbs SB	NND.
P.M.H.	84	1	0	5	1	102	2	1	10	3	160	0	0	6	0	122	3	0	5	3	
N.S.H.	93	0	1	9	2	67	0	2	4	3	95	0	2	9	6	101	2	0	9	3	
M.M.H.	49	0	0	2	0	65	0	0	2	0	45	0	0	2	1	61	0	0	1	1	
ST. M.	18	0	0	1	0	32	1	0	2	1	36	0	0	2	0	37	0	1	2	4	
G.S.H.	31	1	0	2	1	45	2	1	4	2	36	1	2	1	1	UNIT DISCONTINUED					
TOTAL		13		262			31		280			33		339		13		308		1281	
TOTAL	275	2	1	19	4	311	5	4	22	9	372	1	4	20	10	321	5	1	17	11	137
% AGE LOSS		15.4	9.0	7.2	1.6		16.1	15.3	7.8	3.3		3.0	12.5	5.9	3.1		38.4	7.6	5.5	3.7	10.7
LOSS			23.0%*		8.8%*			28.9%*		11.0%*			15.1%*		8.8%*			46.1%*		9.0%*	LOSS

FORCEPS EXTRACTION. A COMPARISON OF FOETAL LOSS IN PREMATURES AND INFANTS  
PREMATURES AND INFANTS OVER 5½ lbs.

	NUMBER	PREMATURES	OVER 5½ lbs.
<u>WHITES</u>	220	S.B. N.N.D. 0 22 0	S.B. N.N.D. 7 198 2
<u>% AGE LOSS</u>		0% 4.7	3.5 1.0% 4.8%*
<u>NON - WHITES</u>	590	7 9	46 23
<u>% AGE LOSS</u>		14.9 25.0 36.1%*	9.2 5.1 13.9%*

FORCEPS EXTRACTION. A COMPARISON OF FOETAL LOSS IN PREMATURES AND  
INFANTS OVER 5½ lbs (WHITES AND NON-WHITES.)

(TABLE 71)

It is also noted that because of the large numbers of complicated breech deliveries in our units, the sustained high perinatal mortality can be explained.

(3) FORCEPS EXTRACTION

(Tables 71,72)

(Graphs 14,15)

INCIDENCE.

During the years 1953-55, 994 babies were delivered by forceps. The incidence of forceps extraction was therefore 4.86%. In "booked" cases it was 4.32%, whereas in "non-booked" it was 6.99%.

The incidence of prematurity in relation to all premature babies born in our units during 1953-55 was 3.00%. In "booked" cases the incidence of prematurity with forceps extraction was 2.43% and in "non-booked" 4.13%.

The incidence of "mature" babies born with forceps extraction in relation to the total number of "mature" babies delivered in our units during 1953-55, was 5.12%. In "booked" cases the incidence of "mature" babies delivered by forceps in relation to the total number of "mature" babies born during 1953-55 was 4.06%. In "non-booked" cases this was 6.16%.

Of 994 forceps deliveries only 77 were premature babies, i.e. 7.7%. In white patients this percentage was 9.9% and in non-whites 9.4%.

There were 708 "booked" patients or 70.9% delivered by forceps in the years 1953-55.

In white patients 83.3% of the babies delivered by forceps were from "booked" patients, whereas in non-whites 50.3% were from "booked" patients.

TOTAL BABIES.	B.	No.	PREMS.		MATURE			TOTAL LOSS.	N.B.	PREMS.				MATURE			TOTAL LOSS
			No.	SB.	No.	SB.	NND.			No.	SB.	NND.	No.	SB.	NND.		
994	708	48	2	4	665	17	9	19SB. 13NND	286	34	9	5	252	42	19	76SB. 24NND.	
% age	70. 9	6. 0	4. 6	10. 7	95. 3	2. 5	1. 4	2.7 1.9	29. 1	11. 9	26. 4	20. 0	88. 1	16. 6	9. 0	26.5 13.6	
			13.9% *			3.9% *		4.5% *			31.1% *			24.2% *		34.9% *	
<u>WHITES.</u>																	
161	134	12	0	0	132	2	0	2SB. 0NND	27	4	0	0	23	3	2	3SB. 2NND.	
% age	83. 3	8. 9	0	0	91. 1	1. 5	0	1.5 0.0	16. 6	14. 9	0	0	85. 1	13. 0	10. 0	11.1 8.3	
			0%			1.5%		1.5% *			0%			21.4%		14.7% *	
<u>NON-WHITES.</u>																	
449	266	19	2	4	247	9	6	11SB. 10NND	173	28	4	4	150	24	14	28SB. 18NND.	
% age	50. 3	7. 1	10. 5	23. 4	92. 9	3. 6	2. 5	4.1 3.9	49. 7	13. 3	17. 4	21. 0	86. 7	16. 0	11. 1	16.1 12.4	
			31.5% *			6.0% *		7.9% *			34.7% *			25.3% *		26.6% *	

FORCEPS EXTRACTION. Foetal loss in "booked" and "non-booked" cases, and in premature and "mature" babies. (1953-55)

(TABLE 72)

FOETAL LOSSES IN FORCEPS EXTRACTION IN PREMATURE AND MATURE  
BABIES IN RELATION TO ANTENATAL CARE.

(Table 72)

Of 994 babies delivered by forceps 132 or 13.2% were lost, of which 9.5% were stillborn and 4.1% neonatal deaths.

In "booked" cases the perinatal mortality was 4.5% compared with "non-booked" cases which was 34.9%, which was almost 8 times greater.

(1) In "booked" cases.

During 1953-55, 708 or 70.9% of forceps deliveries occurred in "booked" patients, and the perinatal loss was 4.5%.

In premature babies.

Of 43 premature babies, 6 were lost or 13.9%, of which 4.6% were stillborn and 9.7% were neonatal deaths.

In "mature" babies.

Of 665 "mature" babies, 26 or 3.9% were lost, of which 2.5% were stillborn and 1.4% neonatal deaths.

Hence there was a greater loss in premature babies as compared with "mature" in the ratio 13.9% : 3.9%. Both stillbirths and neonatal deaths were significantly higher in premature babies.

(2) In "non-booked" cases.

In a period of 3 years 286 babies were delivered by forceps from "non-booked" patients, and the perinatal loss was 34.9%.

In premature babies.

Of 34 premature babies, 14 or 31.1% were lost, of which 26.4% were stillborn and 5 neonatal deaths, or 20.0%.

Compared with "booked" babies therefore the perinatal loss was more than twice greater in "non-booked" cases. Stillbirth

rate was almost 6 times greater in "non-booked" prematures, and neonatal mortality rate was nearly twice larger.

In "mature" babies.

Of 252 "mature" babies delivered by forceps of "non-booked" mothers, 61 or 24.2% were lost.

Almost 6 times a greater perinatal mortality rate occurred in mature "non-booked" cases as in "non-booked" cases.

Stillbirths and neonatal deaths were much more frequent in "non-booked" cases.

FOETAL LOSSES IN THE RACIAL GROUPS.

(Tables 71,72)

IN WHITE PATIENTS.

Of 220 babies delivered by forceps during 1952-55 at the Mowbray H.H., 22 or 10% were premature.

The perinatal mortality was 4.0% or 9 babies, of which 7(3.1%) were stillborn and 2(0.4%) were neonatal deaths.

During 1953-55, of 161 babies delivered by forceps in the same units, 7 or 4.3% were lost, of which 5(3.1%) were stillborn and 2(1.2%) neonatal deaths.

(i) In "booked" cases.

Premature babies. Of 12 babies delivered during 1953-55 no babies were lost in white patients at the Mowbray H.H. In 1952-55 no premature babies were lost.

"Mature" babies. Of 132 "mature" babies delivered by forceps during 1953-55, 2 or 1.5% were lost, of which 1.5% were stillborn and no neonatal deaths.

(ii) In "non-booked" cases.

Premature babies. No premature babies were lost.

"Mature" babies. Of 23 babies born during 1953-55, 5 or 21.4% were lost, of which 13.0% were stillborn and 10.0% neonatal deaths.

It was therefore noted that the perinatal mortality rate in "non-booked" cases was almost 10 times greater than in "booked" cases.

FOETAL LOSSES IN NON-WHITES.

(Tables 71,72)

Of 590 babies delivered by forceps during 1952-55 at our non-white units 47 or 7.9% were premature.

The perinatal mortality was 14.4% or 85 babies lost, of which 8.9% were stillborn and 5.9% neonatal deaths.

Of 449 babies delivered during 1953-55, 67 or 14.9% were lost, of which 8.4% were stillbirths and 6.8% neonatal deaths.

(i) In "booked" cases. Of 266 babies born during 1953-55, 21 were lost or a perinatal mortality rate of 7.9%, of which 4.1% were stillborn and 3.9% neonatal deaths.

In premature babies. Of 19 premature babies delivered by forceps 6 or 31.5% were lost, of which 10.5% were stillborn and 23.4% neonatal deaths.

In "mature" babies. Of 247 babies delivered 15 or 6.0% were lost, of which 4.1% were stillborn and 2.5% neonatal deaths.

Almost 5 times as many premature babies were lost as "mature" in "booked" cases in non-whites, when delivered by forceps.

The stillbirth rate in premature babies was almost 2½ times greater in "booked" cases than in mature "booked" cases.

Neonatal mortality rate was almost 10 times greater in premature babies as in "mature", in "booked" cases.

In non-whites, perinatal losses were 5 times greater in "booked" cases than in whites.

(ii) In "non-booked" cases. Of 173 babies delivered in non-whites during 1953-55, 46 or 26.6% were lost, of which 16.1% were stillborn and 12.4% neonatal deaths.

When compared with perinatal losses in whites of the same group, it was noted that almost twice the percentage was lost in non-whites.

In premature babies. Of 23 premature babies delivered by forceps in non-whites ("non-booked") during 1953-55, 8 or 34.7% were lost, of which 17.4% were stillborn and 21.0% neonatal deaths.

The perinatal losses in "booked" and "non-booked" premature babies in non-whites were therefore almost identical.

No comparison could be made with whites because of the absence of loss in prematures in whites.

In "mature" babies. Of 150 "mature" babies delivered during 1953-55 in non-whites in "non-booked" cases, 38 babies or 25.3% were lost, of which 16.0% were stillborn and 11.1% neonatal deaths.

There was no significant difference in perinatal mortality in premature and "mature" babies in "non-booked" cases in non-whites. However neonatal mortality was much higher in premature babies.

A comparison with losses in "booked" mature cases, shows that there was a 4 times greater perinatal loss in "non-booked".

SUMMARY"FORCEPS EXTRACTION". FETAL LOSSES  
IN MATURE AND PREMATURE BABIES.

The incidence of forceps extraction in our units during 1953-55 was 4.86%. In "booked" cases the incidence was 4.32% and in "non-booked" 6.99%.

The incidence of prematurity in forceps extraction was 3.00% of all premature babies delivered in our units during 1953-55. In "booked" cases the incidence was 2.43% and in "non-booked" 4.13%.

Of 994 babies delivered by forceps during 1953-55, 7.7% were premature. In white patients this incidence was 9.9% and in non-whites 9.4%.

70.9% of forceps extractions occurring in our units were from "booked" patients. In whites this percentage was 83.3% and in non-whites 50.3%.

As in other hazards of labour, a much greater percentage of premature babies was lost than "mature", especially in "non-booked" cases.

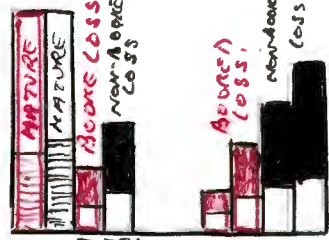
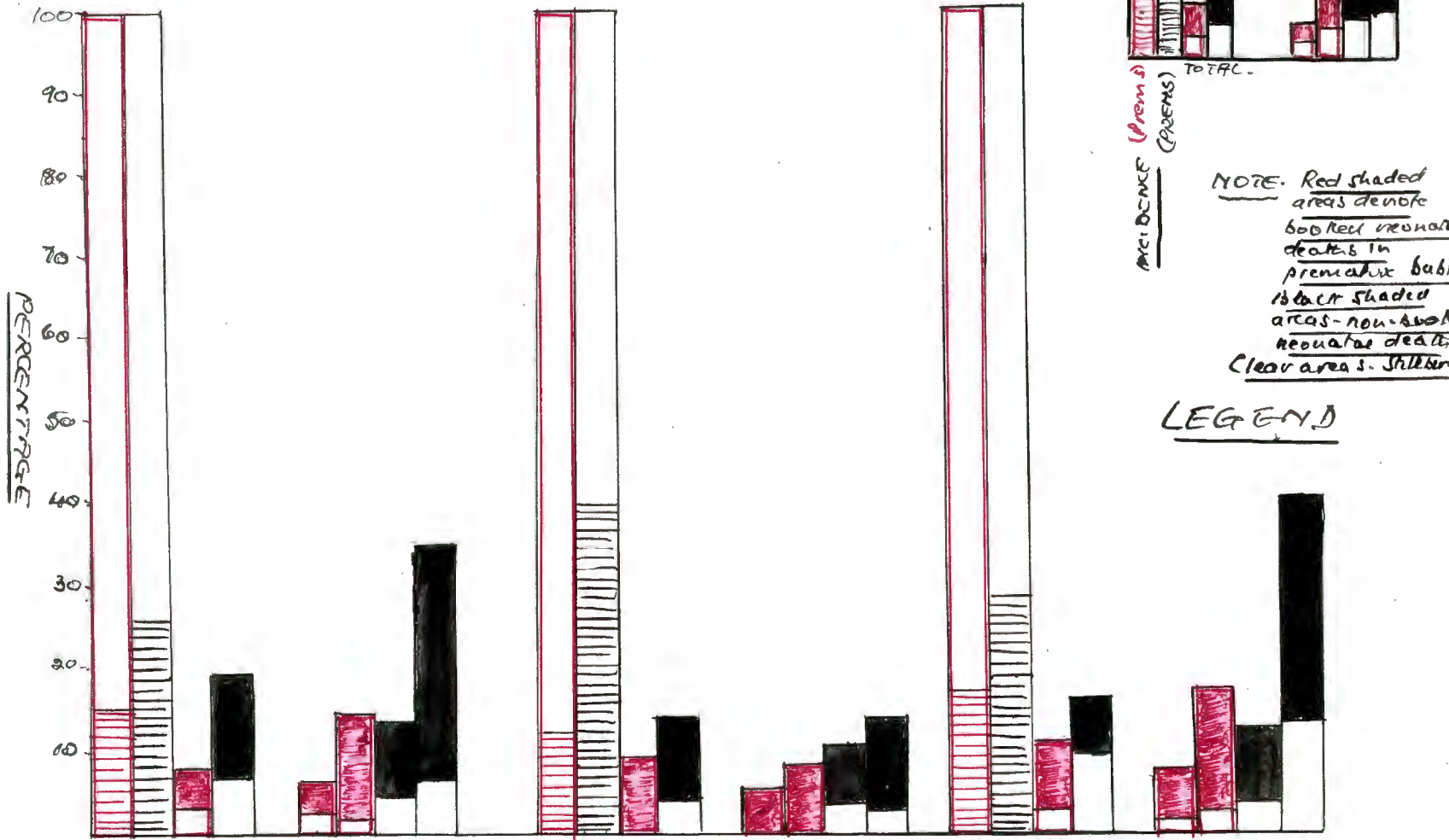
The perinatal mortality rate in premature babies delivered by forceps was higher than in "mature" babies, and perinatal mortality rates in "booked" premature babies was similar to that occurring in "non-booked" cases.

In non-whites perinatal mortality was greater than in whites, especially in "mature" babies delivered of "booked" patients, suggesting inferior prenatal care in non-whites. In "non-booked" cases the perinatal losses in "mature" babies were similar in both races.

In non-whites premature losses were similar in "booked" and

and "non-booked" cases.

It can therefore be concluded that antenatal care plays an important part in the diminution of perinatal losses sustained. However losses in premature babies are similar in "booked" and "non-booked" cases. In "mature" babies the influence of antenatal care was more evident in relation to perinatal mortality, when more babies were lost in women with inadequate care.



NOTE. Red shaded areas denote booked neonatal deaths in premature babies  
 black shaded areas - non-booked neonatal deaths  
 Clear areas - Stillborns

LEGEND

PERINATAL MORTALITY (WITH INCIDENCE) IN PREMATURE BABIES IN "BOOKED" & "NON-BOOKED" CASES.

PERINATAL MORTALITY (WITH INCIDENCE) IN PREMATURE BABIES IN "BOOKED" & "NON-BOOKED" CASES (WHITES)

PERINATAL MORTALITY IN PREMATURE BABIES IN "BOOKED" & "NON-BOOKED" CASES (NON-WHITES)

CAESAREAN SECTION. (GRAPH 16)

INCIDENCE AND PERINATAL MORTALITY IN PREMATURE BABIES IN "BOOKED" AND "NON-BOOKED" CASES.

**(4) CAESAREAN SECTION****(Tables 73,74)****(Graph 16)****INCIDENCE.**

During the years 1953-55, 1139 babies were delivered by caesarean section. The incidence of caesarean section was therefore 5.57%. In "booked" cases the incidence was 4.6% and in "non-booked" 9.41%.

The incidence of prematurity in relation to all cases of prematurity in our units was 11.5% in babies delivered by caesarean section. In "booked" cases the incidence was 6.17% and in "non-booked" 12.21%.

The incidence of "mature" babies born after caesarean section, of all "mature" babies born in our units during 1953-55 was therefore 5.21%. In "booked" cases the incidence was 4.43% and in "non-booked" cases 8.76%.

Of 1139 babies delivered only 206 were premature, that is 18.08%. In white patients this percentage was 19.0%, or 31 premature babies out of 163 delivered by caesarean section. In non-whites the percentage was 21.9%, or 111 premature babies born out of 506 delivered by caesarean section.

There were 754 "booked" patients, or 66.0% delivered by abdominal section in the 3 years 1953-55.

In white patients 74.5% of babies delivered by section were in "booked" patients. In non-whites the percentage of babies born by section in "booked" cases was 57.7%.

**FETAL LOSSES IN CAESAREAN SECTION IN PREMATURE AND MATURE BABIES IN RELATION TO ANTENATAL CARE.**

**(Table 74)**

Of 1139 babies delivered 135 or 11.9% were lost, of which 60 or 5.2% were stillborn and 75(6.9%) neonatal deaths.

TOTAL BABIES	PREMS				MATURE			TOTAL	N.B.	PREMS.			MATURE			TOTAL
	B.	No.	SB.	NND.	No.	SB.	NND.	LOSS.		No.	SB.	NND.	No.	SB.	NND.	LOSS.
1189	754	109	3	15	645	23	21	26SB. 36NND.	385	97	8	25	288	26	14	34SB. 39NND.
% age	66. 0	14. 4	2. 7	14. 1	85. 6	3. 5	3. 4	3.4 4.9	34. 0	25. 1	8. 2	28. 0	74. 9	9. 0	5. 3	8.8 1.1
			16.5%*			6.6%*		8.2%*			32.9%*			13.9%*		18.9%*
<u>WHITES.</u>																
163	125	15	0	4	110	0	4	8NND.	48	16	0	2	32	1	2	1SB. 4NND.
	74. 5	12. 0	0 0	36. 0	88. 0	0 0	3. 6	6.4	25. 5	33. 3	0 0	12. 5	66. 7	3. 1	6. 4	2.0 8.5
			20.0%*			3.6%*		6.4%*			12.5%*			9.4%*		12.5%*
<u>NON-WHITES.</u>																
506	298	54	2	8	244	5	10	7SB. 18NND.	208	57	7	16	151	10	4	17SB. 20NND.
	57. 7	18. 1	3. 7	15. 3	81. 9	2. 0	4. 2	2.3 6.2	42. 3	27. 4	12. 3	32. 0	72. 6	6. 6	2.7	8.1 10.4
			18.5%*			6.4%*		8.4%*			40.3%*			9.2%*		17.8%*

CAESAREAN SECTION(1953-55). Foetal loss in "booked" and "non-booked" cases,  
and in premature and "mature" babies.

(TABLE 74)

In "booked" patients delivered by caesarean section during 1953-55, the perinatal mortality rate was 8.2%, compared with a loss of 18.9% in "non-booked" patients, which was almost twice greater.

(i) In "booked" cases. (Table 74)

In premature babies. Of 109 premature babies delivered 18 or 16.5% were lost, of which 2.7% were stillborn and 14.1% neonatal deaths.

In "mature" babies. Of 645 babies born 44 or 6.6% were lost, of which 3.5% were stillborn and 3.4% neonatal deaths.

It was apparent therefore that perinatal losses in premature babies delivered by caesarean section in "booked" cases were far smaller than in "mature" babies. This was mainly due to the 4 times greater mortality in neonatal deaths.

(ii) In "non-booked" cases.

In premature babies. Of 97 babies born 33 or 32.9% were lost, of which 8.2% were stillborn and 28.0% neonatal deaths.

Premature perinatal mortality was therefore almost twice larger in "non-booked" cases as "booked". Neonatal losses were especially large in the former, but also stillbirths were almost 3 times higher in "non-booked" cases.

In "mature" babies. Of 288 babies delivered by caesarean section 40 or 13.9% were lost, of which 9.0% were stillborn and 5.3% neonatal deaths.

Losses in "booked" cases were therefore much less than in mature "non-booked" cases.

Particularly was it noticeable that neonatal deaths in premature babies in "non-booked" cases were more than 5 times greater.

YEAR.	NO	1952				1953				1954				1955				TOTAL.			
		PREMS.		OVER 5½lbs.		PREMS.		OVER 5½lbs.		PREMS.		OVER 5½lbs.		PREMS.		OVER 5½lbs.					
		SB.	NND.	SB.	NND.	SB.	NND.	SB.	NND.	SB.	NND.	SB.	NND.	SB.	NND.	SB.	NND.				
UNIT F.M.H.	90	5	3	6	2	146	1	5	8	3	125	0	0	12	4	189	1	5	13	9	
N.S.H.	64	4	1	5	2	59	0	1	1	3	93	3	1	5	2	75	1	2	4	2	
M.M.H.	40	1	4	0	0	63	0	5	0	3	52	0	1	0	1	58	0	0	1	3	
ST. M.	18	0	0	0	0	32	1	1	1	0	27	0	0	1	0	34	0	0	2	1	
G.S.H.	45	0	2	0	1	94	1	8	2	3	95	3	11	0	3		NO UNIT IN 1955				
TOTAL	257	52		205		394	80		214		392	72		220		356	54		202		1399
TOTAL LOSS		10	10	11	5		3	20	12	12		6	13	18	10		1	7	20	15	177
% AGE		19.2 23.9		5.3 2.5			3.7 25.9		3.8 3.9			8.3 19.8		5.6 3.3			3.7 13.4		6.6 8.2		12.6%
		38.4%		7.8%			28.5%		7.9%			26.3%		8.9%			16.6%		11.5%		

CAESAREAN SECTION. A COMPARISON OF FORTAL LOSS IN  
PREMATURES AND INFANTS OVER 5½lbs.

WHITES	213	PREMS. 38	OVER 5½lbs. 175	LOSS PREMS 11	(TOTAL) OVER 5½lbs 9
% AGE				⊙(28.9%)	(5.1%)
NON- WHITES.	632	139	493	LOSS PREMS 40	(TOTAL) OVER 5½lbs 38
% AGE				⊙(29.2)	(7.8%)

CAESAREAN SECTION. A COMPARISON OF FORTAL LOSS IN  
PREMATURES AND INFANTS OVER 5½lbs. (WHITES & NON-WHITES)

The greater losses in premature babies was hence mainly due to higher neonatal losses as compared with "mature" babies.

FOETAL LOSSES IN THE RACIAL GROUPS DELIVERED BY CAESAREAN SECTION.

(Table 74)

IN WHITE PATIENTS.

Of 163 babies born in 1953-55 from caesarean section in whites at the Howroy H.H. 7.9% were lost, of which there was only 1 stillbirth(0.6%) and 12 neonatal deaths or 7.4%.

During 1953-55 the perinatal losses in whites were 20 babies out of 213 delivered by caesarean section, or 9.4%. The prematurity frequency was 17.8% during this period of time.

(i) In "booked" cases.

Premature babies. Of 15 premature babies delivered by section there were 4 neonatal deaths. No stillbirths were noted. The perinatal mortality rate was therefore 26.6%.

In "mature" babies. Of 110 "mature" babies there were 4 neonatal deaths only, or a perinatal mortality rate of 3.6%.

It was obvious therefore that losses in premature babies were much greater than in "mature" babies delivered by caesarean section in the ratio of nearly 7 : 1.

(ii) In "non-booked" cases.

Premature babies. Of 16 babies born there were 2 neonatal deaths only, or a loss of 12.5%.

In "mature" babies. Of 32 babies delivered by caesarean section 3 or 9.4% were lost, of which 3.1% were stillborn and 6.4% neonatal deaths.

Fewer "mature" babies were therefore lost in "non-booked" cases than "booked". Neonatal mortality was  $\frac{1}{2}$  that in "mature" as premature babies.

#### IN NON-WHITE PATIENTS.

Of 506 babies delivered by caesarean section during 1953-55 in our non-white units 62 or 12.2% were lost, of which 24 or 4.7% were stillborn and 38(7.8%) neonatal deaths.

It was apparent therefore that perinatal losses in non-whites were higher than in whites, mainly because of the larger stillbirth loss which was almost 8 times greater in the former. Neonatal losses were similar in both races.

(i) In "booked" cases. Of 298 babies delivered 25 or 8.4% were lost, of which 2.3% were stillborn and 6.2% neonatal deaths.

Perinatal losses in "booked" whites were similar therefore to losses in non-whites. The neonatal mortality was similar in both races.

Premature babies. Of 54 premature babies delivered by section 10 or 18.5% were lost, of which 3.7% were stillborn and 15.3% neonatal deaths.

Compared with white babies delivered, there was no significant difference in perinatal mortality rates in the 2 races.

In "mature" babies. Of 244 babies born 15 or 6.4% were lost, of which 2.0% were stillborn and 4.2% neonatal deaths.

Fewer babies were therefore lost in whites than non-whites in "booked" cases.

(ii) In "non-booked" cases. Of 208 babies delivered by section during 1953-55, 37 or 17.8% were lost in non-whites, of which 8.1% were stillborn and 10.4% neonatal deaths.

There was no significant difference in the perinatal losses sustained by the 2 races in "non-booked" cases, although the stillbirth rate was 4 times higher in non-whites.

In premature babies. Of 57 babies delivered by caesarean section in "non-booked" cases of non-white patients, 23 or 40.3% were lost, of which 12.3% were stillborn and 32.0% neonatal deaths.

When perinatal losses in whites are compared with non-whites in premature "non-booked" cases it will be noted that almost 3 times more non-white babies were lost.

Neonatal losses were strikingly heavier in non-whites, in this group.

In non-whites it will be noted that many more premature babies were lost in "non-booked" cases, because of the greater loss in stillbirths(12.3% : 3.7%) and neonatal deaths(15.3% : 32.0%).

In "mature" babies. Of 151 babies delivered by section in non-whites, 14 or 9.2% were lost, of which 6.6% were stillborn and 2.7% neonatal deaths.

The perinatal loss following caesarean section was almost identical in "mature" babies delivered of white patients, and slightly greater than in "mature" babies from "booked" patients.

#### SUMMARY

#### "CAESAREAN SECTION".

During the years 1953-55 the incidence of caesarean section in our units was 5.57%. In "booked" patients the incidence was 4.6% and in "non-booked" 9.41%.

The incidence of prematurity in relation to all cases of prematurity in our units was 11.5% in babies delivered by section. In "booked" cases this percentage was 6.17% and in "non-booked" 12.21%.

Of 1139 babies born by section, 18.08% were premature.

66.0% of patients delivered by caesarean section were "booked" in our units, during 1953-55.

In white patients 74.5% of babies born by section were in "booked" patients. In non-whites this percentage was 57.7%.

Foetal mortality. During 1953-55 the perinatal mortality rate in caesarean section was 11.9%, in "booked" cases 8.2% and in "non-booked" 18.9%.

In white patients the perinatal mortality rate was 7.9% compared with a rate of 12.2% in non-whites, in whom 57.7% of babies delivered were from "booked" patients compared with 74.5% in whites.

There was a greater perinatal mortality rate in premature babies than "mature" babies in both "booked" and "non-booked" cases. Premature babies delivered of "booked" patients were lost in a similar perinatal mortality as in "non-booked" patients.

In white patients the perinatal mortality rate in premature babies delivered by caesarean section in "booked" patients was similar to that in non-whites.

Perinatal mortality rate in "non-booked" patients showed a much higher loss in non-whites as whites when premature babies were delivered. "Mature" babies were lost in equal percentages in "non-booked" patients in both races.

It can thus be concluded that premature perinatal mortality rates were much higher than "mature", in both "booked" and "non-booked" patients. "Mature" losses however were not significantly higher in whites and non-whites in "booked" and "non-booked".

The higher losses in premature babies as compared with "mature" were mainly due to higher neonatal losses in premature babies.

**(5) TRANSVERSE AND OBLIQUE LIE.****(Table 75)**

During the years 1953-55 there were 165 babies which presented as transverse and oblique lie in our units. The incidence of this malpresentation was therefore 0.79%.

In "booked" cases the incidence was 0.40% and in "non-booked" 2.39%.

The incidence of prematurity in relation to all cases of prematurity in our units was 2.34%. In "booked" cases this percentage was 1.24% and in "non-booked" 4.77%.

The incidence of "mature" babies born with transverse and oblique lie of all "mature" babies born in our units was 0.5%. In "booked" cases this was 0.30% and in "non-booked" 1.8%.

Of 165 babies delivered with this malpresentation during 1953-55, 60 or 36.4% were premature. In "booked" cases the frequency was 32.8% and in "non-booked" 38.7%.

There were 40.6% "booked" patients with transverse and oblique lie during the 3 year period.

In white patients 35% of patients were "non-booked", and 42.8% of babies delivered were premature. In non-whites 51.6% were "non-booked" and 40.7% premature.

**FOETAL LOSSES IN TRANSVERSE AND OBLIQUE LIE IN PREMATURE AND MATURE BABIES IN RELATION TO ANTENATAL CARE.**

**(Table 75)**

Of 165 babies delivered, 86 were lost or a perinatal mortality of 52.1%, of which 77 or 44.6% were stillborn and 9 (10.2%) neonatal deaths.

In "booked" cases the perinatal mortality was 31.3%, of which 26.9% were stillborn and 6.1% neonatal deaths.

In "non-booked" cases the perinatal loss was 66.3%, of which 60.2% were stillborn and 15.3% neonatal deaths.

<u>TOTAL LOSS</u>			<u>PREMS.</u>			<u>MATURE</u>		
<u>NON-BOOKED</u>	<u>SB.</u>	<u>NND.</u>	<u>TOTAL</u>	<u>SB.</u>	<u>NND.</u>	<u>TOTAL</u>	<u>SB.</u>	<u>NND.</u>
98	59	6	38	24	4	60	35	2
<u>% age</u>	59.3	15.3	38.7	63.1	28.7	61.3	58.3	8.0
	66.3% *			73.7% •			61.6% •	
<u>BOOKED</u>								
67	18	3	22	13	1	45	5	2
<u>% age</u>	26.9	6.1	32.9	59.0	11.1	67.1	11.1	5.0
	31.3% *			63.6% *			15.5% *	
<u>WHITES</u>								
<u>NON-BOOKED</u>								
7	3	0	3	1	0	4	2	0
<u>% age.</u>	42.8	0	42.8	33.3	0	57.2	50.0	0
	42.8%			33.3%			50.0%	
<u>BOOKED</u>								
0	0	0	1	0	0	5	0	0
<u>% age</u>	NIL			NIL			NIL	
<u>NON-WHITES</u>								
<u>NON-BOOKED.</u>								
42	26	4	14	8	2	28	18	2
<u>% age</u>	61.9%	25.0%	33.3	57.1	33.3	66.6	64.2	20.0
	71.4% *			71.4% *			71.4% *	
<u>BOOKED</u>								
39	13	0	19	9	0	20	4	0
<u>% age</u>	33.3%	0	48.8	47.3	0	51.2	20.0	0
	33.3% *			47.3% *			20.0% *	

TRANSVERSE AND OBLIQUE LIE. Foetal losses in premature and mature babies, in relation to antenatal care, in whites and non-whites.

(TABLE 75)

(1953-55)

It will hence be noted that almost twice as many babies were lost in "non-booked" as "booked" cases. There were almost twice as many stillbirths in "non-booked" cases.

(i) In "booked" cases.

(Table 75)

In premature babies. Of 22 babies delivered of patients with transverse and oblique lie 63.6% were lost or 14 babies, of which 13 or 59.0% were stillborn and 1 neonatal death(11.1%).

In "mature" babies. Of 45 babies delivered 7 or 15.5% were lost, of which 11.1% were stillborn and 5% neonatal deaths.

Therefore more than 4 times as many premature babies as "mature" were lost in "booked" cases. Stillbirths occurred 5 times more frequently in premature as "mature" babies.

(ii) In "non-booked" cases.

In premature babies. Of 38 babies delivered 28 were lost, or a perinatal mortality rate of 73.7%, of which 63.1% were stillborn and 28.7% neonatal deaths.

It is apparent therefore that premature babies in transverse and oblique lie, suffered severely in loss of life. There was no significant difference in losses in "booked" and "non-booked" cases.

In "mature" babies. Of 60 babies delivered 37 were lost, or a perinatal loss of 61.6%, of which 58.3% were stillborn and 8.0% neonatal deaths.

There was therefore a 4 times greater perinatal mortality rate in mature "non-booked" cases as "booked", stillbirths being 5 times more frequent. Neonatal deaths were almost identical in percentage.

There was also no significant difference in perinatal mortality in "mature" and premature babies delivered of "non-booked" cases.

<u>WEIGHT (Gm.)</u>	<u>No.</u>	<u>DEATHS</u>			<u>TOTAL</u>	<u>%age of Infant Mortality</u>
		<u>Intra-natal.</u>	<u>Post-natal.</u>	<u>Neonatal</u>		
<u>NON-CONDUCTION ANAESTHESIA.</u>						
2500-2000	218	5	3	9	17	7.8% *
2000-1500	75	5	1	11	17	22.7% *
1500-1000	34	6	1	11	18	52.9% *
1000-500	20	10	5	5	20	100.0%
<b>TOTAL</b>	<b>347</b>	<b>26</b>	<b>10</b>	<b>36</b>	<b>72</b>	<b>20.8% *</b>

EFFECTS OF ANAESTHESIA (including inhalation, pudental block pentothal, and twilight anaesthesia) ON FOETAL LOSSES. ( Table #6 a)

<u>CONDUCTION ANAESTHESIA</u>						
2500-2000	38	1	0	4	5	3.6% *
2000-1500	65	0	1	3	4	6.2% *
1500-1000	28	0	0	7	7	25.0% *
1000-500	13	1	0	9	10	76.9%
<b>TOTAL</b>	<b>244</b>	<b>2</b>	<b>1</b>	<b>23</b>	<b>26</b>	<b>10.7% *</b>

EFFECTS OF ANAESTHESIA (caudal and spinal) ON FOETAL LOSSES (Table #6 b)

The obviously better results in "booked" cases speaks much for the benefits of adequate antenatal care in transverse and oblique lie.

PREMATURITY.

THE INFLUENCE OF THE TYPE OF ANAESTHESIA  
ON FOETAL MORTALITY. (Table 76)

It is generally agreed that the anaesthetic of choice for the delivery of the new-born babe is one which will not affect the infant adversely in its recovery or promote loss of life, whether such delivery be normal or otherwise.

Non-inhalation anaesthesia would appear to be the ideal form because of its almost negligible effects on the baby. This is particularly the case when there are already signs of distress, and when inhalation might turn the scales against such an infant. It is frequently reported that for the delivery of a premature baby, all forms of depressive agents for the mother prior to birth of her child will affect the recovery of the infant. Hence the effects of such agents as morphine, the barbiturates, pentothal, all forms of inhalation agents and the like would be deleterious.

Local, caudal and spinal analgesics would hence appear to be more satisfactory, particularly for the premature baby when operative or normal birth is anticipated.

Master and Ross(1949) report results of a combined effort by the paediatric and obstetric staffs to lower premature mortality. Patients were divided into 2 groups; conduction and non-conduction.

In the latter group were included 7650 patients whose labours were carried out under twilight sleep, inhalation anaesthesia, pentothal, or a combination of methods.(Table 86a).

In the conduction group were 3000 patients whose labours were

carried out under caudal and saddle block.

Infant mortality under conduction anaesthesia was consistently at least 100% lower than that under non-conduction.

Babies dying when labour began, and which were viable, or during delivery, were termed intranatal deaths. Postnatal deaths were those occurring immediately after delivery, before the baby could be admitted to the premature nursery. Deaths after admission to the premature nursery were called neonatal deaths.

In the series of cases reported by the above authors the premature incidence in the non-conduction cases was 4.9% (35 stillborn macerated infants being included).

The premature incidence in the conduction group was 8.0% (5 stillborn macerated infants being included).

The uncorrected infant mortality of 20.8% achieved for the non-conduction group was lower than that of any series reported elsewhere.

In the conduction group the uncorrected losses were 10.7%, which represents a reduction in premature infant mortality of at least 100 per cent over any figure previously reported.

Other authorities report in a similar vein, although statistical evidence is sadly lacking.

In our units it was not possible to produce statistics in relation to loss of life with different forms of anaesthesia. However it should be mentioned that the majority of anaesthetic agents used in our departments were inhalation, such as nitrous oxide, oxygen and ether. Local and spinal analgesia was seldom used.

#### REFERENCE.

Masters, W.M., and R.W. Ross (1949): J.A.M.A., 141, 909.

PREMATURITY ASSOCIATED WITH UNKNOWN CAUSE

There is certainly no argument that the basis of mortality in all communities, both foetal and maternal, is dependent on the socio-economic standing of that population. The lower the standard of living the higher the mortality, and vice versa.

Not unimportant in association with foetal mortality and socio-economic status, is the ever recurring evil of the birth of a premature baby.

Briefly enumerated, the following factors will be discussed:-

(1) The Nutritional Factor and associated contributory causes such as:

- (a) Earning capacity of the husband.
- (b) Occupation of the husband.
- (c) Occupation of the wife and type of employment either in her own own, outside the home, and whether she has a husband or not.

(2) Biologic Factors. Included in this category are the following subheadings:

- (a) Sex ratio.
- (b) Age and parity of the mother.
- (c) Age of the father.
- (d) Illegitimacy.
- (e) Interval between successive pregnancies.
- (f) Tendency to repeated stillbirths and neonatal deaths.

THE NUTRITIONAL FACTOR IN PREMATUREITY

It is generally agreed that women deprived of an adequate and well balanced diet during pregnancy are more likely to abort or give birth to a premature baby, than those with an adequately balanced diet. A consequent higher foetal mortality in these patients has been shown to occur.

It is also suggested that mothers on a satisfactory diet adequate in vitamins, minerals and proteins suffer less frequently from toxæmia of pregnancy, abortion, premature labour and its consequences.

Raiha(1947) from Helsinki, Finland found that the percentage of premature deliveries was relatively constant(10-12%) from 1917 to 1941. In 1942, the incidence dropped to 6. without significant change in the number of deliveries.

The incidence of premature labour remained constant until 1946, due greatly to the lowered incidence of toxæmia. It was difficult to understand this because the living conditions became much worse and the female was mobilised for war.

Pariaiven(1949) in Scandinavia confirmed the above findings for the war years 1939-45. After an increase of incidence of prematurity in 1940(i.e. the first full year of the war) the incidence fell to 6.26% from 7.5% in the previous year. The incidence continued to fall to 5.57% in 1944, the last full year of the war.

Antovan(1947) noted that during the siege of Leningrad mothers were exposed to even greater hardships and exertion. He reported "poor" infants and a greater incidence of prematurity.

Nørregaard(1953) in a report from Copenhagen, quotes 1125 premature infants and 1000 "mature" ones. Of the mothers of the premature babies 18% were of the indigent class, whereas 10% were

from the control series.

The well-to-do class represented 3% of premature infants and 6% of the control series.

He concluded that mothers who gave birth to premature infants had had both quantitative and qualitative poorer food than mothers of "mature" infants.

Tyson(1946) investigated a group of 750 expectant mothers on a scientifically controlled diet containing large amounts of protein, vitamins and mineral salts with definite limitation of fluids and fruit, under adequate supervision. These women had no premature infants, whereas 37 premature babies were born to mothers on a special diet.

Edwards(1946) noted the effects of the Indian famine of 1943 on the weights of Bengal babies. His clinical impression gained from the Dufferin Hospital, Calcutta during the famine was that larger numbers of premature babies were born. Examination of the diets of the mothers did not reveal striking deficiencies. Their nutritional condition however was poor, anaemia was general and lactation poor.

Huggott(1944) found that moderate reduction of diet during the war years had no effect on birth weights. However it should be stressed that adequate supplements were prescribed.

Bourne and Williams(1948) maintain that all evidence in man and from animal experiments shows that the child's weight will not be affected unless the mother's diet was seriously restricted during the last 3 months of pregnancy.

Smith(1947) reported that in Rotterdam in the pre-hunger years of October 1943 to May 1944, 4.98% of infants born weighed less than 5 lbs(2500G.) With those conceived in the hunger period (October 1944 to December 1945) the percentage was 8.4.

In the Hague similarly the incidence was 8.2% for those born in the "pre-hunger" year, and 11% in the "hunger" period.

In the United States of America and Canada the highest incidence of premature babies was found among the poorest fed groups, especially negroes.

Stear and Kassar(1952) at the Sloane Hospital for Women reported the incidence of toxæmia of pregnancy in private patients(socio-economically "well-off") to be 5 times less frequent than in ward patients, i.e. patients consisting mainly of whites, negroes and Puerto Ricans. The difference was not due to the negroes, but more to the Puerto Ricans who were most probably the poorest economically and hygienically, and who exerted the real difference on the ward rates.

Similarly in other non-white hospitals in the U.S.A. (Charity Hospital, Louisiana, John Hopkins, Freedmen's, Washington D.C.), the incidence of premature birth was highest because of poor socio-economic status.

Smith concluded that only when circumstances such as famine imposed a severe nutritional deprivation and hunger on the mother is there evidence of significant reduction in the foetal birth weight. The deficiencies of diet affected all elements of nutrition. There was a significant fall in birth weight especially when the deficiencies occurred in the last 2 months of pregnancy.

#### EXPERIMENTAL EFFECTS OF DIET DEFICIENCIES ON PREGNANT WOMEN.

Burke, Reel, Kirkwood and Stuart(1943) and Burke, Harding and Stuart(1943) from the Public Health School at Harvard, U.S.A., made detailed studies of the diet consumed by pregnant women and compared it with the clinical condition of the infant at birth and during the first 2 weeks of postnatal life.

At the Lying-in Hospital, Chicago, they investigated 216 women over a period of 10 years. Of these, 31 had had a good

diet, 149 a fair diet and 36 poor diets.

There was a significant relationship between the adequacy of the diet and condition of the infant at birth.

"Superior" infants occurred in mothers who received good or excellent foods. "Poorest" infants were found in mothers who had had poor diets. However there was doubt of the actual diets consumed by these women. Also another fact was not taken into consideration when coming to their final analysis of the types of children born. The importance of associated social conditions such as physical work of the mother was not taken into consideration.

In other experiments other under-developed social groups were studied and various supplements given to unselected members from the earlier months of pregnancy. The outcome of pregnancy in women on their own inadequate diets is then compared with that of those given the supplements.

#### THE TORONTO EXPERIMENTS.

Ebbs, Tisdale and Scott (1941) and Ebbs, Tisdale, Moyle and Bell (1942) in the 1938 to 1941 period investigated pregnant women in whom extra fats, protein, vitamins and iron was given. The effects of these supplements were studied in women in a general hospital.

It was found that (i) in 120 of those with a poor diet there were 34 stillbirths (ii) in 90 with supplemented diet of extra food and vitamin there were no stillbirths and (iii) in 170 with good diets there were only 6 stillbirths.

These investigators concluded that when nutrition was good consistently better results were found in foetuses in instances of abortion, premature labour and complications, both before and during labour. The infant had therefore a greater chance of survival.

OSLO EXPERIMENTS.

Toverud(1939 and 1946) in Stockholm gave extra vitamin A and C to patients.

At a home for unmarried mothers for 7 years from 1931 to 1938 an optimum diet was given. It was found that 16% of 125 women admitted after or just before delivery had premature infants. In 223 other patients on the optimum diet the incidence was 22%.

Balfour(1944) from South Wales investigated 11618 pregnant patients who received supplements in milk, yeast(vitamin D complex) and marmite. There were 8095 controls.

There was a significant reduction in the foetal loss in the group specially fed compared with the controls. The stillbirth and neonatal deaths rates was 59.6 in the fed group, and 73.3 in the controls. In a smaller group of women, supplements of vitamins A and D with calcium and phosphorous were given, and the stillbirth and neonatal rates of 57 in the fed group and 64.7 in controls was found.

Cameron and Graham(1944) of the Glasgow Royal Maternity & Women's Hospital studied the intake of food of 300 women in the last 3 months of pregnancy. These women had had extra rations of milk, eggs, meat and vitamins. Of these women 100 had had stillbirths, 100 had had premature live births and 100 had had full term births.

Their assessment showed that the diet of the first 2 groups was deficient on all counts. The 3rd group had had an optimum diet.

The People's League of Health(1946) from a group of London Hospitals studied 2 groups of women (i) 2510 treated with extra iron, iodine and vitamins A and D, and (ii) 2512 controls.

There was a significant lowering of the toxæmia rate in the treated series, although there was no measurable lowering of the

of foetal growth differences. Of course toxæmia is an important predisposing agent for stillbirths and premature births.

Williams and Fralin(1942) studied 514 women in Philadelphia, 100 of whom had a good diet,209 a fair diet,and 259 a poor diet. No association was found between adequacy of the diet and of the occurrences of certain complications of pregnancy,such as toxæmia,premature labour etc.

Bell(1942) and Fisher(1943) do not agree with the findings of the above authors. They stress that mothers on "superior" diets suffer less frequently from toxæmia,abortion,premature labour,stillbirths and neonatal deaths.

Huggett(1941) states that a progressive increase in average birth weight occurs with an increase in dietary protein.

Dieckman et al(1944) investigated the effects of certain mineral and vitamin supplements during pregnancy in 563 women. They found no significant effects of the factors that could be attributed to changes of diet.

#### EVIDENCE OF MALNUTRITION IN SOUTH AFRICA.

Cluver(1939) states that while the extent and degree of undernourishment in South Africa is not yet accurately known, there is no doubt that a serious nutritional problem does exist.

An enquiry undertaken by the Office of Census and Statistics showed that in white families with a definite income,those of the lower groups receive insufficient protective foods,being short in vitamins,calcium,with a bare minimum of protein.

This enquiry left untouched the large numbers of whites below this income group,which include all the so-called "poor whites", and the bulk of non-whites who would also fall much below the lowest income group studied. Probably the majority of non-whites and a large proportion of white children are undernourished because of inadequate supply of the protective foods such as milk, vegetables ,eggs,fruit,and meat. As a consequence of which

a population is produced which is physically unfit with a greater susceptibility to disease, indicated by a rapidly increasing demand in the Union of South Africa for hospitalization, mental deterioration etc.

Bearing in mind that undernutrition is an important factor in the predisposition to prematurity in childbirth, one cannot but not be surprised by its high incidence in our community, and possibly a contributory factor in the high incidence of preeclamptic toxæmia and essential hypertension of pregnancy.

Cluver puts the problem briefly in the supplying of protective foods to low paid white and non-white population. A high proportion of low paid workers are natives, coloured and a few whites, who live on cheap starch foods such as bread and South African mealie meal. These are the types of individual who are especially seen in the maternity departments of the University of Cape Town.

It would be interesting to note in future the effects of the recent introduction of "fortified" or reinforced bread with fish (Bremer bread) on the health of the general population.

The necessity for education of a population which in the main is very much below par cannot be too strongly stressed, and tribal customs and traditional foods thereby altered to maintain a healthy community. The preparation of essential foods and vitamins need be radically altered by these poorly educated peoples, so that destruction by overcooking of vegetables and other foods be eliminated.

Not unimportant in the education of the pregnant woman, or the populace as a whole is the control of chronic alcoholism, and over-indulgence in inferior wines which is so rife in the non-white.

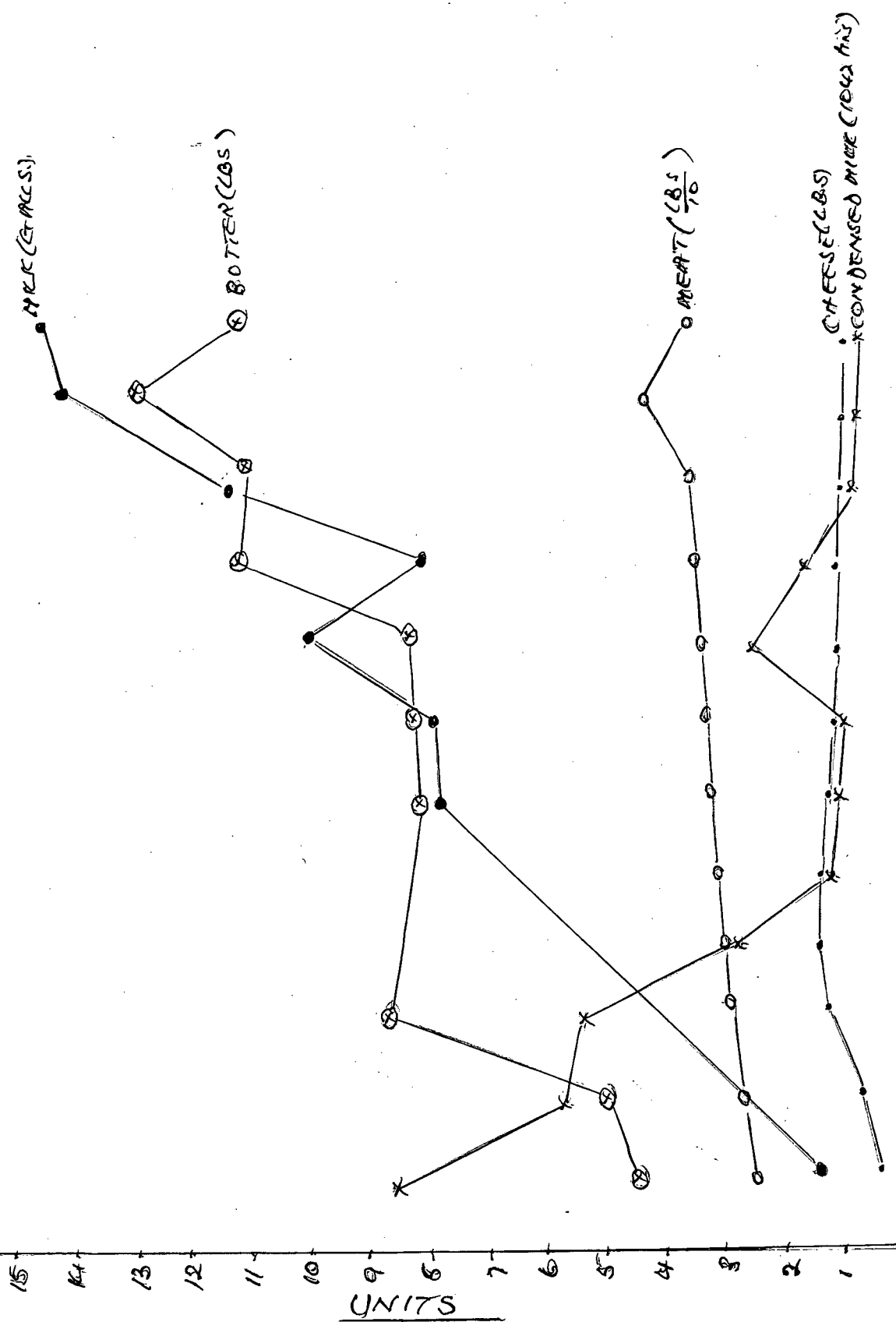
It behoves of an extensive educational propaganda in the use of cheap but important foodstuffs within easy reach of the poorest families, especially rich in mineral salts, vitamins A and D, and the promotion of free milk schemes among the general population,

**CONCLUSIONS.**

The results of experiments in diets among pregnant women show that some diversity is apparent in different countries. However it is the general concensus of opinion that a better diet in all its essentials has some benefits in lowering the incidence of prematurity, toxæmia of pregnancy, stillbirths and neonatal deaths.

It may be suggested that where the results differ, these women have always had a suboptimal nutrition and that they are unable, despite their supplements, to meet the requirements of pregnancy. Support of this may be sought in the study of social statistics.

Inadequate diets (especially in the underprivileged) cannot be dissociated from other hardships such as work, worry etc. which might operate before and during pregnancy.



125 150 200 250 300 350 400 450 500 550 600 650 (€)

CONSUMPTION OF DAIRY PRODUCTS AT VARIOUS

LEVELS OF INCOME (BUDGETARY INQUIRY, 1937)

(GRAPH 17)

COMPARISON OF MILK CONSUMPTION IN VARIOUS COUNTRIES.

(FAO, 2nd world food survey, 1952)

Available for consumption per capita (1948-49) in Gallons/annually.

Iceland	86	United Kingdom	47
Switzerland	76	Australia	44
Sweden	67	South Africa	30
U.S.A.	64	India	10
New Zealand	53	Japan	1

Table 77

It is evident that in a country such as South Africa, despite its wealth in natural resources, that an equal distribution of the essential foodstuffs necessary for the maintenance of adequate health in its indigent population is sadly lacking.

Taken by and large, it is only the poverty of the various social classes which magnifies the inadequacies in nourishment, and the incidence of maternal ill health as a consequence. However one stresses the appalling lack of education, and the tribal customs, as not insignificant factors in the lack of satisfactory good health.

Fox(1954) shows these inadequacies in essential foods by comparing the available foodstuffs per head of population in New Zealand, South Africa and India, from statistics compiled by the Food and Agricultural Organization(FAO) in Rome in 1952.

(Tables 77,78,79)

These figures compare the best fed country(New Zealand) with the worst(India) and South African figures. Provided they are all based on sufficiently accurate figures(based on FAO), such calculations do at least serve as an approximate measure of the adequacy of the food produced to meet individual requirements. They also serve to reveal differences in food resources and dietary patterns

as between one country and another.

The real nutritional problem for South Africa (Graph 17) as for many other countries is not so much whether we can increase the production of foodstuffs: this we can most certainly do, but whether for a freely reproducing population food production per person can be made to reach and then be maintained at the level required for good health.

The influence of income is best illustrated by the consumption of dairy produce (Graph 17) in the form of milk, butter and condensed milk, the poorer classes consuming the least expensive, i.e. the latter, to a greater extent than the former. However, meat and cheese is less affected. Tradition and other influences must be operating here, which could be explained by the sociologists. Consumption habits are difficult to eradicate.

**EVIDENCE OF INADEQUACY OF FOODSTUFFS AVAILABLE TO THE POPULATION****IN SOUTH AFRICA**

(Table 77a)

**(i) Food supplies available per head (at retail price) in Kilos. per year.**

	<u>New Zealand</u> (1935-39)	<u>New Zealand</u> (45-49)	<u>South Africa</u> (35-38)	<u>South Africa</u> (46-49)	<u>India</u> (34-38)	<u>India</u> (49-50)
(a) Cereals	87	90	156	153	143	119
Starchy foods	50	49	16	18	8	7
Pulses	3	3	3	4	22	20
Sugar	50	52	23	39	14	13
(b) Fats	17	15	3	4	3	3
Fruits	67	55	17	24	26	25
Vegetables	65	65	26	25	25	16
Meat	109	96	38	43	3	2
Eggs	13	13	2	2	0.4	0.1
(c) Milk	108	240	75	82	65	45
Fish	12	11	3	5	1	2

(a) In terms of flour and meal.

(b) Including butter.

(c) Excluding butter.

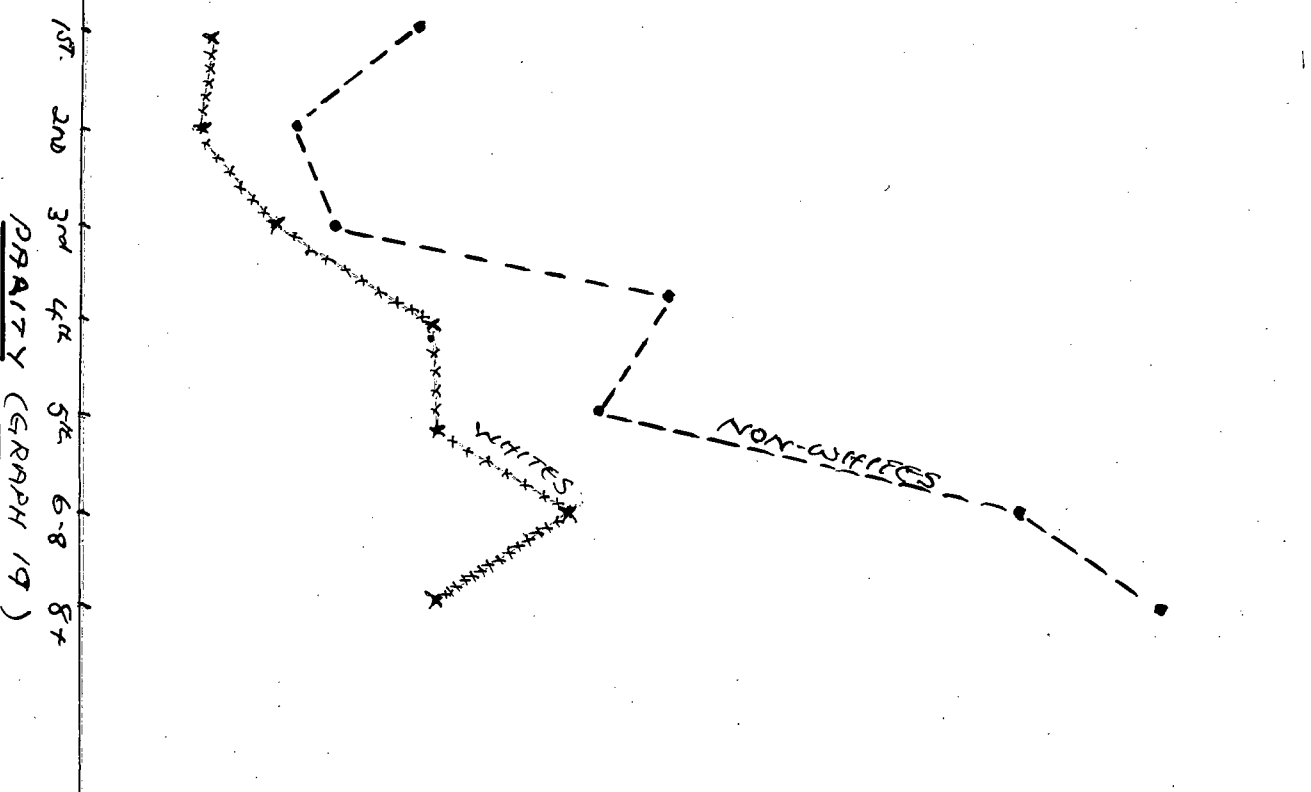
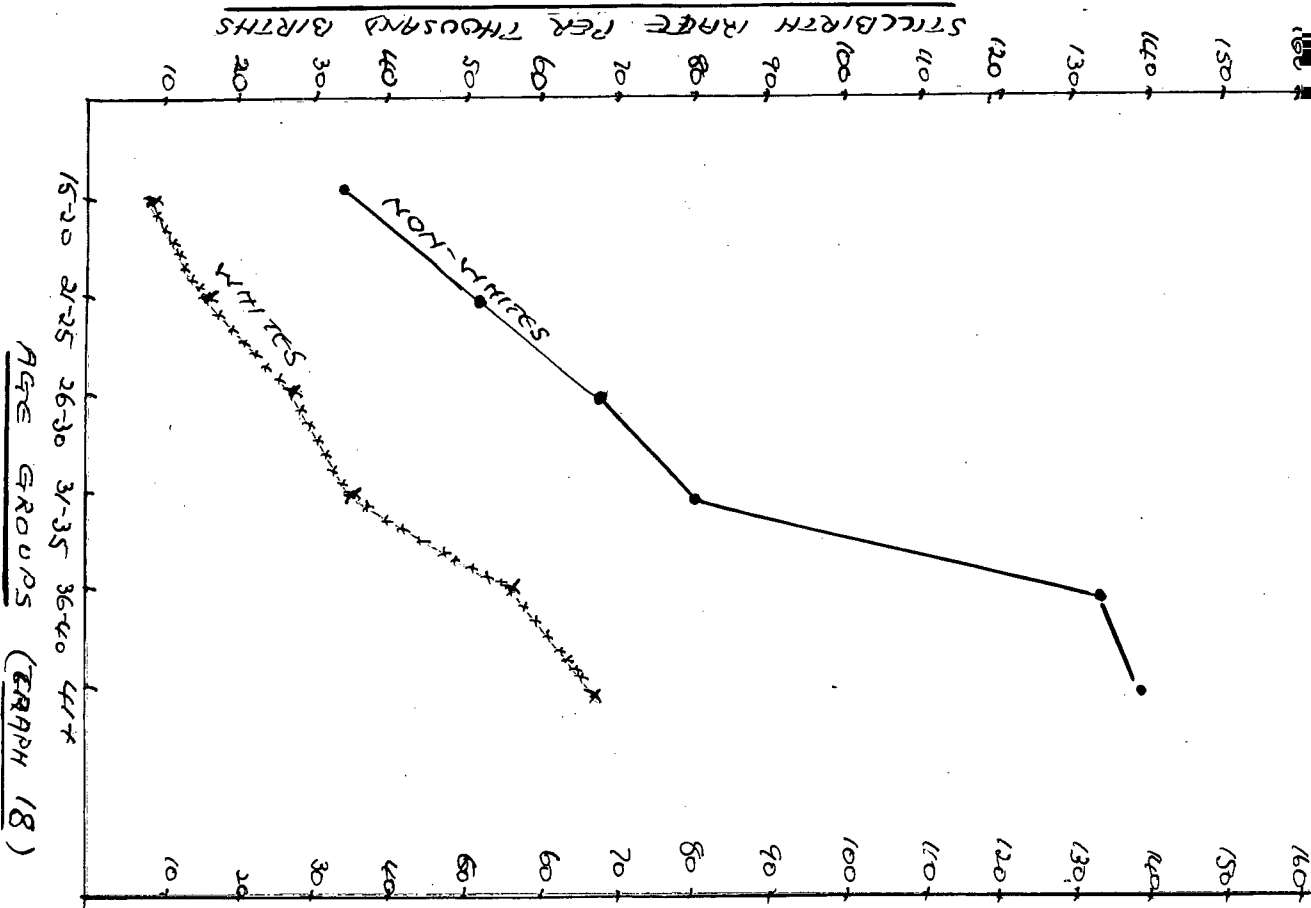
**(ii) Calorie and Protein Content of National Food Supplies (At retail level)****in Grammes per head per day.**

(Table 77b)

	<u>N.Z.</u> (35-39)	<u>N.Z.</u> (45-49)	<u>S.A.</u> (35-38)	<u>S.A.</u> (46-49)	<u>India</u> (34-38)	<u>India</u> (49-50)
CALORIES	3260	3250	2300	2520	1970	1700
Total protein	96	96	68	73	56	44
Animal protein	64	65	24	27	8	6
Pulse protein	1	1	1	2	12	10
Estimated calories requirement.		2670		2400		2250

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STILLBIRTHS ACCORDING TO AGE AND PARITY OF THE MOTHER.

Sutherland(1949) maintained that it was convenient to regard the age of the mother and her parity together since a woman's parity was not independent of her age.

He found that when the stillbirth rate of all parties were grouped together, the stillbirth rate was constant at 26 per thousand total births for mothers up to the age of 25 years, but for older mothers the rate increases more and more rapidly. For mothers aged 45 years and more the rate was 94.

When mothers were classified according to parity there was an appreciable decline between the rates of the first, which Sutherland found to be 39, and the second which was found to be 24. The rate thereafter increases with parity. To mothers with 10 or more previous children it is as high as 73.

Sutherland quoted stillbirths from England and Wales for the years 1938 to 1940 according to parity and age as follows:-

<u>PARITY</u>	0	1	2	3	4	5	6	7	8	9	10
<u>RATES</u>	38.9	24.0	29.5	35.8	42.6	46.1	49.3	53.7	60.7	62.5	73.4

The increase in stillbirth rate with age of the mother was characteristic of each parity group.

There was a marked decline between the rates of the first and second child. For the third and subsequent children born to mothers of the same age, the rate shows a tendency to rise again but not as high as the first. Exceptions to the general picture occur in cases of mothers with unusually large families for their age when the stillbirth rates are excessive.

Ansell(1874) analysed 48843 births for life insurance purposes in families of the upper and professional classes. He found the same results as Sutherland, namely that primipara have the higher stillbirth rate than multipara, and that the rates for both increase after the age of 25 years. His results briefly tabulated were as follows:-

<u>0</u>	<u>1</u>	<u>2</u>	<u>3-5</u>	<u>6 and over</u>
40.2	20.0	15.5	17.4	20.8

In births to mothers aged 20 years, the incidence of premature babies was 5.3% increasing to 18.5% in the age group 40-44 years.

Ansell concluded that from his studies it seems possible that age and parity variations in the stillbirth rate are bound up to some extent with similar variations in premature rate.

the large number of stillborn eldest children. The proportion of dead to living births in that class was more than double the average class.

Rochester(1923) and Fraser(1928) from the U.S.A. and New Zealand respectively agree with Ansell's findings.

Yerushalmy(1938) stated that the same factors apply to neonatal deaths based on 82140 live births and the picture very similar to that of stillbirths.

Burns(1942) in an analysis of stillbirths according to ages of the mother, in 165000 live and stillbirths found that pre-eclamptic toxæmia(including essential hypertension), difficult labours and illdefined and unknown causes of loss of life all had more stillbirths among first babies than among later births. For foetal defects and general diseases of the mother there was no difference. He also found stillbirths more frequent among multipara.

Feeney(1953) analysing 4115 deliveries in Ireland found the loss among grand multipara to be double that of other mothers. The foetal mortality in these women was 12.6%.

Feeney also states that the health of the grand multipara suffers as a consequence of unemployment of the husband, high cost of essential foodstuffs, faulty diets, defective constitutional development, with a high incidence of abnormal labour.

Woodbury(1925) in a paper on the causal factors in infant mortality in the U.S.A. analysed 23000 records of infants born in 8 cities. A larger proportion of premature births occurred in younger than among older mothers. He gives figures of 8.6% for mothers under 20 years of age, decreasing to 4.1% at 35-39 years, and then 4.8% in 40 years and over.

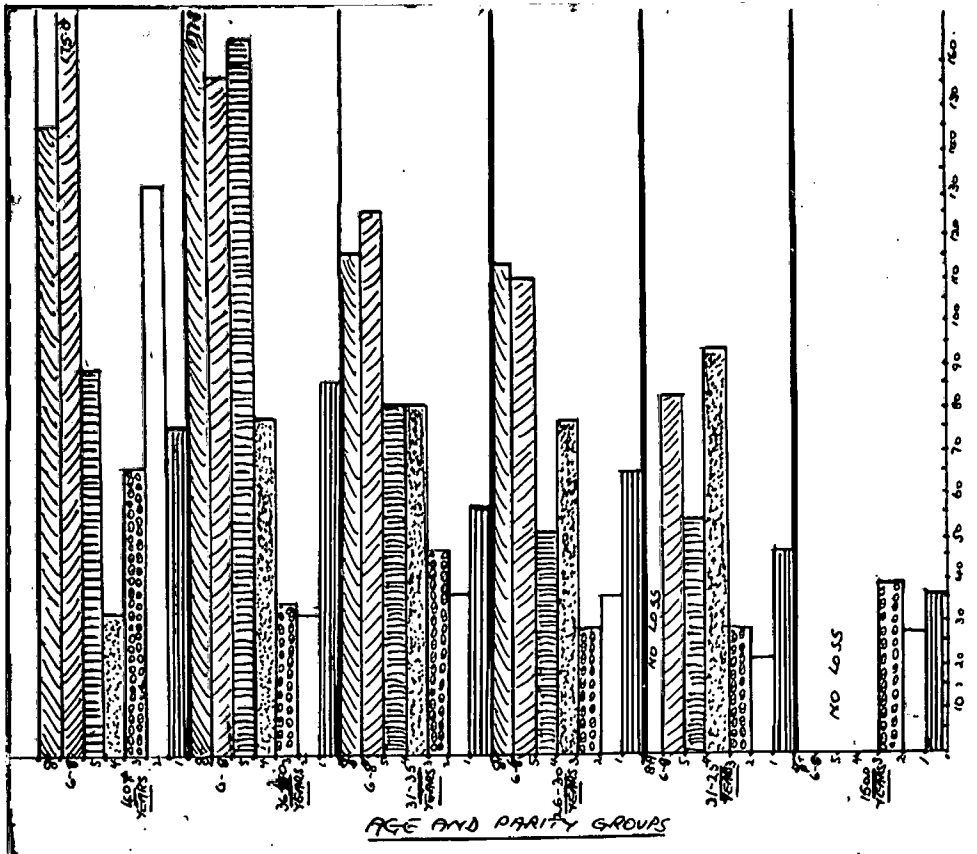
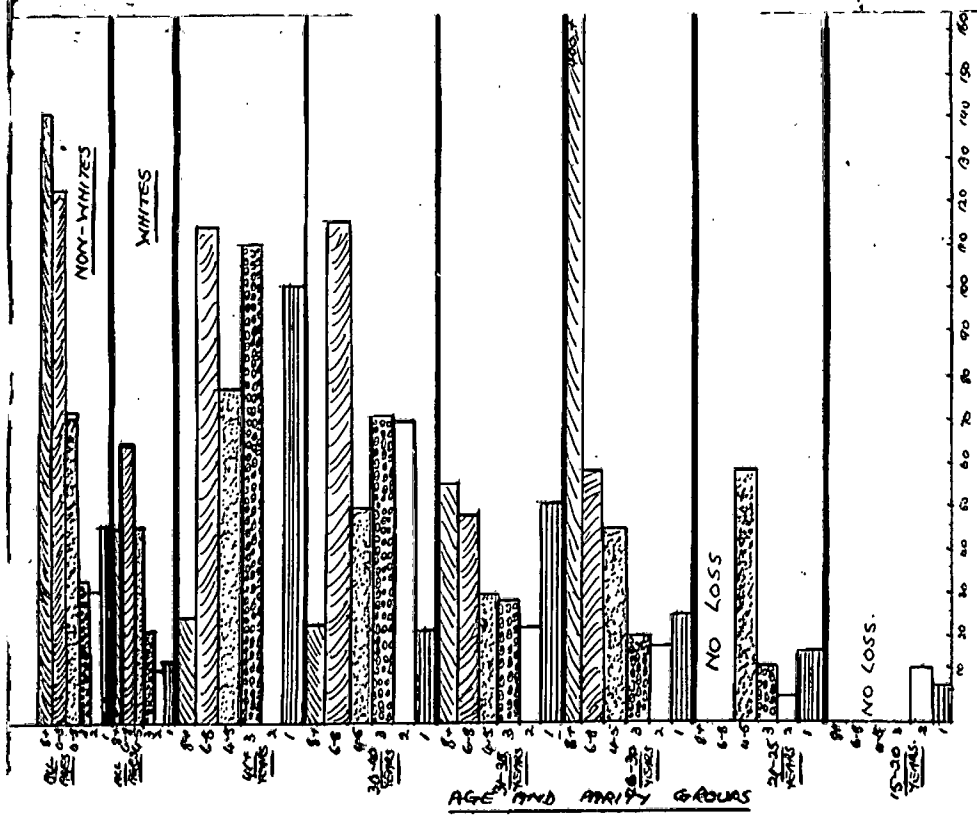
Anderson, Browne and Lyon(1943) found the highest proportion of stillbirths between the ages of 15-19 years.

Nørregaard(1953) reported that more mothers under 20 years have premature births, and also a high number when over 40 years.

Peckham(1938) in an analysis of 3578 premature babies out of a total of 38844 live births, maintained that there was possibly an increase of premature babies after the age of 35 years, and there was a higher incidence of prematurity in primipara than multipara. Of infants premature by weight, 44.6% were born to primipara compared with 35.9% of 1st births in a general series.

Crosse(1952) studied 924 premature births between 1931 and 1943, and failed to confirm Peckham's findings. She reported that 64.8% of premature births occurred in primipara with a general incidence of 66.3%.

Drillien(1947) in a discussion on 4659 single births found a definite trend in premature rates with increase in age of the mother.



(GRAPH 20a) STILLBIRTH RATES PER THOUSAND TOTAL BIRTHS  
 IN WHITE MOTHERS. (1957-58)  
 (WITH A COMPARISON IN NON-WHITES OF ALL AGES)

(GRAPH 20a) STILLBIRTH RATES PER THOUSAND TOTAL BIRTHS  
 (IN NON-WHITES) (1953-55)

MATERIAL

The case histories of 18101 non-whites delivered in our non-white units at the Groote Schuur Hospital, Peninsula Maternity Home, Somerset Hospital and St. Monica's Home were investigated, for the years 1952-55 inclusive.

In addition, from the Howbray Maternity Hospital and Peninsula Maternity Home the case notes of 5678 white patients were analysed for the above period of time.

It was unfortunately found that many case folders were not available, or incomplete for the purpose of this study.

Tables 78a and 78b briefly summarize the results obtained. A graphical picture of these results are also produced to show the variation in stillbirth rates in the racial groups.

STILLBIRTH RATES ACCORDING TO THE AGE OF THE MOTHER.

From the graphs and tables produced it will be noted that the lowest stillbirth rates in both racial groups according to age occurred in the young primipara. Thereafter there was a steady increase in mortality with the heaviest losses following the birth at the ages of 36 years and over.

IN NON-WHITES.

(Table 79a)

<u>AGE OF MOTHER</u>	<u>15-20</u>	<u>21-25</u>	<u>26-30</u>	<u>31-35</u>	<u>36-40</u>	<u>41+</u>
<u>STILLBIRTH RATES</u>						
<u>PER THOUSAND BIRTHS</u>	33.7	50.2	63.0	79.9	132.6	138.3

The increasing stillbirth rates with age is apparent from the above table, with a considerable increase after the age of 35 years, when more than 4 times the rate occurred as in the younger primipara.

PARITY.	1st	2nd	3rd	4-5th	6-8th	8+	TOTAL
AGE No.	3803	735	134	47	0	0	4719
18-20 S.B.'s	134	19	5	1	0	0	159
S.B.Rate/1000	35.2	25.8	37.3	21.2	0	0	33.7
21-25 No.	4009	1232	546	519	95	9	5410
S.B.'s	181	26	15	42	8	0	272
S.B.Rate	45.1	21.0	27.4	80.9	84.2	0	50.2
26-30 No.	1353	526	438	672	395	70	3459
S.B.'s	89	19	13	45	44	8	218
S.B.Rate	65.7	36.1	29.8	66.9	111.3	114.2	63.0
31-35 No.	384	129	185	420	333	319	1770
S.B.'s	22	5	9	28	42	36	140
S.B.Rate	57.3	38.9	48.6	61.9	126.1	112.8	79.9
36-40 No.	93	90	82	172	315	326	1078
S.B.'s	8	3	3	21	50	58	143
S.B.Rate	86.0	33.3	36.5	122.0	158.7	177.8	132.6
41+ No.	38	15	30	62	120	400	665
S.B.'s	3	2	2	4	21	59	91
S.B.Rate	78.7	133.2	66.0	64.5	175.0	147.5	138.3
ALL AGES No.	9880	2222	1415	1902	1258	1124	18101
S.B.'s	437	74	47	139	165	161	1023
S.B.Rate	44.9	28.2	33.3	72.0	123.3	143.2	84.5

STILLBIRTHS.

FORTAL LOSSES IN RELATION TO AGE AND PARITY OF THE MOTHER (U.C.F. 1952-55) . (TABLE 57 a)-  
(NON-WHITES)

	PARITY	1st	2nd	3rd	4th-5th	6-8th	8+	TOTAL
AGE No.		890	164	14	1	2	0	1071
15-20 S.B.'s		7	2	0	0	0	0	9
S.B.Rate/1000		7.8	12.2	0	0	0	0	8.4
21-25 No.		1000	526	348	103	6	0	1983
S.B.'s		16	3	5	6	0	0	30
S.B.Rate		16.0	5.7	14.3	58.2	0	0	15.1
26-30 No.		364	320	307	235	69	5	1300
S.B.'s		9	4	6	10	4	2	35
S.B.Rate		24.7	12.5	19.5	44.5	57.9	400.0	26.9
31-35 No.		122	174	168	199	92	18	772
S.B.'s		6	4	5	6	4	1	26
S.B.Rate		49.9	22.9	29.7	30.0	43.4	55.5	33.1
36-40 No.		44	57	42	103	88	44	378
S.B.'s		1	4	3	5	7	1	21
S.B.Rate		22.7	70.5	71.4	48.5	79.5	22.7	55.1
41+ No.		10	27	18	42	35	42	174
S.B.'s		1	0	2	4	4	1	12
S.B.Rate		100.0	0	111.1	78.9	114.2	23.8	67.4
All ages No.		8429	1288	897	683	292	109	5678
S.B.'s		40	17	21	31	19	5	133
S.B.Rate		16.4	15.9	23.4	45.3	64.7	45.8	23.4

STILLBIRTHS. Fortal losses in relation to age and parity of the mother. (U.C.F. 1952-55)  
(TABLE 77b) (WHITES)

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Graph 18 is very revealing in this marked increase in stillbirth rate with aging of the mother.

IN WHITE MOTHERS.

(Table 79b)

<u>AGE OF MOTHER</u>	<u>15-20</u>	<u>21-25</u>	<u>26-30</u>	<u>31-35</u>	<u>36-40</u>	<u>41+</u>
<u>STILLBIRTH RATES</u>						
<u>PER THOUSAND BIRTHS</u>	8.4	15.1	26.9	33.6	55.5	67.8

It was again apparent that the stillbirth losses sustained increased with the older the mother becomes in relation to child-birth, again the greatest losses occurring after the age of 35 years.

Graph 18 again demonstrates the above point still further.

A comparison of stillbirth rates in relation to age of the mother in the 2 racial groups shows a much higher stillbirth rate in each of the age groups in the non-white.

Apart from poorer socio-economic circumstances in the non-white and associated poorer general health, the part played by inferior antenatal care in the non-white appears to be a potent factor in this great divergence in rates in the ratio of 4 : 1.

Similarly in the other age groups, but especially in the age groups after 35 years of age, the non-white stillbirth rates were more than double that occurring in the white mother.

The majority of stillbirths occurring in whites followed the hazards of labour, such as breech and forceps extraction in primiparous women up to the age of 35 years. Antepartum haemorrhage and maceration of the foetus for no apparent reason were the next most common. Syphilis as a cause of death was noted.

In non-white primiparous women, it was significant that syphilis as a cause of stillbirth was most frequently found in young women from the ages of 15-25. Of 32 stillbirths due to syphilis 25 occurred in this age group, and all occurred in patients without antenatal supervision.

Prolonged and obstructed labour, preeclamptic toxæmia and essential hypertension, and accidental hæmorrhage were the most important contributors to the cause of stillbirth in non-white primiparous patients. In the majority of instances autopsy examination was not performed in these cases because of circumstances beyond our control, and the pathological cause of death was not accurately confirmed. Together with the large numbers of premature babies born in primiparous patients and which were stillborn or dead at birth for no certain cause, the bulk of deaths in this parity group could be designated therefore as unknown cause.

In the older multiparous woman in non-whites preeclamptic toxæmia and essential hypertension played an important part in the causation of stillbirth, often with maceration of the foetus, especially in the Groote Schuur Hospital Unit where the majority of these patients were admitted. Prematurity was very common in the age groups over the age of 35 years, and the majority of these small babies were dead at birth for no apparent reason because autopsy examination was so seldom carried out.

Obstructed labour due to malposition of the foetus was most frequent in the older multipara, necessitating intrauterine manipulations such as internal version and breech extraction. Ruptured uteri was hence most commonly found in this parity group.

Antepartum hæmorrhage, especially accidental hæmorrhage, was frequently found in the latter and accounted for a large percentage of premature stillbirths.

In white patients in the age group over 35 years, with 6 or more babies, antepartum hæmorrhage and maceration of the foetus were the most frequent factors in the causation of stillbirth. Obstructed labour was infrequent in these patients compared with non-whites.

In the intermediate age parity groups multiple pregnancy was

most frequent in non-whites especially in 2nd, 3rd, 4th and 5th parae. Premature birth was hence common in this group, in association too with frequent occurrence of antepartum haemorrhage with and without P.E.T.

Abnormal labour was least common in this parity group, especially in 2nd and 3rd parae.

Again "unknown causes" of stillbirth, because of non-confirmation by postmortem was the most important in this category, often in association with preeclampsia.

Malformation of the foetus was more commonly noted in white patients as a cause of stillbirth, the vast majority occurring in multiparous women. In non-whites stillbirths due to malformation was also found more frequently in multiparae, and more than 3 times less commonly than in whites.

It can be concluded that the causes of stillbirths in non-whites according to age and parity was to be found most frequently in the primiparous patient, and in the mother over the age of 35 years with 6 or more pregnancies, the majority of whom had no antenatal care.

In the majority of instances the cause for stillbirth on pathological basis was not determined, because postmortem was performed too infrequently (in only 18.4% of cases).

Premature birth associated with P.E.T., antepartum haemorrhage, multiple pregnancy and for "no known cause" no doubt played an important part in the causation of stillbirth, 500 or 40.6% of which occurred in our units during 1952-55, especially in multiparae.

In white patients most of the stillbirths occurring during 1952-55 were noted in multiparous women older than 35 years, in whom preeclampsia was frequent, and in whom antepartum haemorrhage and maceration of the infant was most common. Premature birth was an important factor in the causation of stillbirth in this parity group.

UNITS.	PARITY	1st	2nd	3rd	4-5th	6-8th	8+	TOTAL
TOTAL	S.B.Rate	44.9	28.2	33.2	73.0	123.3	143.2	56.5
P.M.H.	S.B.Rate	41.1	33.8	22.9	94.7	159.0	187.5	59.5
N.S.H.	S.B.Rate	40.9	23.1	36.6	86.8	154.8	137.1	52.9
St.M.	S.B.Rate	30.5	17.4	26.3	34.7	103.5	149.2	37.9
G.S.H.	S.B.Rate	64.8	57.0	19.7	72.9	99.6	130.9	71.6

STILLBIRTH RATES IN RELATION TO PARITY IN NON-WHITES (1952-55). (Table 82)

UNIT	PARITY	1st	2nd	3rd	4-5th	6-8th	8th	TOTAL
M.M.H.	S.B.Rate	13.8	12.5	21.1	40.2	65.7	24.4	19.1
P.M.H.	S.B.Rate	25.6	15.3	36.2	58.2	64.1	68.9	34.5
TOTAL	S.B.Rate	16.4	15.9	23.4	45.3	64.7	45.8	23.4

STILLBIRTH RATES IN RELATION TO PARITY IN WHITE MOTHERS (1952-55) (Table 83)

UNIT	AGE	15-20	21-25	26-30	31-35	36-40	41+	ALL AGES
<u>NON-WHITES</u>								
P.M.H.	S.B.Rate	21.2	40.0	78.4	99.6	150.7	144.5	59.5
N.S.H.	S.B.Rate	29.7	38.7	67.5	85.7	193.7	191.3	52.9
St.M.	S.B.Rate	21.2	25.1	46.2	60.9	131.3	100.0	37.9
G.S.H.	S.B.Rate	58.6	51.1	65.9	80.7	107.4	101.8	71.6
<u>WHITES</u>								
M.M.H.	S.B.Rate	7.8	13.0	19.9	26.2	47.6	70.8	19.1
P.M.H.	S.B.Rate	10.8	22.5	42.6	50.7	68.0	65.5	34.5

STILLBIRTH RATES IN RELATION TO AGE OF THE MOTHER (1952-55) (Table 84)

(WHITES AND NON-WHITES)

STILLBIRTH RATES ACCORDING TO PARITY OF THE MOTHER. (Non-whites)

(Graphs 19 &amp; 20)

<u>PARITY</u>	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4-5th</u>	<u>6-8th</u>	<u>8+</u>
<u>STILLBIRTH</u>						
<u>RATES/1000.</u>	44.9	28.2	33.3	73.0	123.3	143.2

A pattern of stillbirth rates according to increasing parity similar to that described by other authors was discovered, with however markedly higher rates for the respective parity groups.

The higher stillbirth rate in the primipara compared with 2nd and 3rd para is in keeping with the findings of other authors. The big jump in rate in 4-5th parae, and then a more considerable increase in mothers in the 6-8th parity group, and those who had had more than 8 babies was significant.

In our non-whites there were more primiparous patients than multiparae. In white mothers there were more multiparae than primiparae. ( See Tables 77a & b ).

STILLBIRTH RATES ACCORDING TO PARITY OF THE MOTHER (Whites)

(Graphs 19 &amp; 20)

<u>PARITY</u>	<u>1st</u>	<u>2nd</u>	<u>3rd</u>	<u>4-5th</u>	<u>6-8th</u>	<u>8+</u>
<u>STILLBIRTH</u>						
<u>RATES/1000.</u>	16.4	15.9	23.4	45.3	64.7	45.8

A similar pattern of stillbirth rates in relation to the parity of the mother in non-whites and whites was found. There was however a much greater loss in each parity group in non-whites as whites.

**STILLBIRTH RATES IN RELATION TO ANTENATAL CARE.**

The greater incidence of patients with inadequate antenatal care, apart from socio-economic influences, in the non-white (12.2% compared with 20.4%) especially in the higher parity and older patient groups will I think account for the higher still-birth rates in these groups in both white and non-whites, especially the latter. In this group there was a much greater loss in the non-white because of the large numbers of patients without adequate antenatal supervision. This was mainly because of insufficient accommodation in our non-white institutions.

The stillbirth rates in relation to age and parity in our obstetric units according to antenatal attendances are reflected in the figures presented. (Tables 82,83,84).

One must however not lose sight of the fact that socio-economic conditions worsen in the older mother with many children, and often with an unemployed husband, because she has to provide for a much larger family and is frequently suffering from ill health, resulting in a higher incidence of abnormal labour than that of the younger woman with a smaller family.

SUMMARY"STILLBIRTH RATES ACCORDING TO AGE AND PARITY  
OF THE MOTHER"

The findings in our units for the years 1952-55 of stillbirth rates in relation to age and parity of the mother are in keeping, on the whole, with other authors.

Altogether 23,779 deliveries were investigated, 18,101 of which occurred in non-whites and 5678 in white women.

Stillbirth rates in relation to age in both races revealed that in the young mother in the age group 15-20 years the smallest losses occurred. In whites of this age group the rate was only 8.4 per thousand in our units at Howbray Maternity Home and Peninsula Maternity Home, whereas in non-whites the rate was 33.7 at Groote Schuur, Peninsula M.H., St. Monica's Home and New Somerset Hospital.

Thereafter there is a definite increase in stillbirth rates with increasing age until the age of 36 years and over, when a 4 times greater rate occurred as in young primiparae in non-whites and an almost 8 times greater rate in whites.

Stillbirth rates in relation to parity of the mother similarly showed that in 1st para the lowest occurred, with a diminution in 2nd and 3rd para, followed by a rapid increase with the 4-5th parity, and a startling accentuation of losses in 6-8th parae and in women bearing more than 8 children. Non-whites however suffered more severely than whites in each parity and age group, when stillbirth rates were 2-3 times greater in each parity group.

Because of inadequate data in relation to the cause of stillbirth due to the small numbers of postmortems performed in non-whites, there was merely a clinical diagnosis offered.

Unknown causes of stillbirth was the most common diagnosis in which were included deaths for no apparent reason, deaths associated

with maternal causes such as P.E.T., antepartum haemorrhage, and those associated with the hazards of labour.

Prematurity due to the above causes was a prominent factor in resulting 500 stillbirths in this series (or 40.6% of all our stillbirths), occurring most frequently in multiparae.

In primiparae in non-whites "unknown causes" of stillbirth figured most prominently, followed by stillbirths associated with the hazards of labour, and accidental haemorrhage. Premature birth in this parity group was frequently found as a factor in the causation of stillbirth.

In the older parity groups after the birth of the 5th baby again "unknown causes" of death was most prominent, often associated with premature birth, with or without the birth of macerated infants.

Antepartum haemorrhage (especially accidental haemorrhage, but now also placenta praevia) figured more prominently in this age group. Abnormal labour due to foetal malposition, associated with more frequent intrauterine manipulations, occurred in this older group and it was here that rupture of the uterus was most frequently found.

Preeclampsia, essential hypertension and rarely chronic nephritis affected most commonly the older parity and younger parity groups, although a generous sprinkling occurred in all parities.

In relation to antenatal supervision it was noted that in all parity groups in non-whites the stillbirth rates were higher, particularly when there was inadequate antenatal care.

Hence at Groote Schuur Hospital where the majority of patients admitted were "non-booked", stillbirths rates were higher in all parities than at St. Monica's Home, where only about 10% of patients were "non-booked". It should however be emphasized that the former unit admitted in the main only patients with the medical complications of pregnancy such as P.E.T., diabetes, heart disease and the like. Similarly greater stillbirth rates in the parity groups occurred at the Peninsula Maternity Hospital and Somerset Hospital where a larger

number of "non-booked" patients were admitted.

It should also be noted that 25 of the 32 stillbirths occurring as a result of syphilis occurred in young "non-booked" primiparae in the 15-25 year group.

PREMATURITYTHE EFFECTS OF EMPLOYMENT DURING PREGNANCYThe effects of work outside the home.

Sarraute-Laourie(1899) in a thesis on the effects of rest on the duration of pregnancy found that rest in hospital and living comfortably during the last few weeks of pregnancy resulted in prolongation of pregnancy by 20 days or more. When however the pregnant mother entered hospital shortly before delivery the premature birth rate was higher.

It has similarly been noted by authorities writing on the subject of postmaturity, that prolonged rest in bed, at home or in hospital, for such conditions as P.E.F., cardiac conditions, and even multiple pregnancy, will not infrequently prolong a pregnancy which might have terminated, spontaneously or by induction, earlier in the absence of such rest.

Raiha(1947) in a paper on the incidence of premature births reported the following in a series of 36,919 deliveries:-

<u>OCCUPATION</u>	<u>INCIDENCE OF PREMATURITY</u> (Table 85)
Housewives at home	5.1%
Housewives with outside work	14.0%
Unmarried women	15.7%

Rochester(1923) showed that the more severe the work particularly in the last 3 months of pregnancy, the higher the prematurity and stillbirth rates.

<u>EMPLOYMENT</u>	<u>STILLBIRTHS</u>	(Table 86)
Nil	29.5/1000	
Work at home	40.0/1000	
Work away from home	66.8/1000	

Balfour(1938) on the other hand reported that as far as stillbirths were concerned, there was no definite difference in the occupation of the mother doing weaving in Lancashire and Yorkshire.

McNeil(1942) showed that in Scotland and England the still-birth rate was higher than in Holland, because of the greater work outside the home.

Burns(1942) reported a definite trend in socio-economic status and prematurity and stillbirths.

Titmus(1943) similarly found a definite relationship between earning capacity, prematurity and stillbirth loss.

Baird(1945) in an analysis of 10,728 women of all classes of obstetric practice according to social status, concluded that prematurity rates were twice as high in hospital patients as those of private practice. He emphasized that the contrast in rates of stillbirths must be due to the greater differences in physical health and diets of the mothers.

Baird and Wyper(1941) divided patients into 5 socio-economic groups and found that stillbirth rates increased with each group dependent on status viz. 24.4; 33.4; 35.6; 37.6; 39.7 per thousand total births. In private practice the rate was 12/1000 compared with hospital booked practice of 54.6 and 78.5 in domiciliary practice. The explanation given for this variation was a combination of better economics, better nursing and medical care.

In a study of specialist hospital cases he demonstrated the marked effect of obstetrical skill on the stillbirth rate among women of the upper income group and a much slighter effect among the poorer strata of life. Hence the conclusion of the effects of better physical state and health and diet of the mothers was emphasized.

Sutherland(1949) analysed premature birth rates in 3 groups of

salary workers in London and reported as follows:-

Table 87

In wives of salaried and professional workers	4.3%
In wives of black coated workers	6.5%
In wives of wage earners	9.7%

Dundesen, Potter, Bauer and Fishbein(1951) took 5 areas in a big city such as Chicago and compared the prematurity and stillbirth rates in the poorest and lowest class with the highest class. In the former the premature birth rate was 96.8/1000 live births and the latter 73.1. Among the Negroes this rate was the highest, and stillbirth and neonatal death rates followed similar patterns.

Sutherland concluded in his survey of stillbirths that when allowance was made for biologic factors, the prematurity and stillbirth rates showed definite association with the percentage of poorly paid workers and of unemployed, but not with overcrowding.

CONCLUSIONS. Although it would be difficult to separate the effects of work during pregnancy and their social status, it is significant that in the lower income groups dependent on their own housework and work outside the home, the prematurity and stillbirth rates are higher than in the upper social classes.

PREMATURITY IN RELATIONSHIP TO THE EARNINGS OF THE HUSBAND

It is a well known fact that where the income of the family is low, the premature birth rate and foetal loss is greater, that is the degree of poverty in the home is in direct relation to the foetal mortality.

Rochester(1923) analysed 11,195 births in 1915 and showed the following rate of stillbirths:-

<u>Annual Earnings</u>	<u>Total Births</u>	<u>S.D.Rate/1000</u> (Table 88)
None	222	67.6
Under \$450	1615	40.0
\$450-849	2490	29.3
\$1250-1849	810	24.7
\$1850 and over	448	37.9

Rietz(1930) reported on the stillbirth loss from fathers' income in Stockholm for the years 1918 and 1922.

<u>Income</u>	<u>Live Births</u>	<u>S.D.Rates/1000</u> (Table 89) <u>Livebirths</u>
Under 4000Kr.	5314	17.5
4000-6000Kr.	6878	15.8
6000-10000Kr.	2880	13.0
Over 10000Kr.	2784	8.8

In our units of the University of Cape Town there were 2 main classes of patient according to the annual incomes earned. No provision is made for the private patient(white or non-white) in our units in whom the income was far and beyond that of the former 2 classes of woman. The average salaries in hospital patients are

analysed according to the standard for the years 1952 to 1955.

<u>SALARY/ANNUAL(£)</u>	<u>SOCIAL GROUP</u>	<u>PREM. RATE</u>	<u>S.D. RATE/1000</u> (Table 90)
0 - 120(Non-whites)	1	14.8	49.9
120-less than 720 (mainly whites)	2	7.4	23.8

The majority of non-whites delivered in our institutions fall into the social group 1, and who were very poor coloured and natives. These undernourished women more often than not lived "below the breadline" under conditions of abject poverty and squalor, with chronic ill health and subject to the ravages of venereal disease and tuberculosis.

Very many of the husbands of these patients were unemployed, and despite this fact were very prolific in childbearing, mainly because of lack of education.

Only 40% of these women were able to gain admission to hospital for their confinements because of the lack of accommodation. Although antenatal care was available to these non-whites, a large number did not avail themselves of the use of the antenatal clinics in our units or the municipality.

In the social group 2, are grouped the mothers delivered in our white units(Howbray Maternity Hospital and Peninsula Maternity Hospital). The salary earned varied considerably in the type of patient admitted. The "ceiling" of £720 was chosen because above that level "medical aid" was often sought from membership of the various "Medical Aid Societies" in Cape Town. Such a patient was "able to afford" more often than not confinement in a private maternity hospital.

Antenatal care in social group 2 was often much more adequate than in group 1 because of the greater availability of accommodation for supervision of such complications as preeclampsia, essential hypertension, multiple pregnancy etc.

The incidence of chronic ill health, and infection due to venereal disease was very much less frequent than in our non-whites.

As reflected in loss of life of the foetus, the stillbirth rate was almost  $\frac{1}{2}$  that occurring in our non-whites.

Prematurity rates in whites were also  $\frac{1}{2}$  that occurring in non-whites.

Of further interest is the stillbirth rate found in "private patients" delivered at a maternity hospital in Cape Town (The Booth Memorial Home) where the average salary earned by the family (usually the husband) was twice or more of that of the patient delivered in our white units. The stillbirth rate at this institution during 1952-55 was noted as 13.1 per thousand, with a prematurity rate of only 2.55.

Antenatal care of patients confined at the above "home" was usually highly adequate, and conducted mainly by general practitioners and specialists, attention by whom the patient could "afford".

It was thus obvious that the greater the earning capacity of the family (especially the husband) the lower the stillbirth losses, and the lower the prematurity rates.

CONCLUSIONS. The income of the husband (and therefore the family in most cases) is not independent of the prematurity rate, stillbirth rate, and usually the early neonatal death rate. One cannot however divorce the element of work entirely from the picture of nutritional deficiency.

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THE INFLUENCE OF THE AGE OF THE FATHER ON FOETAL MORTALITY.

Yerushalmy(1938a) drew attention to the interesting phenomenon which emerged from the data on neonatal deaths.

When the age of the mother was held constant, the variation of neonatal mortality with age of the father was very marked.

It started high for very young fathers, dropped to a minimum and rose thereafter with age of the father. The picture of first births only was similar, indicating that the effect was independent of parity.

Yerushalmy(1939) after analysing 400,000 stillbirths and 10 million livebirths recorded in the U.S.A. from 1931-35, showed variations in stillbirth rate both for male and female births similar to those described for neonatal mortality.

A similar report from the vital statistics for New Zealand for the years 1934-1941, on 6156 stillbirths and 213,686 livebirths shows the usual rapid increase in stillbirths with age of the mother. This is characteristic of each age group of father as well as for the totals. In all ages of the mother, the stillbirth rate drops to a minimum for fathers aged 21-24 and thereafter increases steadily with age of the father, though not as rapidly as with the age of the mother.

SUMMARY. This analysis shows that there is no evidence that the age of the father is connected with the stillbirth rate, save when the father is under 21 years and the mother under 20 years.

RACE	1951 - 1952		1952 - 1953		1953 - 1954		1954 - 1955		RATE OF NATURAL INCREASE (per 1000 population)			
	LIVE BIRTHS	BIRTH RATE	LIVE BIRTH	BIRTH RATE	LIVE BIRTH	BIRTH RATE	LIVE BIRTH	BIRTH RATE	1951 -2	1952 -3	1953 -4	1954 -5
WHITES.	4538	24.35	4702	24.53	4659	24.61	4670	24.51	8.39*	9.04*	8.86*	8.47*
NON - WHITES 1. COLOURED	8818	45.87	10060	44.29	10015	42.96	10240	41.99	27.17	27.18	26.21	26.25
2. NATIVE.	1009	47.05	1609	49.89	1649	48.94	1607	44.77	12.86	18.17	17.60	17.24
3. ASIATIC.	365	54.07	322	45.06	378	52.86	354	48.49	44.72	35.12	43.91	37.80
TOTAL. 4. NON-WHITES.	10192	46.24	11991	44.99	12042	43.95	12201	42.51	26.94*	26.30*	25.61*	25.43*
ALL RACES.	16603	36.25	16694	36.43	16711	36.07	16883	35.35	18.43	19.08	18.77	18.66

BIRTHRATE AND RATE OF NATURAL INCREASE OF POPULATION OF

CITY OF CAPE TOWN (UNCORRECTED) IN WHITES AND NON-WHITES.

(TABLE 92)

YEAR.	LEGITIMATE BIRTHS	STILL BIRTHS	WHITES.		TOTAL BIRTHS
			ILLEGITIMATE BIRTHS	STILL BIRTHS	
1952	4378	70 (1.6%)	160	3 (1.8%)	4538
1953	3563	64 (1.7%)	139	11 (7.9%)	4702
1954	4478	69 (1.5%)	181	5 (2.7%)	4659
1955	3267	51 (1.8%)	89	1 (1.1%)	3356
TOTAL.	15686 (96.7%)	264 (1.7%)*	569 (3.3%)*	20 (3.5%)*	17255
			NON-WHITES:		
1952	8426	306 (3.6%)	3293	117 (3.5%)	11719
1953	8823	328 (3.7%)	3260	156 (4.7%)	12083
1954	8834	326 (3.6%)	3397	141 (4.1%)	12231
1955	8096	245 (3.0%)*	2509	93 (3.7%)	10605
TOTAL.	34179 (83.3%)	1205 (3.5%)*	12459 (26.7%)*	506 (4.0%)*	46538

STILLBIRTHS (ILLEGITIMATE & LEGITIMATE) IN

WHITES & NON - WHITES (CITY OF CAPE TOWN.)

(TABLE 93)

**THE INFLUENCE OF THE INTERVAL BETWEEN SUCCESSIVE BIRTHS**  
**ON STILLBIRTH RATES AND PREMATUREITY RATES.**

Rochester(1923) showed that the stillbirth rates are lowest when the interval between births was 3 to 4 years, and rose thereafter for longer and shorter intervals.

A shorter interval between 2 successive births unduly prejudices the chance of survival of the second child.

<u>INTERVAL SINCE PRECEDING BIRTH(YEARS)</u>	<u>S.B.RATE/1000</u> (Table 91)
1	35.7
2	29.1
3	23.7
4	35.4

Yerushalmy(1945) from an extensive analysis in the U.S.A. claimed that the interval between births was a basic factor in the maintenance of the stillbirth rate. Too long as well as too short a period involved a raised stillbirth rate.

In a report of Maternity in Great Britain(1948) there was evidence that the proportion of premature births followed a pattern similar to that of Rochester's, and was lowest for a birth interval of between 2 and 4 years.

Eastman(1944) considered that the risk of stillbirth was not increased in infants born 12-24 months after delivery of a viable infant, and that infant spacing involved maternal aging with higher risks to mother and child. Data of this kind is very difficult to extract from records. It is doubtful if they have received sufficient consideration in surveys concerned with the importance of social factors such as poverty, nutrition and overcrowding.

Douglas(1950) in a national survey, reported that women who space more than 2 years but less than 6 years are the least likely

to have premature babies, and hence fewer stillbirths. He states that social differences were a relatively unimportant factor in premature delivery.

There was a significant high premature rate in two well defined groups of working class women.

(i) Primipara of 20 years or less old and (ii) multipara with closely spaced pregnancies. These 2 groups received least adequate antenatal care and care at the confinement, are the least likely to get help for housework, and were often employed until late in pregnancy. There was the harmful effect of work outside the home in the last months of pregnancy, and the lack of domestic help as well. (A similar picture can be painted for our women attending the antenatal clinics of our hospitals).

#### IN OUR UNITS.

(Table 92)

It was significant that in our units at the University of Cape Town the majority of any group of patients confined were primiparous, who totalled more than half of the admissions in the non-white institutions. Analysing this group still further it was noted that the bulk of these women were between 15-25 years.

It might be of interest to note that in comparing the rate of natural increase in the population of Cape Town (Table 92) during the years 1952 to 1955 inclusive, there was a 3 times greater increase in the non-white on an average per year as whites. As will be noted, comparisons are given between whites and coloureds, natives and asiatics. From these figures it might be gauged that interval spacing of infants was at much shorter intervals in the non-whites, especially in the asiatics.

Comparing too the birth rates among whites and non-whites, one is impressed by the fact that twice the number of births are occurring in the non-whites as whites in Cape Town.

It is therefore not surprising to find that apart from poor social conditions in whites and non-whites, that poor interval spacing in the non-whites predisposes to an increase of the premature birth rate (in our obstetric units this was double) and thereby to increased stillbirth rates.

STILLBIRTH RATES IN LEGITIMATE AND ILLEGITIMATE BIRTHS.

(Table 93)

McKinlay (1948) in an analysis of the stillbirth rate in legitimate and illegitimate births found that a high proportion of stillbirths occurred in illegitimacy as compared with legitimates in England and Wales for the years 1928-1946.

He suggested that the higher stillbirth rate among illegitimate births is characteristic for certain causes of stillbirth only, namely ill-defined and unknown, and also for the difficulties of labour and syphilis.

Particularly noted in our units, almost entirely in non-whites, was the occurrence of stillbirths (almost all macerated) due to syphilis in primiparous young women of the age group 15-25. Antenatal care in these women was totally inadequate, in fact absent. Syphilis as a cause of stillbirth in white patients was not recorded in our annual reports for the years 1952-55.

The cause may also be biological: mental and physical deficiency may be correlated, the former predisposing to illegitimacy and the latter to stillbirth. Of course it might be social, with a lack of knowledge concerning childbirth due to ostracism of the unmarried girl.

Many other authors including Sutherland, Munro Kerr and others found the same factors and similar higher stillbirth rates in the illegitimate.

From statistics of births in the City of Cape Town for the years 1952-55 it was noted that 96.7% in whites were legitimate and 73.3% in non-whites.

Despite the fact that 8 times more illegitimate births occurred in non-whites as whites, the stillbirth rate in the two races was almost identical. This phenomenon was contrary to facts presented by other authors. An explanation however can be sought in the fact that in the non-white (especially the native) the stigma of illegitimate pregnancy is not the "disgrace" it is in white mothers. It is also known that among non-whites the prospective husband will not enter into marriage contract until he proves that his prospective wife will be fertile.

In the coloured community, as in the native, mental and physical deficiencies predispose to a high illegitimate birth rate. In the white patient such deficiencies are not as marked.

A comparison of stillbirth rates in legitimate pregnancy in whites, and illegitimate pregnancy shows that a higher foetal loss occurred in the latter in the ratio of 1 : 2.

In the non-white the ratio of stillbirth rates in illegitimate and legitimate pregnancy was more than 7 : 1.

A comparison of stillbirth rates in legitimate and illegitimate pregnancy with rates in our community is revealing in the figures presented for Wales and England for the years 1939-41.

STILLBIRTH RATES FOR ENGLAND AND WALES (1939-41)

	<u>S.B. Rate (Illegitimate)</u>	<u>S.B. Rate (Legitimate)</u>
1928-30	54.14	39.63
1937-39	48.97	37.89
1941-42	44.44	34.14
1945	31.5	22.25

It is apparent from this table that more stillbirths occur following illegitimate than legitimate pregnancy.

**SUMMARY AND CONCLUSIONS.****"LEGITIMATE AND ILLEGITIMATE PREGNANCY".**

Although illegitimate pregnancy occurred with a much greater frequency in non-whites as in whites in the City of Cape Town, there was no significant statistical difference in stillbirth losses(%) in the racial groups.

In white patients twice more babies were lost in illegitimate as in legitimate pregnancy.

In non-whites there was no statistical difference in stillbirth mortality rates in legitimate and illegitimate pregnancy.

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### THE SEX FACTOR IN THE BABY IN RELATION TO STILLBIRTH RATE

It is well known that many biological factors are associated with the stillbirth rate. It is also known that male infants and children have a higher death rate than females of the same age. It is not surprising to find the same for the foetus.

In mathematical terms the sex ratio loss of foetal life is determined by the proportion of males per thousand lost in relation to the numbers of females. Hence if the sex ratio for stillbirths was 1234, then it means that 1234 male foetuses were stillborn per thousand female stillbirths.

Russel(1936) in an analysis of 77373 stillbirths found that the sex ratio for stillbirths in England and Wales varied between 1234 in 1928-30 to 1156 in 1945.

He also reported very significantly that the sex ratio for stillbirths was extremely high the earlier the duration of the gestation. Hence for foetuses under 4 months duration the sex ratio was 3755; for 4-6 months 1426; and for 7-9 months 1293.

In our units during 1952-55 the sex ratio for stillbirths was 1340 in 1156 stillbirths, 642 of which were male and 494 female.

This abnormally high ratio might be explained by the fact that a large number of stillbirths which occurred in our units were premature babies. It might be of interest to repeat that 993 of our premature babies(or 26.7%) weighed less than 4 lbs., and that almost 30% of our perinatal losses were composed of premature babies.

Hence the high sex ratio in relation to stillbirths in our units confirms Russel's findings that the greater the prematurity of the infant in relation to the gestation period, the higher the ratio.

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SUMMARY.

AN ANALYSIS OF THE CAUSES OF STILLBIRTHS AND EARLY NEONATAL DEATHS (PERINATAL MORTALITY) IN THE OBSTETRIC UNITS OF THE UNIVERSITY OF CAPE TOWN FOR THE YEARS 1952-55 (INCLUSIVE) WITH SPECIAL REFERENCE TO ANTENATAL CARE AND PREMATURITY.

Recent trends in perinatal mortality reveal marked decreases in stillbirth and neonatal mortality rates in the majority of teaching centres during the past 2 decades.

Commensurate losses were noted in white patients attending our units of the University of Cape Town during the 4 years 1952-55.

The same thing however unfortunately cannot be said of non-whites (coloured and natives) despite the fact that some reductions in perinatal losses have occurred during the same period of time.

Factors responsible for such variance in perinatal mortality rates in the racial groups are outlined.

Apart from socio-economic differences in white and non-white patients admitted to our units, it is my opinion that differences in degree of antenatal supervision play no unimportant part in such variations in degrees of loss of infant life.

A short summary of the socio-economic status in the two racial groups (whites and non-whites) admitted to our units revealed that the vast majority of women admitted were non-whites from the lowest strata of life with little or no education, with severe chronic ill health, a high illegitimate pregnancy rate, and disease ridden with venereal infections.

Among our white women admitted to our units the socio-economic status was of a higher level, with a lower incidence of severe chronic illhealth, with better physiques for child bearing purposes, a lower illegitimate pregnancy rate, and rarely affected by venereal disease.

Perinatal mortality rates in the 2 racial groups as a result mainly of differences in socio-economic status showed a twice greater loss in the non-white as in the white patients (84/1000 compared with 37.8/1000). Stillbirth rates in the non-white was proportionately high (51.5 : 24.3), and neonatal death rates similarly (26.8 : 13.9).

As a point of interest it was noted that the stillbirth rate in a private white maternity teaching hospital for the same period of time was only 13.1 per thousand births.

Although it is beyond our scope to alter socio-economic conditions, it might be within our means to facilitate improved antenatal services, and hence better prenatal supervision.

It is the object of this paper to demonstrate statistically the effects of inadequate prenatal care mainly due to defective administration of obstetric service as a consequence of which a desperate shortage of hospital bed accommodation for non-whites occurred.

A short history of antenatal care during the years is presented to demonstrate how obstetric mortality has been controlled with increasing supervision of the pregnant woman, comparisons being made with other centres.

The adverse effects of inadequate care in the "non-booked" patient, and the benefits of reasonable supervision in "booked" cases are compared, other centres being also compared.

In our units there was a 5 times greater perinatal mortality rate in "non-booked" as in "booked" patients. In whites, a similar loss ratio was noted. In the non-white, the ratio was smaller because of an inferior service in the shortage of hospital beds.

Hence it was noted that only 40% of non-whites were able to gain admission to hospital as compared with 80% in whites. There appeared to be a direct relationship between hospital confinement and perinatal mortality, in whites and non-whites. Similarly there was a relationship between maternal and perinatal mortality in our units.

The 5 units of the University of Cape Town are briefly described, with special emphasis on inadequacies in prenatal facilities provided for the non-white compared with whites, due mainly to shortage in bed accommodation for supervision purposes. The difficulties encountered in special investigations such as x-rays, laboratory examinations, and autopsy facilities are noted.

A further reflection in failure of obstetric services especially in non-whites was revealed in the undesirable practice of "outpatient treatment" for our commonest and lethal illness in the form of preeclampsia, including essential hypertension; a practice which was unavoidable and frowned upon, but which we were forced to employ because of the shortage of accommodation. The common deterioration in such illnesses with added complications was not unexpected.

An almost complete absence of "home visiting" to keep in touch with patients who had been refused admission, was another sad reflection in deficiency of our antenatal service.

Very briefly the main causes of perinatal mortality were as follows:-

- (i) The hazards of labour in 34.5% of cases,
- (ii) Maternal ill health in 31%,
- (iii) Unknown causes in 23.7%,
- (iv) Foetal malformation, in 7.8%, and
- (v) Other causes in 2.7%.

Hence  $1/3$  of all our perinatal deaths could be attributed to the hazards of labour,  $1/3$  to maternal chronic ill health, almost  $1/3$  to unknown causes, and foetal malformation and other causes the rest. It should however be emphasized that overlapping of causes of death of the baby was frequent, and the proportions might easily be altered one way or other.

It should also be stressed that because of limited opportunities for autopsy investigation in our units for reasons beyond our control, that a clinical classification of causes of death of the infant has been followed.

The causes of stillbirths in our units revealed as follows:-

- (a) Stillbirths associated with chronic maternal ill health in 39.89%, of which accidental haemorrhage accounted for 19.9%.
- (b) Stillbirths associated with the hazards of labour in 37.12%, of which cord complications accounted for 11.7%.
- (c) Unknown causes of stillbirth in 17.06%, half of which were macerated. The part played by ill health in this group could not be determined. Latent syphilis as a contributory factor (often following incomplete treatment) could not be ruled out.
- (d) Foetal malformation and other causes in 6%.

It should also be noted that P.E.T. and essential hypertension in our units was a very common illness and that as a contributory cause of stillbirth it played a major part in the causation of no fewer than 18.9% of all our stillbirths during 1952-55.

Prematurity as a contributory factor in the causation of stillbirth occurred in 466 of the 1231 cases or nearly 30%.

In over 50% of stillbirths encountered in our units during 1952-55, the foetal heart beat was not heard on admission of the patient to hospital. In many other instances, the foetal heart beats were "poor", irregular or unsatisfactory in other cases.

Foetal malformation usually reported as accounting for as many as 15-20% of stillbirths in other teaching centres was noted in only 5% in our non-whites and 15% of white patients.

The adverse effects of inadequate antenatal care in "non-booked" patients are revealed in a 6 times larger stillbirth rate as in "booked" patients attending our antenatal clinics.

The causes of neonatal deaths in our units during 1952-55 were noted as follows:-

- (a) Unknown causes in 36.5%,
- (b) Causes associated with the hazards of labour in 32.8%,
- (c) Causes associated with antepartum haemorrhage in 15.75%,  
and
- (d) Foetal malformation and other causes in 15.75%.

No fewer than 66.3% of all neonatal deaths occurred in premature babies.

Almost 5 times a greater neonatal mortality rate occurred in "non-booked" as in "booked" cases.

<u>COMPLICATIONS OF PREGNANCY AND LABOUR.</u>	<u>TOTAL INCIDENCE</u>			<u>PREMATURITY</u>			<u>MATURE BARRIES</u>		
	<u>All cases.</u>	<u>B.</u>	<u>N-B.</u>	<u>All cases.</u>	<u>B.</u>	<u>N-B.</u>	<u>All cases.</u>	<u>B.</u>	<u>N-B.</u>
<u>ALL PREGNANCIES.</u> (% age)	20442 (100)	16354 (80.1)	4088 (19.9)	2560 (12.8)	1766 (10.8)	794 (19.3)	17882 (87.2)	14588 (89.20)	3294 (80.77)
<u>P.E.T.</u> (% age)	17203	12.8	22.5	27.4	22.3	38.6	15.5	14.9	18.6
<u>ACCIDENTAL HAEMORRHAGE</u> (% age)	3.56	2.07	9.44	13.1	7.64	25.31	2.19	1.41	5.61
<u>PLACENTA PRAEVIA.</u> (% age)	1.23	0.55	3.98	4.5	2.15	9.9	0.77	0.35	2.63
<u>CORD COMPLICATIONS</u> (% age)	0.89	0.58	2.15	0.89	0.45	1.88	0.90	0.60	2.21
<u>BREECH DELIVERY</u> (% age)	4.43	3.57	7.85	14.7	13.1	19.5	2.9	2.4	5.05
<u>FORCEPS EXTRACTION</u> (% age)	4.86	4.32	6.99	3.00	2.43	4.13	5.12	4.06	6.16
<u>CAESAREAN SECTION</u> (% age)	5.58	4.6	9.41	11.5	6.17	12.21	5.21	4.43	8.76
<u>TRANSVERSE LIE</u> (% age)	0.79	0.40	2.39	2.34	1.24	4.77	0.5	0.30	1.8

INCIDENCE. Incidence of the various complications of pregnancy and labour in relation to the birth of premature and "mature" babies in "booked" and "non-booked" cases.

(SUMMARY.)

(1953-55)

The individual complications of pregnancy and labour and their incidence in relation to perinatal mortality are next analysed and compared with centres elsewhere, with special reference to the benefits of antenatal supervision, in the racial groups.

Almost invariably it was found that the incidence of complications of pregnancy and labour was higher in patients with inadequate prenatal supervision as compared with patients receiving reasonable care in our units. This phenomenon was more particularly noticeable among our whites, in whom antenatal care was of a higher degree of adequacy than in non-whites because of reasons previously outlined.

Apart from foetal malformation as a cause of perinatal mortality, which was more frequent in the white patient, all complications of pregnancy were associated with higher perinatal losses in "non-booked" patients, and similarly in non-whites. So too was there a strikingly higher loss in the hazards of labour under the above circumstances.

Points of interest found under the various complications of pregnancy and labour in addition to those noted above were as follows:-

- (1) ACCIDENTAL HAEMORRHAGE. The very high incidence of 3.24% in this complication in our units during 1952-55 inclusive as compared with other centres was striking. The higher stillbirth losses of accidental haemorrhage when associated with P.E.T. as compared with accidental haemorrhage without an associated hypertension. Poor results in relation to accidental haemorrhage in "non-booked" when compared with "booked" cases, more marked in "non-whites".
- (2) PLACENTA PRAEVIA. Conservative and operative management of this complication are compared in our units and elsewhere, and the poor results obtained by us during 1952-55 are explained.

COMPLICATIONS OF PREGNANCY AND LABOUR	TOTAL BABIES	WHITES					NON-WHITES					
		B.	P.N.M.	N-B.	P.N.M.	TOTAL P.N.M.	TOTAL BABIES	B.	P.N.M.	N-B.	P.N.M.	TOTAL P.N.M.
<u>P.E.T. (1953-55)</u> (% age)	829	729	23	100	14	37.1	1611	1021	109	590	140	249
		87.9	3.1*	22.1	14.0*	4.4*		63.4	10.9*	36.6	22.7*	15.4*
<u>ACCIDENTAL HAEMORRHAGE</u> (% age)	137	92	7	45	19	26	436	173	54	263	157	211
		67.1	7.6*	32.9	42.2*	18.9*		39.6	31.2*	60.4	59.6	48.4*
<u>PLACENTA PRAEVIA</u> (% age)	30	15	4	15	2	6	115	39	9	76	28	37
		50.0	26.6*	50.0	13.3*	20.0*		33.9	23.0*	66.1	36.8*	32.1*
<u>MULTIPLE PREGNANCY</u> (% age)	100	80	3	20	3	6	476	255	60	121	30	90
		80	3.7*	20	15.0*	6.0*		74.6	23.5*	25.4	24.7*	18.8*
<u>CORD COMPLICATIONS</u> (% age)	10	8	4	2	1	5	106	63	31	43	29	60
		80.0	50.0	20.0	50.0	50.0*		59.9	49.1	40.1	67.4*	56.6*
<u>BREECH DELIVERY</u> (% age)	95	72	15	23	11	26	446	293	66	153	78	144
		75.7	20.8*	24.3	47.8*	27.7*		65.7	22.5*	34.3	50.9*	32.2*
<u>FORCEPS EXTRACTION</u> (% age)	222	185	3	37	6	9	590	377	32	213	51	83
		83.3	1.6*	16.7	16.2*	4.0*		62.9	8.4*	37.1	23.9*	14.0*
<u>CAESAREAN SECTION</u> (% age)	170	124	10	46	5	15	508	317	26	191	39	65
		73.0	8.0*	27.0	10.5*	8.9*		62.4	8.2*	37.6	20.4*	12.7*
<u>TRANSVERSE AND OBLIQUE</u> (% age)	13	7	NIL	6	3	3	81	38	16	43	27	43
		53.9		43.1	50.0	23.0*		46.2	42.1*	53.8	62.7*	51.8*

**A TABLE TO DENOTE THE PERINATAL MORTALITY IN THE VARIOUS COMPLICATIONS OF PREGNANCY AND LABOUR IN RELATION TO ANTENATAL CARE IN WHITES AND NON-WHITES (SUMMARY)**

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In both (1) and (2) perinatal losses in relation to the method of delivery were noted, and in the racial groups.

(3) PREECLAMPTIC TOXAEMIA (INCLUDING ESSENTIAL HYPERTENSION AND ECLAMPSIA).

This very common complication in our units during 1952-55 was a factor in as much as 27.6% of all perinatal losses sustained.

The more severe degrees of this condition in the non-white was reflected in the larger perinatal mortality rates and higher prematurity rates especially of babies weighing 4 lbs. and under, especially in "non-booked" patients. The undesirable practice of "outpatient treatment" of P.E.T. because of inadequate hospital accommodation for supervision in the non-white is emphasized.

The larger percentage of babies weighing 8 lbs. and over in the white patient, was also not entirely unrelated to antenatal care of an adequate degree from the 28th week onwards.

The greater frequency of premature induction of labour, by surgical rupture of the membranes in the non-white, usually because of more severe degrees of P.E.T. was often the result of inadequate prenatal supervision consequent on "shortage of beds" for this purpose, and "outpatient treatment" as practised in our units.

Perinatal mortality rates in relation to various methods of delivery of the baby are outlined, and the superior results attained by vaginal delivery as compared with caesarean section are noted. The higher neonatal losses in the latter method of delivery was especially striking.

Ferinfatal losses in patients with P.E.T. undergoing forceps extraction were similar statistically to those in women without P.E.T.

In patients with P.E.T. delivered by caesarean section there was a significantly higher neonatal mortality than in patients without P.E.T. Stillbirth rates were similar.

As a further index of the poor standard of prenatal supervision in patients with P.E.T. in non-whites, was the high incidence of eclampsia in "non-booked" mothers. Only 20% of babies delivered from mothers with eclampsia were from "booked" cases. The high stillbirth rate of 26.1% in patients with eclampsia was an indication of the seriousness of this illness.

There was a higher stillbirth rate in patients with mild essential hypertension only or in the presence of slight proteinuria, than when more severe grades were noted.

#### (4) SYPHILIS IN PREGNANCY.

The obvious advantages of early antenatal treatment of syphilis in our units were noted by the fact that all stillbirths due to this infection in our units during 1952-55 occurred in "non-booked" patients; stillbirths which were all macerated.

It is suggested that a contributory cause of "unknown" stillbirths might be latent syphilis, either inadequately treated or from reinfection whose "contact" had not been treated. In the non-white it was not possible to trace "man" in very many instances because of the high rate of illegitimate pregnancy in this race.

#### (5) DIABETES IN PREGNANCY.

The benefits of adequate prenatal supervision in patients with diabetes were reflected in the very good

results in relation to perinatal mortality in the "booked" patient stabilized early in pregnancy and termination of pregnancy at opportune times. The superiority of results with caesarean section are emphasized, although it is not suggested that all patients with diabetes in pregnancy be "sectioned".

(G) MULTIPLE PREGNANCY.

The high incidence of twin and triplet pregnancy in our units during 1952-55 is noted, especially in non-white patients.

The large percentage of premature infants delivered (more than 50%) was an important factor in the high perinatal mortality rate sustained.

The higher incidence of P.E.T. in multiple pregnancy than in single pregnancy, as was the higher incidence of other complications of labour such as prolapse of the umbilical cord and other complications was noted.

The greater tendency for the loss of the second of twins as compared with the first twin in our units in the ratio of 2 ; 1, was strikingly recorded.

The serious effect of an associated hydramnios in twin pregnancy in relation to perinatal mortality as compared with twin pregnancy in the absence of excessive liquor amnii was demonstrated.

A comparison of findings in multiple pregnancy with those occurring at the University College, Ibadan, Nigeria (an all non-white institution) reveals the striking ill-effects of prematurity, despite the low incidence of P.E.T. in that unit.

- (7) Perinatal mortality as occurring in conditions such as heart disease, pregnancy with ovarian cysts, and miscellaneous infections of the mother are briefly discussed.

The tendency to premature labour in tuberculosis associated with pregnancy was not observed in our units.

(8) COMPLICATIONS OF THE UMBILICAL CORD.

The consistently high incidence of this complication of labour during 1952-55 and the high perinatal losses sustained especially in the "non-booked" patient and in the non-white is stressed.

Perinatal losses with different methods of delivery showed that caesarean section offered the best choice of treatment for the baby, especially when the cervix was not completely dilated. Intrauterine manipulations for prolapse of the cord, particularly when incomplete dilatation of the cervix was present, were very lethal for the baby.

(9) BREECH PRESENTATION AND DELIVERY.

Perinatal mortality rates in relation to complicated and uncomplicated breech delivery are discussed, and the higher losses in the former were recorded, especially in the "non-booked" patient and non-white.

The statistically higher perinatal losses in babies weighing 5½ lbs. and less as compared with larger babies delivered by the breech.

The high percentage of premature babies born by the breech (more than 40%) especially in complicated cases, was a noteworthy feature. So too was the factor of ante-partum haemorrhage associated with placenta praevia and less frequently accidental haemorrhage important in the causation of premature birth.

	PREMATURE BABIES						MATURE BABIES					
	TOTAL BABIES	B.	P.N.M.	N-B.	P.N.M.	TOTAL P.N.M.	TOTAL BABIES	B.	P.N.M.	N-B.	P.N.M.	TOTAL P.N.M.
<u>P.E.T.</u>	702	56.2%	27.6%	43.8%	39.4%	47.0%	2790	845%	4.0%	15.5%	19.2%	6.5%
<u>ACCIDENTAL H.</u>	336	40.0%	37.0%	60.0%	61.6%	51.8%	392	52.9%	14.0%	47.1%	43.2%	27.8%
<u>PLACENTA P.</u>	117	32.5%	36.8%	67.5%	64.5%	58.1%	163	31.9%	11.8%	68.1%	12.6%	16.4%
<u>CORD PROLAPSE</u>	23	34.7%	35%	65.3%	73.7%	60.8%	161	54.6%	48.4%	45.4%	76.7%	60.8%
<u>BREECH</u>	378	58.9%	36.8%	41.1%	54.8%	41.7%	528	68.5%	15.7%	31.5%	35.5%	21.9%
<u>FORCEPS</u>	77	55.8%	13.9%	44.2%	31.1%	25.9%	917	72.5%	3.9%	27.5%	24.2%	9.4%
<u>CAESAREAN SECTION.</u>	206	52.9%	16.5%	47.1%	32.9%	24.7%	933	69.1%	6.6%	30.9%	13.9%	9.0%
<u>TRANSVERSE &amp; OBLIQUE LIE</u>	60	36.6%	63.6%	63.4%	73.7%	70.0%	105	42.8%	15.5%	57.2%	61.6%	41.9%
<u>NORMAL DELIVERY</u>	2526	69%	23.7%	31%	41.7%	(27.0% ( (38.3%	19487	1.71%	15.0%	(2.54% ( (14.1%		
<u>OPERATIVE DELIVERY</u>	815											

**A TABLE TO DENOTE THE PERINATAL MORTALITY IN PREMATURE AND "MATURE" BABIES IN VARIOUS COMPLICATIONS OF PREGNANCY AND LABOUR IN RELATION TO ANTENATAL CARE. (SUMMARY)**

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There was no significant statistical difference in perinatal mortality rates in primiparous and multiparous patients delivered in our units during 1952-55. Also similarly in white patients there was no significant difference. In non-whites however a much higher perinatal loss was noted in primiparous patients.

External cephalic version, performed routinely when possible in our units resulted in a considerable lowering of perinatal mortality. Over 90% of such patients received adequate antenatal care, and only 3.9% of infants delivered were lost. In both whites and non-whites there was similarly a marked lowering of perinatal mortality rates following external version. In less than 1% of babies lost could any blame be attached to the performance of this manoeuvre.

The benefits of antenatal care of adequate degree was hence farther emphasized.

The risks of breech presentation and delivery in our units during 1952-55 can be appreciated when it was recorded that nearly 20% of the total perinatal losses sustained during that time was associated with that complication.

(10) FORCEPS EXTRACTION.

The consistently low incidence of this operation in our units of about 5% over the years is difficult to explain, compared with a much higher frequency in other teaching centres.

In non-whites the superiority as parturients might account for the low incidence of forceps delivery of 5.2%. In whites however the low incidence of 5.1% cannot be accounted for.

The significant benefit of antenatal care in relation to perinatal losses following forceps delivery both in whites and non-whites were noted.

There was a statistically significant different mortality in babies delivered by forceps with and without manual rotation of the foetal head in occipito-posterior presentation, the latter procedure resulting in better outlook. In whites a lesser perinatal mortality was recorded as in non-whites following forceps extraction, although there was no significant statistical difference in the two methods of delivery in their respective groups.

The higher stillbirth losses in "failed" and "trial" forceps was noted which was 3 times that of other forceps deliveries (31.7% : 10.7%). In non-whites there was a 5 times greater incidence of "failed and trial" forceps as in white patients, the reason being that there were almost twice the number of "non-booked" patients in the former who had received little if any antenatal care.

Prolonged labour is discussed as occurring in our units and elsewhere, in relation to the different methods of delivery, in the "booked" and "non-booked" patient and in the racial groups. The danger of a prolonged first stage of labour to the baby rather than a long second stage was noted in our units. The very high perinatal mortality of prolonged labour in association with breech presentation was striking in that 53.3% of babies were lost.

Caesarean section when performed for prolonged labour resulted in the lowest perinatal losses as compared with other methods of delivery especially in the non-white, in addition to spontaneous delivery.

#### (11) CAESAREAN SECTION.

Many aspects of this operation are discussed in relation to perinatal mortality in our units and elsewhere. The high losses sustained during 1952-55 was attributed mainly to the high neonatal death rate associated with the delivery of

many premature babies, from women with P.E.T., placenta praevia and the like. The higher perinatal losses in patients with P.E.T. when caesarean section was performed compared with patients without P.E.T. was noteworthy.

Of interest was the large percentage of women who had had previous caesarean section and who were delivered by the vaginal route subsequently in our units. As many as 75% of these women were so managed, the majority of whom received adequate care during the antenatal period in our clinics, with a very much lower perinatal mortality rate. The benefits of such prenatal supervision was hence further emphasized.

#### (12) THE OTHER HAZARDS OF LABOUR.

Transverse lie occurred twice more frequently in non-whites as whites, and 6 times more often in "non-booked" as "booked" cases in our units during 1952-55.

As expected perinatal mortality rates were high, being twice greater in non-whites as whites and similarly in "non-booked" cases.

Caesarean section for this complication resulted in a 4 times lower perinatal mortality rate as vaginal delivery following version in labour. (16.6% : 67.9%).

The early detection of transverse and oblique lie during the antenatal period and its correction when possible, or other treatment resulting in the best consequences for both mother and child can only be accomplished by careful management and supervision under the strictest observation.

Rupture of the uterus in our units during 1952-55 occurred with a frequency of 1 in 685 deliveries or 0.15%, and nearly 7 times more often in non-whites as whites, and almost 8 times more common in "non-booked" cases.

The very high perinatal mortality rate (74.3%) with

this complication of labour was indicative of the seriousness of its consequences especially to the baby. This was more obvious when it was noted that there was no significant statistical difference in perinatal losses in "booked" and "non-booked" cases, in whites and non-whites.

The rarity of occurrence of rupture in the white patient in our units was indicative of the superiority of antenatal care in this racial group as compared with non-whites. Similarly in the "booked" cases was this the case, except in "non-whites whose attendance at the antenatal clinic was not adequate.

#### Normal and operative delivery.

With normal delivery in our units during 1952-55, 22013 babies were delivered of which 1178 babies or 53.5 per thousand were lost. Of these 727 babies or 33.02 per thousand births were stillborn, and 451 or 21.1 per thousand livebirths died in the early neonatal period.

In operative delivery 3917 babies were born and 755 babies were lost, or a perinatal mortality rate of 192.7 per thousand births. Of these 504 or 128.6 per thousand births were stillborn and 251 or 73.5 per thousand livebirths died in the neonatal period.

The significantly higher perinatal losses sustained with operative delivery speaks for itself when compared with normal delivery.

The high stillbirth rates sustained with normal delivery especially were due to the large numbers of premature babies delivered, many of which were macerated for no apparent reason. (see later under "PREMATURITY")

Destructive operations were more frequently performed in "non-booked" patients (75.5%). In only 28.5% of operations performed was the foetus abnormal. In the rest obstructed labour was the cause. In "non-booked" cases 70.2% of destructive operations were done for obstructed labour, whereas in "booked" cases obstructed labour was an indication in 50% of cases.

The rarity with which the infant was "destroyed" as a means of procuring delivery in the white patient was in striking contrast to the significantly higher frequency with which this operation was performed in the non-white.

Again the superiority of antenatal care in the white patient was in evidence under those circumstances.

Face and brow presentation.

Although the incidence of these complications were similar in the racial groups (0.4%) perinatal losses were twice higher in non-whites, more of whom were "non-booked".

(13) FOETAL MALFORMATION AS A CAUSE FOR PERINATAL MORTALITY.

Although the incidence of foetal malformation in our units is similar to other centres the frequency of perinatal mortality due to this factor is lower.

This phenomenon could be explained by the fact that among our non-whites the percentage of stillbirths due to abnormality was very low (3.8%) compared with the average stillbirth rate of 13.1% in whites.

Because the prematurity rate in non-whites was twice as common as in whites, possibly because of socio-economic factors mainly, the probability of abortion in the early months of pregnancy of the malformed foetus in this racial group is within the realms of possibility.

The causes of malformation of the foetus are briefly summarized with references to the literature in relation to viral and non-viral infection.

The possibility of viral infection as a cause of intrauterine foetal death, especially in the non-white is noted.

**(14) RHESUS INCOMPATIBILITY AS A CAUSE OF FOETAL LOSS.**

The incidence of rhesus negative women in relation to the racial groups is noted, and the low frequency in the native and coloured patient compared with whites is recorded.

Only 5% of women who were rhesus negative during 1953-54 in our units developed antibodies during pregnancy.

Perinatal mortality rates associated with spontaneous and induced labour in rhesus incompatibility are recorded and it is noted that there was no significant statistical difference in foetal losses in the 2 methods of onset of labour in our units.

Antenatal care would obviously make an important difference in numbers of babies surviving rhesus incompatibility because of the timely induction of labour in the occasional patient with a bad previous history, and expert nursing care of the premature baby so delivered.

The disappearance of rhesus incompatibility as a cause of perinatal mortality would scarcely make a difference to the overall losses in any institution or community.

**(15) OTHER CAUSES OF PERINATAL MORTALITY.**

Conditions such as epilepsy, haemorrhagic disease of the newborn, maternal asthma, carcinoma of the liver in the mother, stab wound of the abdomen, extrauterine pregnancy, and maternal jaundice are briefly noted.

**(16) POSTMATURITY.**

The significance of postmaturity in the causation of perinatal mortality is briefly discussed, with reference to literature on this subject and in relation to its occurrence in our units.

It is the general concensus of opinion that postmaturity carries with it an increased risk to the life of the infant, perinatal losses being greater when pregnancy is prolonged more than 2 weeks beyond the expected date of confinement.

As to the management of undue prolongation of pregnancy there is still such controversy. There are those authors who advise termination of pregnancy by induction of labour. Others are not in support of this method of management, because of the increased incidence of operative interference arising from such treatment.

In our units the true incidence of postmaturity was not established mainly because of insufficient data provided among non-whites in relation to menstruation. In only approximately 40% of non-white records as obtained in antenatal clinics was there any close relationship between date of delivery and actual date of expected confinement.

It is only within recent years that such an entity as postmaturity was recognized in our units, and as elsewhere accurate records were not maintained. True information on this subject until recently was therefore not kept.

In white patients during 1953-56 there was a 25.5% induction rate for postmaturity in our units, with a perinatal loss of 4.7%.

**(17) FOETAL DISTRESS IN RELATION TO PERINATAL MORTALITY.**

As recorded in our annual reports the incidence of foetal distress was 2% during the years 1953-55.

The incidence of foetal distress in "booked" cases was almost exactly 3 times less than in "non-booked" cases (1.4% : 4.28%), mainly because of the greater numbers of cases of cord complications in the latter.

Perinatal losses in "non-booked" cases were significantly higher than in "booked" in the ratio of almost 2 : 1.

Similarly in non-whites, the perinatal mortality rate was twice greater than in whites when foetal distress was present, in the presence of cord complications.

Foetal distress in the absence of cord complications was associated with a much higher loss in non-whites as in whites in the ratio of almost 4 : 1.

Antenatal care hence was of the utmost importance in reducing losses associated with foetal distress.

**(18) BIRTH TRAUMA AS A CAUSE OF PERINATAL MORTALITY.**

Literature on this subject is briefly reviewed, and it is significant that a large percentage of stillbirths are attributed to this cause, especially in premature babies.

In our units it was not possible to estimate with any degree of accuracy the frequency with which trauma contributes to perinatal mortality because of the low rate of postmortem examination (18.4%) for reasons beyond our control.

As large a percentage of all our stillbirths as 37.12 were found in the "hazards of labour" group, which however did not mean that birth trauma was the cause of death.

Other causes such as respiratory failure due to lung collapse, and inflammation are included.

As far as neonatal deaths were concerned 30% were associated with the "hazards of labour".

It should be emphasized that because of the high incidence of prematurity in our units, many babies died for no apparent reason other than prematurity.

(19) PREMATURITY AND ITS RELATIONSHIP TO PERINATAL MORTALITY WITH SPECIAL REFERENCE TO ANTENATAL CARE.

The close relationship between prematurity and perinatal mortality is emphasized.

During 1952-55 as many as 1000 of the 1933 babies lost in our units, or 51.7% were premature.

Premature stillbirths accounted for 43.4% of all stillbirths sustained during 4 years, and neonatal deaths for 66.3%.

The incidence of prematurity in our units was 12.8%, in whites 7.4% and in non-whites 14.8%. In a private teaching maternity hospital (white) the incidence of prematurity was only 2.5% for the years 1950-57 inclusive.

The higher incidence of prematurity in "non-booked" as compared with "booked" patients was noted.

The incidence of prematurity in the various complications of pregnancy and labour, and "unknown causes

are tabulated.

"Unknown causes" of prematurity accounted for 37.6%;  
 P.E.T. (including essential hypertension) for 26.6%;  
 Antepartum haemorrhage for 13.4%;  
 Multiple pregnancy for 17.1% (including cases of P.E.T.);  
 Syphilis in pregnancy for 3.6%; and  
 Other causes for 3.1%.

Almost 3 times more babies weighing 4 lbs and under were born to mothers with P.E.T. in non-whites as in white patients.

A larger percentage of babies weighing 8 lbs and over were born to mothers with P.E.T. in whites than in non-whites, in the ratio of 2 : 1.

There was a greater frequency of surgical induction for P.E.T. in non-whites than in whites in the ratio 3 : 1, resulting in a larger percentage of premature babies.

As many as 51.7% of babies delivered from twin pregnancies were premature, a greater percentage of which were found in non-whites because of the higher incidence of multiple pregnancy in this race.

Not only was the incidence of prematurity greater in almost all the complications of pregnancy in "non-booked" as in "booked" patients, but also in all the hazards of labour.

So also was the incidence greater in non-whites as in whites, because of the inferior antenatal services provided particularly in relation to inadequacy of beds for supervision in hospital.

In only foetal malformation was there a greater incidence of prematurity in whites as in non-whites in the ratio 3 ; 1.

Perinatal mortality in premature and "mature" babies is discussed in considerable detail, with each complication of pregnancy and labour being outlined, not only in the "booked" and "non-booked" case, but also in relation to the 2 racial groups.

Apart from the conditions also mentioned perinatal mortality rates in normal and operative delivery are compared, both in premature and "mature" babies, and in "booked" and "non-booked" patients.

The greater losses suffered by the premature baby in every complication of pregnancy and labour (including normal delivery) as compared with "mature" infants are strikingly revealed, especially in the "non-booked" and non-white patient.

It is obvious from this analysis that antenatal care plays a considerable part in maintaining a lower perinatal mortality, not only by preventing prematurity to some extent, but also in reducing the complications which favour premature birth. P.E.T. including essential hypertension is but one example.

(20) THE INFLUENCE OF SOCIO-ECONOMIC FACTORS IN PERINATAL MORTALITY.

It is universally accepted that socio-economic factors play a dominant role in the determination of perinatal mortality rates. So in our obstetric units the poorer results were noted in the non-white patient.

Patients attending our obstetric units could hence be classified into 2 distinct groups according to their socio-economic status.

(1) Non-white hospital patients, the majority of whom filled our obstetric beds, and were on the whole "very poor".

(2) White hospital patients, in the main such better off than non-whites not only socio-economically, but also with a higher standard of education.

Compared with these 2 social classes was the white private patient, cared for usually by general practitioners and obstetric specialists, and confined in private maternity homes or hospitals. Socio-economically these women were much "better off" than the hospital class patient in groups (1) and (2).

The following factors are discussed in relation to socio-economic status; factors which determined to a greater or lesser extent the physical well being of the patient.

(1) NUTRITIONAL FACTORS.

Diet in pregnancy is discussed, and the effects of deficiency (including experimental) in South Africa of nutrition and elsewhere are noted, especially among our non-whites.

No conclusive evidence is produced whereby perinatal mortality and dietary deficiencies could be linked, except in the causation of an increased prematurity rate especially when starvation states are involved.

(11) AGE AND PARITY OF THE MOTHER IN RELATION TO STILLBIRTH RATES.

(a) Age of the mother. The lowest stillbirth rate occurred when the mother was 20 years and younger, and the highest losses in mothers over the age of 30 years.

Both in whites and non-whites there was a gradual increase in stillbirth rates with age, but with a much greater loss in each age group in the latter. This was due in the main to the greater incidence of prematurity in the non-white, not only due to socio-economic factors but also to an inferior antenatal obstetric service.

(5) Parity of the mother.

With the birth of the first child there was a comparatively high stillbirth rate (especially in the non-white) followed by a fall in rate with the second and 3rd birth. This fall in stillbirth rate was not so marked as in other centres because of the higher incidence of P.E.F. and essential hypertension and multiple pregnancy.

With the 4th and 5th babies a marked increase in stillbirth rate was noted, especially in the non-white, followed by a startling rise in rate in the 6-8 parity group.

After the 8th pregnancy stillbirth rates in our units were highest, again in the non-white in whom P.E.F. and essential hypertension was very common with increase in age, and in whom prematurity was very common. Antepartum haemorrhage and an increase in the frequency of abnormality in delivery was very rife in this parity group.

Laceration of the baby found frequently in the elderly multiparous patient in association with P.E.F. and hypertension, was also prominent in the young primiparous woman because of acute syphilitic infection.

(iii) The effects of employment in pregnancy.

It was significant that the lowest income groups dependent on their own housework and work outside the home showed higher prematurity and stillbirth rates than in

the higher income groups. In our non-whites especially was this the case when compared with our white patients, and those in private maternity hospitals.

(iv) The income of the husband in relation to stillbirth rates.

The income of the husband is not independent of prematurity and stillbirth rates. This applies also to neonatal death rates. One cannot however divorce the element of work entirely from the picture of nutritional deficiency.

The influence of the age of the father shows that there is no evidence that the age of the father is connected with stillbirth rates, save when he is under 21 years of age and the mother under 20 years.

(v) Poor interval spacing of childbirth in relation to stillbirth rates.

There is no doubt that too short an interval between having children predisposes to an increase in prematurity rates, and thereby enhances the possibility of higher stillbirth rates.

Too long as well as too short an interval between births involved a raised stillbirth rate.

The rate of natural increase per thousand population in the City of Cape Town during the years 1952-55 reveals that 3 times more babies are being born to non-whites as whites on an average each year. Asiatics were the most prolific, followed by coloureds, and then natives.

Interval spacing in non-whites was hence at much shorter intervals than in whites.

Stillbirth rates in non-whites were twice larger than in whites.

Birth rate figures in the City of Cape Town during the same interval of times (1952-55) revealed a twice

greater figure in the non-white.

Apart from a much lower economic status in the non-white associated with poorer living conditions, the twice greater prematurity rate in this race compared with whites was not entirely unexpected. The stillbirth rate similarly on an average over 4 years was twice larger in the non-white.

**(vi) Stillbirths in relation to legitimate and illegitimate births.**

Illegitimate births are generally associated with a higher stillbirth rate than in legitimate births.

In our white population of the City of Cape Town during 1952-55 this trend was striking.

There was however no significant statistical difference in stillbirth rates in white and non-whites in Cape Town despite the fact that the illegitimate birth rate in non-whites was 8 times greater than in whites. The reason for this unexpected finding was that no social stigma was attached to illegitimate childbirth in the non-white, as was the case in whites.

**(vii) The sex factor in the child in relation to stillbirth rates.**

Mainly as a result of the large percentage of premature babies born in our units, especially those under 4 lbs., the sex ratio for stillbirths was much higher than in other centres.

### CONCLUSIONS.

Antenatal care in its broadest sense means not only the supervision of a woman throughout her pregnancy and labour but also the provision of a well administered antenatal service.

Although it is generally acknowledged that socio-economic influences and health of the woman play the dominant roles in determining obstetric mortality rates, it became apparent when analyzing obstetric data from the annual records of the University of Cape Town, the Corporation of City of Cape Town and other centres for the 4 years 1952-55, that variations in the degree of efficiency of antenatal care in the racial groups (white and non-white) might be concerned to no small extent with differences in such losses.

Despite obvious improvements in antenatal services in our units of the University of Cape Town as reflected in the good results obtained among our white patients during 1952-55 as compared with previous years, variations in maternal, perinatal (stillbirths and neonatal deaths) mortality rates and prematurity rates in whites and non-whites were still obviously apparent.

Statistical comparisons of results using the  $\chi^2$  distribution test, in almost all the complications of pregnancy and labour (including normal delivery) revealed a statistically significant constantly recurring higher perinatal mortality rate not only in women receiving inadequate antenatal supervision but also in the 2 racial groups according to the degree of available prenatal care.

Similarly was there a statistically significant difference in prematurity rates in whites and non-whites.

A failure or weak link in the chain of any obstetric service is reflected in the obstetric mortality rates sustained.

Perinatal mortality rates were hence inversely related to the degree of efficiency of such a service.

Shortcomings in administration in the obstetric service of our units of the University of Cape Town particularly in the non-white group were reflected as follows:-

- (1) A gross shortage of bed accommodation for non-whites especially for antenatal supervision in relation to the obstetric population. Only 40% of this racial group were able to gain admission to hospital for delivery compared with 80% in white patients.
- (2) Frequent refusal of admission to hospital even in urgent cases.
- (3) "Outpatient treatment" of such conditions such as preeclamptic toxemia, including essential hypertension.
- (4) A high incidence of "non-booked" patients admitted to hospital.
- (5) An almost complete non-existence of "home-visiting" allied with a poor antenatal clinic "attendance rate".
- (6) Overcrowding of existing hospital accommodation for both mother and child, with sporadic outbreaks of infection.
- (7) Inadequate medical and nursing staffing at times when overcrowding was apparent.

It is not unreasonable to assume that these factors will accentuate existent perinatal losses, associated with poor socio-economic status and severe degrees of chronic maternal ill health.

The part played by the obstetrician in relation to loss of life can be measured to a large degree by the results obtained in relation to obstetric mortality, and the circumstances under which he works.

The lower the existing standard of obstetrics and the higher the perinatal mortality rate, the greater must be his scope.

But a high standard of obstetrical skill may not produce a low obstetric death rate if mothers are generally unhealthy, of poor physique and antenatal care not up to the prescribed standard.

It should be noted that a definite gradient exists in stillbirth rates according to social and economical circumstances and according to obstetrical care received.

One should not forget too that antenatal influences are likely to be of more importance than obstetrical factors in a high proportion of stillbirths because so many foetuses are already dead at the onset of labour. That these deaths might have been prevented by a higher degree of antenatal care there is no doubt, in a limited number of instances.

There is no correlation between the quantity of antenatal supervision and perinatal mortality rate. The quality of antenatal care which is difficult if not impossible to measure is probably of greater importance; a quality which includes the availability of obstetrical facilities in hospital, because there is a definite negative correlation between perinatal mortality rates and the percentage of births occurring in such institutions.

Apart from these considerations, certain other biological factors associated with perinatal losses should be borne in mind; factors usually beyond our control, but which might be minimized by education in the arts of contraception and control. Such important and interesting matters as age and parity of the mother; the interval between successive births (either too long or too short); multiple births involving a greater risk to the second baby; illegitimate pregnancy; a higher stillbirth rate associated with a high rate of previous loss of infants born to some mothers; a close association between perinatal mortality and unemployment and poorly paid work especially outside the home; and maternal under-nutrition.

It is now apparent that in the poorer strata of society with lower standards of education, bad dietary habits persist and mothers in this group are probably less well equipped to bear children as result of nutritional deficiencies in their childhood and adolescence.

It is my opinion that the best practical policy for a further reduction in perinatal mortality appears to be an equitable distribution of essential foods, and to ensure that sound education in nutrition reaches the poorest sections of the community through antenatal care and otherwise.

Apart from this provision it is my opinion that a proportionate increase in hospital facilities for both sections of the obstetrical population, especially for the non-white, would achieve a considerable decrease in perinatal wastage. This would be further enhanced when and if a solution to the problem of preeclamptic toxæmia (including essential hypertension) and its complications can be laid bare.

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