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THE 1984 WESTERN AUSTRALIAN BIRTH COHORT

Perinatal and Infant Mortality Identified by Maternal Race

DIANE J. MOORE, R.N., R.M., Dip.App.Sc., F.C.N.A.
Epidemiology Branch

July, 1986

Health Department of Western Australia

Statistical Series/3

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1. INTRODUCTION

This report on Perinatal and Infant Mortality identified by maternal race, is the first in a planned series of annual reports. It is based on the 1984 birth cohort in Western Australia. Previous reports from the Maternal and Child Health Studies Unit have been based on the year of death and the aboriginal and non-aboriginal sub-populations only have been reported. As ''other races'' now represent 5.1% of the 1984 births in Western Australia, this subgroup has been identified in this report.

In Western Australia we are very fortunate to have available valuable and unique maternal and child health statistics. These data have shown aboriginal perinatal and infant mortality rates to be consistently higher than those of non-aboriginals.

In the past, assessment of aboriginal health including pregnancy and childbirth was difficult as aboriginals were excluded from vital statistical collections prior to 1966 and until the past few years race has not been a coded item on vital documents in most Australian States.[14]

The high aboriginal stillbirth and infant mortality has been a cause for concern while significant improvements in the maternal and child health of aborigines has taken place, their overall health status relative to non-aboriginal subpopulations remains poor.[3]

Although perinatal and infant mortality rates overall have fallen, particularly in the past decade, there is still much room for improvement in the community based factors in some population subgroups, such as aborigines and new migrants.[12]

If required, additional tabulations are available upon request to:

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2. DEFINITIONS

Birthweight

The first weight, measured to the nearest five grams, of the newborn. It is usually obtained within the first hour of birth.

Low Birthweight

A birthweight of less than 2500 grams

Very Low Birthweight

A birthweight of less than 1500 grams

Extremely Low Birthweight

A birthweight of less than 1000 grams

Congenital Malformation

Any defect present at birth, probably of developmental origin.

Crude Birth Rate

The number of livebirths per 1000 person-years of total population.

Fertility Rate

The total births per 1000 woman-years to women aged between 15-44 years.

Infant Death

The death of a liveborn infant within the first year of life.

Livebirth

The complete expulsion or extraction from its mother of a product of conception, irrespective of duration of pregnancy, which after separation shows signs of life.

Mortality Proportions

Stillbirth - is the number of stillbirths per 1000 total births in a year.

Neonatal Mortality - is the number of neonatal deaths per 1000 livebirths in a year.

Perinatal Mortality - is the number of stillbirths and neonatal deaths per 1000 total births in a year.

Postneonatal Mortality - is the number of post-neonatal deaths per 1000 livebirths in a year.

Infant Mortality - is the number of infant deaths per 1000 livebirths in a year.

Neonatal Death

The death of a liveborn infant within 28 days of birth.

Parity

The total number of livebirths and stillbirths of the mother prior to the parturition under consideration.

Perinatal Death

Is a stillbirth or neonatal death.

Postneonatal Death

Is the death of a liveborn infant occurring after the first month and within the first year of life.

Plurality

The number of fetuses or babies resulting from the pregnancy. On this basis, pregnancy may be classified as singleton or multiple.

Race - refers to mother's racial group

Caucasian - includes all persons of caucasoid (European) heritage.

Aboriginal - includes persons of Australian-Aboriginal heritage (Australoid) or of mixed Aboriginal-caucasian heritage.

Other - includes American negroes, Asian, Indian, Polynesian, etc.

Stillbirth

Is the complete expulsion or extraction from its mother, of a product of conception of at least 20 weeks gestation or 400 grams birthweight, which after separation did not show any sign of life.

3. SUMMARY

During 1984, there were 22,917 total births in Western Australia. Amongst these births were 134 stillbirths, 116 neonatal deaths and 89 post-neonatal deaths notified to the Midwives' Notification System.

The overall stillbirth proportion was 5.85/1000 total births and for the aboriginal births it was more than double at 13.42/1000 total births. Low birthweight (less than 2500 grams) was recorded for seven in every ten stillbirths. The major causes of stillbirth were unknown causes in 38.3% of cases and extremely low birthweight (<1000 grams) (26.3%).

The neonatal death proportion was 5.01/1000 livebirths and amongst the aboriginal births it was more than double at 12.76/1000 livebirths. Of the aboriginal women who experienced a neonatal death, 80% were teenagers and for four in ten women it was their first baby. Of the neonatal deaths, 64% were of low birthweight and sixty percent of the neonatal deaths occurred within the first day of life. The major causes of neonatal death identifed were low birthweight (<2500 grams) in 43.1% and lethal congenital malformations in 35.3% of cases.

The post-neonatal death proportion was 3.9/1000 livebirths and for aboriginals it was three times more at 11.9/1000 livebirths. One in five of the women whose baby resulted in a post-neonatal death were teenagers and of these, 35% were aboriginals. The major causes of post-neonatal death were Sudden Infant Death Syndrome in 52.8% of cases and congenital malformations in 21.3% Of these deaths, 75% occurred after the first month and before six months of age.

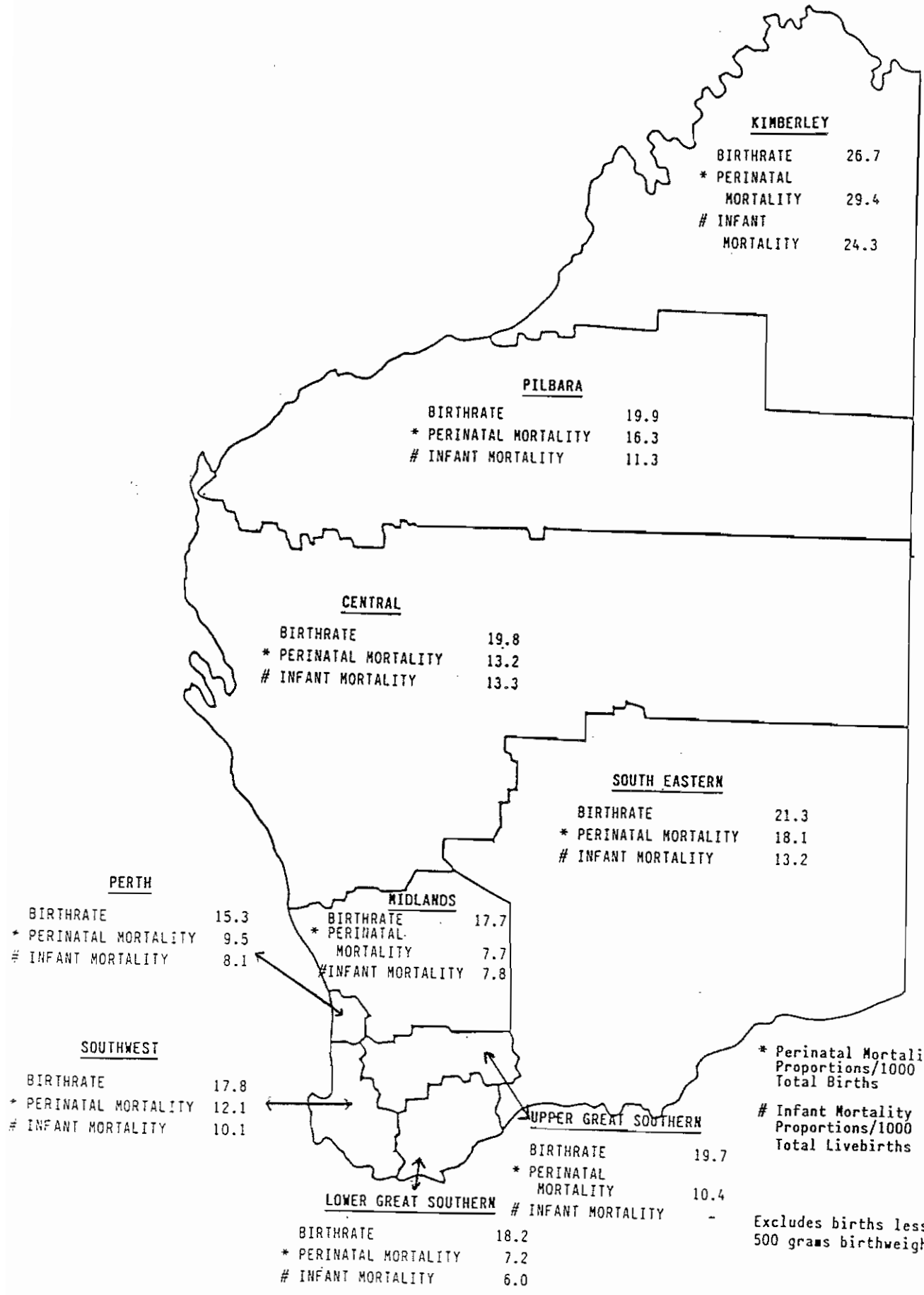
The infant death proportion was 9.0/1000 livebirths overall, and for aboriginals it was 24.7/1000 livebirths. Almost half the infant deaths were to women whose age was less than 25 years, whereas for the aboriginals, eight in every ten women were less than 25 and of these 38% were teenagers. The major causes of infant death were low birthweight, lethal congenital malformations and sudden

infant death syndrome (cot death). Almost six in ten of all infant deaths occurred in the first month of life and 90% were within the first six months of life.

Figure 1 demonstrates that outside the metropolitan area, birth rates and perinatal and infant mortality were generally higher and in particular in those areas with the largest proportion of aboriginal people, e.g., Kimberley, Pilbara, Central and South Eastern Statistical Divisions.

FIGURE 1

CRUDE BIRTH RATE, PERINATAL AND INFANT MORTALITY PROPORTIONS BY STATISTICAL DIVISION OF MATERNAL RESIDENCE FOR BIRTHS WHICH OCCURRED IN WESTERN AUSTRALIA IN 1984



SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
AUSTRALIAN BUREAU OF STATISTICS

4. DATA COLLECTION

This is the first report from the Maternal and Child Health Studies Unit to be based on the year of birth cohort. All previous reports from the Unit have used the year of death as a basis and calculated the mortality proportions using the births which occurred during that same year.1.

In changing the methodology, the aims are to give a more accurate account of the perinatal and infant mortality proportion by having the numerator (deaths) congruent with the denominator (births).

The data in this report are mainly based on the Western Australian Midwives' Notification System, with additional information on deaths from the Registrar General's Office and Community and Child Health Services.

As a statutory requirement in Western Australia, a Midwives' Form is completed for every livebirth or stillbirth of at least 400 grams birthweight or more, or twenty weeks gestation or more. However, only those births which resulted in a final product of conception being equal to or greater than 500 grams birthweight have been included in this report.

Information on maternal race was obtained from the Notification of Case Attended Form 2 or Midwives' Form. Race is recorded by the midwife in attendance at the birth as either 'caucasian', 'aboriginal' or 'other'.[5] In recording the information no distinction is made between mixed or full blood aborigines and data are only available for race of mother, not father or infant.

The information on perinatal and infant deaths in Western Australia was checked both manually and by computer listing against the information included in the Midwives' System by using name, date of birth, birthweight and sex of the baby to ensure complete ascertainment of all perinatal and infant deaths amongst the 1984 birth cohort. A separate computer file was then established linking all the deaths to the appropriate Midwives' Form

with the additional information on type of death, date of death and cause of death being included. This was to enable comprehensive analyses to be undertaken on all data available.

The classifications used in categorising the cause of death identified from the Registrar General's information, on the death certificate, was the same used by Stanley and Waddell who stated it was a simple, contemporary classification for stillbirths, neonatal deaths and postneontal infant deaths.[12] It is intended that these classification on cause of death will be used in all future reports from the Maternal and Child Health Studies Unit.

Caution must be taken when comparing data on the causes of death from previous reports of the Maternal and Child Health Studies Unit, as the cause of death classifications differ.

The population estimates used in this report were obtained from the Western Australian Branch of the Australian Bureau of Statistics.

TABLE 1: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY IDENTIFIED BY STATISTICAL DIVISION OF MATERNAL RESIDENCE AND RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

	MATERNAL RACE															TOTAL					
	CAUCASIAN						ABORIGINAL						OTHER								
	STILL-BIRTHS		NEONATAL		PERINATAL		STILL-BIRTHS		NEONATAL		PERINATAL		STILL-BIRTHS		NEONATAL		PERINATAL		STILL-BIRTHS		NEONATAL		PERINATAL	
	NO.	(1)	NO.	(2)	NO.	(1)	NO.	(1)	NO.	(2)	NO.	(1)	NO.	(1)	NO.	(2)	NO.	(1)	NO.	(1)	NO.	(2)	NO.	(1)
Perth	70	5.03	64	4.62	135	9.71	0	-	1	*	1	*	4	*	5	5.50	9	9.86	74	4.90	70	4.66	144	9.53
Southwest	13	6.77	11	5.77	24	12.51	0	-	0	-	0	-	0	-	0	-	0	-	13	6.55	11	5.58	24	12.09
Lower Great Southern	3	*	1	*	4	*	1	*	1	*	2	*	0	-	0	-	0	-	4	*	2	*	6	7.16
Upper Great Southern	5	11.24	0	-	5	11.24	0	-	0	-	0	-	0	-	0	-	0	-	5	10.44	0	-	5	10.44
Midlands	4	*	3	*	7	8.24	0	-	0	-	0	-	0	-	0	-	0	-	4	*	3	*	7	7.73
Southeastern	5	5.73	5	5.77	9	10.32	5	48.08	3	*	8	76.92	0	-	0	-	0	-	10	10.10	8	8.14	18	18.13
Central	4	*	4	*	8	9.52	3	*	2	*	5	26.18	0	-	1	*	1	*	7	6.58	7	6.62	14	13.16
Pilbara	4	*	7	9.51	11	14.86	0	-	1	*	1	*	4	*	0	-	4	*	8	8.17	8	8.24	16	16.34
Kimberley	2	*	0	-	2	*	7	20.71	7	21.15	14	41.42	0	-	0	-	0	-	9	16.54	7	13.08	16	29.41
W.A. unspecified	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Outside W.A.	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Unknown	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
TOTAL	110	5.35	95	4.65	205	9.98	16	13.42	15	12.76	31	26.01	8	6.81	6	5.15	14	11.93	134	5.85	116	5.09	250	10.91

Excludes births less than 500 grams birthweight

(1) Stillbirth & Perinatal Death proportion/1000 total births

(2) Neonatal Death proportion/1000 livebirths

* Where totals are less than 5 proportions have not been calculated

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
CHILD AND COMMUNITY HEALTH SERVICES

5. STILLBIRTHS, NEONATAL AND POST-NEONATAL MORTALITY AMONGST THE 1984 BIRTHS IN WESTERN AUSTRALIA

5.1 Stillbirths

There were 134 stillbirths in 1984 in Western Australia that were notified to the Midwives' Notification System. The stillbirth proportion was 5.85/1000 total births (Table 1).

For aboriginal births, the stillbirth proportion of 13.42/1000 total births was more than double that for non-aboriginals.

When the area of mother's usual residence was examined by statistical division it showed the highest proportion of stillbirths occurred to women resident in areas outside the metropolitan statistical division and in particular the Kimberley where it was 16.54/1000 total births (Table 1, Figure I). The highest proportion of aboriginal stillbirths occurred to women resident in the Southeastern Statistical Division.

Almost one in ten women who experienced a stillbirth, were less than 20 years of age. For aboriginal women more than one third were teenagers (Table 2).

TABLE 2: STILLBIRTHS IDENTIFIED BY MATERNAL RACE AND AGE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Maternal Age	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
15 - 19	7	6.4	6	37.5	0	0.0	13	9.7
20 - 24	36	32.7	5	31.3	2	35.0	43	32.1
25 - 29	26	23.6	3	18.8	2	25.0	31	23.1
30 - 34	26	23.6	2	12.5	3	37.5	31	23.1
35 - 39	7	6.4	0	0.0	1	12.5	8	6.0
40 - 44	5	4.5	0	0.0	0	0.0	5	3.7
> 45	3	2.7	0	0.0	0	0.0	3	2.2
TOTAL	110	100.0	16	100.0	8	100.0	134	100.0

Excludes births less than 500 grams birthweight

Ten percent of stillbirths were to women who were unsupported, either single, separated, divorced or widowed (Table 3).

TABLE 3: STILLBIRTHS IDENTIFIED BY MATERNAL RACE AND CONJUGAL STATE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Conjugal State	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Single	8	7.2	3	18.8	1	12.5	12	9.0
Married/defacto	101	91.8	13	81.3	6	75.0	120	89.5
*Other	1	0.9	0	0.0	1	12.5	2	1.5
TOTAL	110	100.0	16	100.0	8	100.0	134	100.0

Excludes births less than 500 grams birthweight

* Other include separated, divorced and widowed

Forty five percent of the stillbirths were to women who had had their first baby and almost one in five were to women whose parity was three or more (Table 4).

TABLE 4: STILLBIRTHS IDENTIFIED BY MATERNAL RACE AND PARITY AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Parity	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
0	50	45.5	5	31.3	5	62.5	60	44.8
1 - 2	43	39.1	6	37.5	1	12.5	50	37.3
3 - 5	13	11.8	5	31.3	2	25.0	20	14.9
≥ 6	4	3.6	0	0.0	0	0.0	4	3.0
TOTAL	110	100.0	16	100.0	8	100.0	134	100.0

Excludes births less than 500 grams birthweight

Seven in every ten stillbirths were of low birthweight (<2500 grams) whereas the overall percentage of low birthweight was 6.1% of all births in 1984.[6] (Table 5)

TABLE 5: STILLBIRTHS IDENTIFIED BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Birthweight (Grams)	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
500 - 999	31	28.2	7	43.8	3	37.5	41	30.6
1000 - 1499	17	15.5	4	25.0	2	25.0	23	17.2
1500 - 1999	12	10.9	0	0.0	1	12.5	13	9.7
2000 - 2499	15	13.6	0	0.0	1	12.5	16	11.9
		68.2		68.8		87.5		69.4
2500 - 2999	15	13.6	1	6.3	0	0.0	16	11.9
3000 - 3499	13	11.8	2	12.5	1	12.5	16	11.9
3500 - 3999	4	3.6	1	6.3	0	0.0	5	3.7
4000 - 4499	2	1.8	0	0.0	0	0.0	2	1.5
≥ 4500	1	0.9	1	6.3	0	0.0	2	1.5
Total	110	100.0	16	100.0	8	100.0	134	100.0

Excludes births less than 500 grams birthweight

The major causes of stillbirth in Western Australia are unknown causes in 38.3% of cases and extremely low birthweight (<1000 grams) in 26.3%. Amongst the aboriginal stillbirths, the major cause of death was extremely low birthweight in 43.8% of cases. A correction of the adverse birthweight distribution in the aboriginal population will be the most important factor in reducing their high perinatal mortality further.[9] (Table 6)

In this report, the time of stillbirth has not been categorised as antepartum or intrapartum, however, it is planned to include this information in future reports from the Maternal and Child Health Studies Unit.

TABLE 6: CAUSES OF STILLBIRTH IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Cause of Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Lethal congenital malformations	14	12.8	0	0.0	1	12.5	15	11.3
*Extremely low birthweight (<1000g)	25	22.9	7	43.8	3	37.5	35	26.3
Unknown	45	41.3	4	25.0	2	25.0	51	38.3
Maternal								
Obstetric	2	1.8	1	6.3	0	0.0	3	2.2
Medical	3	2.8	2	12.5	0	0.0	5	3.8
Hypertension	5	4.6	1	6.3	0	0.0	6	4.5
Placenta & cord	13	11.9	1	6.3	2	25.0	16	12.0
Other	3	2.8	0	0.0	0	0.0	3	2.3
TOTAL	110	100.0	16	100.0	8	100.0	134	100.0

Excludes births less than 500 grams birthweight

* Any non-malformed stillbirth of birthweight less than 1000 grams was included in the extremely low birthweight category

5.2 Neonatal Deaths

There were 116 neonatal deaths amongst the 1984 livebirths, notified to Midwives' Notification System. The neonatal death proportion was 5.09/1000 livebirths and for aboriginal births it was 12.76/1000 livebirths which was more than double that for non-aboriginal births (Table 1).

Similar to the stillbirths, the highest proportion of neonatal deaths were to women whose usual residence was outside the metropolitan area and the greatest proportion was within the Kimberley Statistical Division (Table 1, Figure 1). A greater reduction in rural neonatal mortality might be attained through attempts to reduce fertility at the extremes of maternal age, and in high parities, and/or to improve socio-economic conditions.[11]

Of the aboriginal women who experienced a neonatal death, 80% were less than 24 years of age and half of these were teenagers (Table 7).

TABLE 7: NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND AGE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Maternal Age	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
15 - 19	7	7.4	6	40.0	0	0.0	13	11.2
20 - 24	25	26.3	6	40.0	0	0.0	31	26.7
25 - 29	28	29.5	3	20.0	3	50.0	34	29.3
30 - 34	24	25.3	0	0.0	1	16.7	25	21.6
35 - 39	9	9.5	0	0.0	1	16.7	10	8.6
40 - 44	2	2.1	0	0.0	1	16.7	3	2.6
⩾ 45	0	0.0	0	0.0	0	0.0	0	0.0
TOTAL	95	100.0	15	100.0	6	100.0	116	100.0

Excludes births less than 500 grams birthweight

There were more unsupported women identified amongst those whose baby resulted in a neonatal death, than for either the total confinements or those who had a stillbirth (Table 8).

TABLE 8: NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND CONJUGAL STATE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Conjugal State	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Single	10	10.5	9	60.0	0	0.0	19	16.4
Married/defacto	85	89.5	6	40.0	5	83.3	96	82.8
*Other	0	0.0	0	0.0	1	16.7	1	0.9
TOTAL	95	100.0	15	100.0	6	100.0	116	100.0

Excludes births less than 500 grams birthweight

* Other include separated, divorced and widowed

For more than four in ten of the women with a neonatal death it was their first baby (Table 9).

TABLE 9: NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND PARITY AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Parity	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
0	42	44.2	5	33.3	3	50.0	50	43.1
1 - 2	40	42.1	6	40.0	2	33.3	48	41.4
3 - 5	11	11.6	4	26.7	1	16.7	16	13.8
⩾ 6	1	1.1	0	0.0	0	0.0	1	0.9
Unknown	1	1.1	0	0.0	0	0.0	1	0.9
TOTAL	95	100.0	15	100.0	6	100.0	116	100.0

Excludes births less than 500 grams birthweight

Of the 496 multiple livebirths, ten resulted in a neonatal death. They were all caucasian babies (Table 10).

TABLE 10: NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND PLURALITY AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Plurality	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Singleton	85	89.5	15	100.0	6	100.0	106	91.4
Multiple	10	10.5	0	0.0	0	0.0	10	8.6
TOTAL	95	100.0	15	100.0	6	100.0	116	100.0

Excludes births less than 500 grams birthweight

Overall there were more males amongst the neonatal deaths 52.6% than female babies (Table 11).

TABLE 11: NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND SEX AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Sex	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Male	47	49.5	10	66.9	4	66.7	61	52.6
Female	48	50.5	5	33.3	2	33.3	55	47.4
TOTAL	95	100.0	15	100.0	6	100.0	116	100.0

Excludes births less than 500 grams birthweight

Low birthweight was recorded in 64% of all neonatal deaths (Table 12). Most of the improvement in the low birthweight component of neonatal death rates in recent years is attributable to better survival of these infants rather than to any major reduction in the incidence of low birthweight.[4]

TABLE 12: NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Birthweight (Grams)	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
500 - 999	30	31.6	8	53.3	0	0.0	38	32.8
1000 - 1499	13	13.7	1	6.3	2	33.3	16	13.8
1500 - 1999	8	8.4	3	20.0	0	0.0	11	9.5
2000 - 2499	7	7.4	1	6.3	1	16.7	9	7.8
		61.1		85.9		50.0		63.9
2500 - 2999	10	10.5	0	0.0	1	16.7	11	9.5
3000 - 3499	17	17.9	2	13.3	1	16.7	20	17.2
3500 - 3999	8	8.4	0	0.0	1	16.7	9	7.8
4000 - 4499	2	2.1	0	0.0	0	0.0	2	1.7
⩾ 4500	0	0.0	0	0.0	0	0.0	0	0.0
Total	95	100.0	15	100.0	6	100.0	116	100.0

Excludes births less than 500 grams birthweight

The majority of neonatal deaths, 59.4%, occurred within the first day of life and eight in every ten deaths were within the first week (Table 13).

TABLE 13: AGE AT NEONATAL DEATH AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Age at Neonatal Death	No.	% of all Neonatal Deaths	
< Day 1	41	35.3)	59.4
Day 1	28	24.1)	
Day 2	4	3.4	
Day 3	6	5.2	
Day 4	7	6.0	
Day 5	6	5.2	
Day 6	2	1.7	
Day 7	0	0.0	
Day 8 - 14	9	7.8	
Day 15 - 21	7	6.0	
Day 22 - 28	6	5.2	
Total	116	100.0 (100.0)	

Excludes births less than 500 grams birthweight

The major causes of neonatal death in Western Australia was low birthweight (<2500 grams) in 43.1% of cases and lethal congenital abnormalities in 35.3%. For more than half of the aboriginal neonatal deaths the cause was identified as low birthweight (Table 14)

TABLE 14: CAUSES OF NEONATAL DEATH IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Cause of Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Lethal congenital malformations	38	40.0	1	6.7	2	33.3	41	35.3
*Extremely low birthweight (<2500g)	40	42.1	8	53.3	2	33.3	50	43.1
Asphyxia	6	6.3	0	0.0	1	16.7	7	6.0
Pregnancy conditions	3	3.2	1	6.7	0	0.0	4	3.4
Infections	6	6.3	1	6.7	0	0.0	7	6.0
Other	2	2.1	0	0.0	1	16.7	3	2.6
S.I.D.S.	0	0.0	2	13.3	0	0.0	2	1.7
Unknown	0	0.0	2	13.3	0	0.0	2	1.7
TOTAL	95	100.0	15	100.0	6	100.0	116	100.0

Excludes births less than 500 grams birthweight

S.I.D.S. Sudden Infant Death Syndrome

* Any non-malformed neonatal death of birthweight less than 2500 grams was included in the low birthweight category

5.3 Post-Neonatal Deaths

There were 89 post-neonatal deaths amongst the 1984 births notified to the Midwives' Notification System. The post-neonatal death proportion was 3.9/1000 livebirths. There appeared to be a slight increase in the number of caucasian post-neonatal deaths identified from the 1983 totals. The aboriginal post-neonatal mortality proportion of 11.9/1000 livebirths was almost three times greater than for the non-aboriginal subpopulation. Aboriginal mothers experience a significantly higher rate of post-neonatal mortality than those born to non-aboriginal mothers.[7] (Tables 15)

TABLE 15: NEONATAL, POST-NEONATAL AND INFANT MORTALITY BY STATISTICAL DIVISION OF MATERNAL RESIDENCE AND RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

STATISTICAL DIVISION	MATERNAL RACE												TOTAL		
	CAUCASIAN					ABORIGINAL				OTHER					
	NEONATAL	POST-NEONATAL	INFANT			NEONATAL	POST-NEONATAL	INFANT		NEONATAL	POST-NEONATAL	INFANT			
	NO.	%	NO.	%	NO. (1)	NO.	%	NO.	%	NO. (1)	NO.	%	NO.	%	NO. (1)	NO. (1)	NO. (1)	NO. (1)	NO. (1)	NO. (1)
Perth	64	67.4	47	65.3	111 8.02	1	6.7	2	14.3	3 *	5	83.3	2	66.7	7 7.70	70 4.66	51 3.39	121 8.05		
Southwest	11	11.6	9	12.5	20 10.49	0	-	0	-	0 -	0	-	0	-	0 -	11 5.58	9 4.56	20 10.14		
Lower Great Southern	1	1.1	3	4.2	4 *	1	6.7	0	-	1 *	0	-	0	-	0 -	2 *	3 *	5 6.00		
Upper Great Southern	0	-	1	1.4	1 *	0	-	0	-	0 -	0	-	0	-	0 -	0 -	1 *	1 *		
Midlands	3	3.2	4	5.6	7 8.27	0	-	0	-	0 -	0	-	0	-	0 -	3 *	4 *	7 7.76		
South Eastern	5	5.3	2	2.8	7 8.07	3	20.0	3	21.4	6 60.61	0	-	0	-	0 -	8 8.14	5 5.09	13 13.22		
Central	4	4.2	3	4.2	7 8.37	2	13.3	3	21.4	5 26.60	1	*	1	33.3	2 *	7 6.62	7 6.62	14 13.25		
Pilbara	7	7.4	2	2.8	9 12.22	1	6.7	1	7.1	2 *	0	-	0	-	0 -	8 8.24	3 *	11 11.33		
Kimberley	0	-	1	1.4	1 *	7	46.7	5	35.7	12 36.25	0	-	0	-	0 -	7 13.08	6 11.21	13 24.30		
W.A. unspecified	0	-	0	-	0 -	0	-	0	-	0 -	0	-	0	-	0 -	0 -	0 -	0 -		
Outside W.A.	0	-	0	-	0 -	0	-	0	-	0 -	0	-	0	-	0 -	0 -	0 -	0 -		
Unknown	0	-	0	-	0 -	0	-	0	-	0 -	0	-	0	-	0 -	0 -	0 -	0 -		
TOTAL	95	100.0	72	100.0	167 8.17	15	100.0	14	100.0	29 24.66	6	100.0	3	100.0	9 7.72	116 5.09	89 3.91	205 9.00		

Excludes births less than 500 grams birthweight

(1) Proportion/1000 livebirths

* Where totals are <5, proportions have not been calculated

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
CHILD AND COMMUNITY HEALTH SERVICES

The statistical divisions with the highest proportions of post-neonatal deaths are based on the mother's usual residence similar to those for stillbirths and neonatal deaths and are those areas with the greatest percentages of aboriginal livebirths.[7] For the Kimberley, the post-neonatal mortality was 11.21/1000 livebirths (Table 15, Figure I).

Almost six out of ten women who experienced a post-neonatal death were aged less than 25 years of age and of these 20% were teenagers (Table 16).

TABLE 16: POST NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND AGE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Maternal Age	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
15 - 19	12	16.7	5	35.7	1	33.3	18	20.2
20 - 24	27	37.5	6	42.9	0	0.0	33	37.1
25 - 29	19	26.4	2	14.3	0	0.0	21	23.6
30 - 34	9	12.5	1	7.1	2	66.7	12	13.5
35 - 39	5	6.9	0	0.0	0	0.0	5	5.6
TOTAL	72	100.0	14	100.0	3	100.0	89	100.0

Excludes births less than 500 grams birthweight

Almost 30% of the women who experienced a post-neonatal death were unsupported (Table 21). It has been shown in other data that higher post-neonatal mortality in disadvantaged groups such as aboriginals[4] exists (Table 17).

TABLE 17: POST-NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND CONJUGAL STATE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Conjugal State	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Single	12	16.7	6	42.9	1	33.3	19	21.3
Married/defacto	54	75.0	8	57.1	2	66.7	64	71.9
*Other	6	8.3	0	0.0	0	0.0	6	6.7
TOTAL	72	100.0	14	100.0	3	100.0	89	100.0

Excludes births less than 500 grams birthweight

* Other include separated, divorced and widowed

One in four post-neonatal deaths occurred to women who had first had their first baby (Table 18).

TABLE 18: POST-NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND PARITY AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Parity	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
0	18	25.0	3	21.4	2	66.7	23	25.8
1 - 2	42	58.3	7	50.0	1	33.3	50	56.2
3 - 5	11	15.3	4	28.6	0	0.0	15	16.9
>= 6	1	1.4	0	0.0	0	0.0	1	1.1
TOTAL	72	100.0	14	100.0	3	100.0	89	100.0

Excludes births less than 500 grams birthweight

There was one aboriginal multiple birth amongst the 89 post-neonatal deaths (Table 19). It has been shown in other data that multiple births and those infants born to mothers whose previous issues were over four were also at high risk of post-neonatal death.

TABLE 19: POST-NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND PLURALITY AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Plurality	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Singleton	72	81.8	13	14.8	3	3.4	88	100.0
Multiple	0	0.0	1	100.0	0	0.0	1	100.0
TOTAL	72	80.9	14	15.7	3	3.4	89	100.0

Excludes births less than 500 grams birthweight

The major cause of post-neonatal death amongst the 1984 births in Western Australia were Sudden Infant Death Sydrome (cot death) in 52.8% of cases. The incidence of Sudden Infant Death Syndrome has increased overtime (nil in 1970 to 46.1% of all post-neonatal deaths in 1977), but this is no doubt due to the increased diagnosis of S.I.D.S. and to changes in classification of post-neonatal deaths.[7] Congenital malformations accounted for another 21.3% of the post-neonatal deaths (Table 20).

TABLE 20: CAUSES OF POST-NEONATAL DEATH IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Cause of Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Sudden Infant Death Syndrome	39	54.2	6	42.9	2	66.7	47	52.8
Lethal Congenital Malformations	16	22.2	3	21.4	0	0.0	19	21.3
Infection	4	5.6	2	14.3	0	0.0	6	6.7
Other	13	18.1	1	7.1	1	33.3	15	16.9
Unknown	0	0.0	2	14.3	0	0.0	2	2.2
TOTAL	72	100.0	14	100.0	3	100.0	89	100.0

Excludes births less than 500 grams birthweight

The fall in post-neonatal mortality from infectious diseases has been particularly striking. These improvements are attributed in the main to social and economic changes, improvements in the standard of living, particularly in nutrition, better hygiene and widespread immunisation against the major infectious diseases of childhood.[12]

The majority of post-neonatal deaths occurred after the first month of life and within the first six months of life (Table 21).

TABLE 21: POST-NEONATAL DEATHS IDENTIFIED BY MATERNAL RACE AND AGE AT DEATH AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Age at Death (Months)	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
> 1 - 3	30	41.7	7	50.0	2	66.7	39	43.8
4 - 6	22	30.6	5	35.7	1	33.3	28	31.5
7 - 9	10	13.9	0	0.0	0	0.0	10	11.2
10 - 12	10	13.9	2	14.3	0	0.0	12	13.5
TOTAL	72	100.0	14	100.0	3	100.0	89	100.0

Excludes births less than 500 grams birthweight

More than half the deaths which occurred from Sudden Infant Death Syndrome were in the first one to three months of age (Table 22).

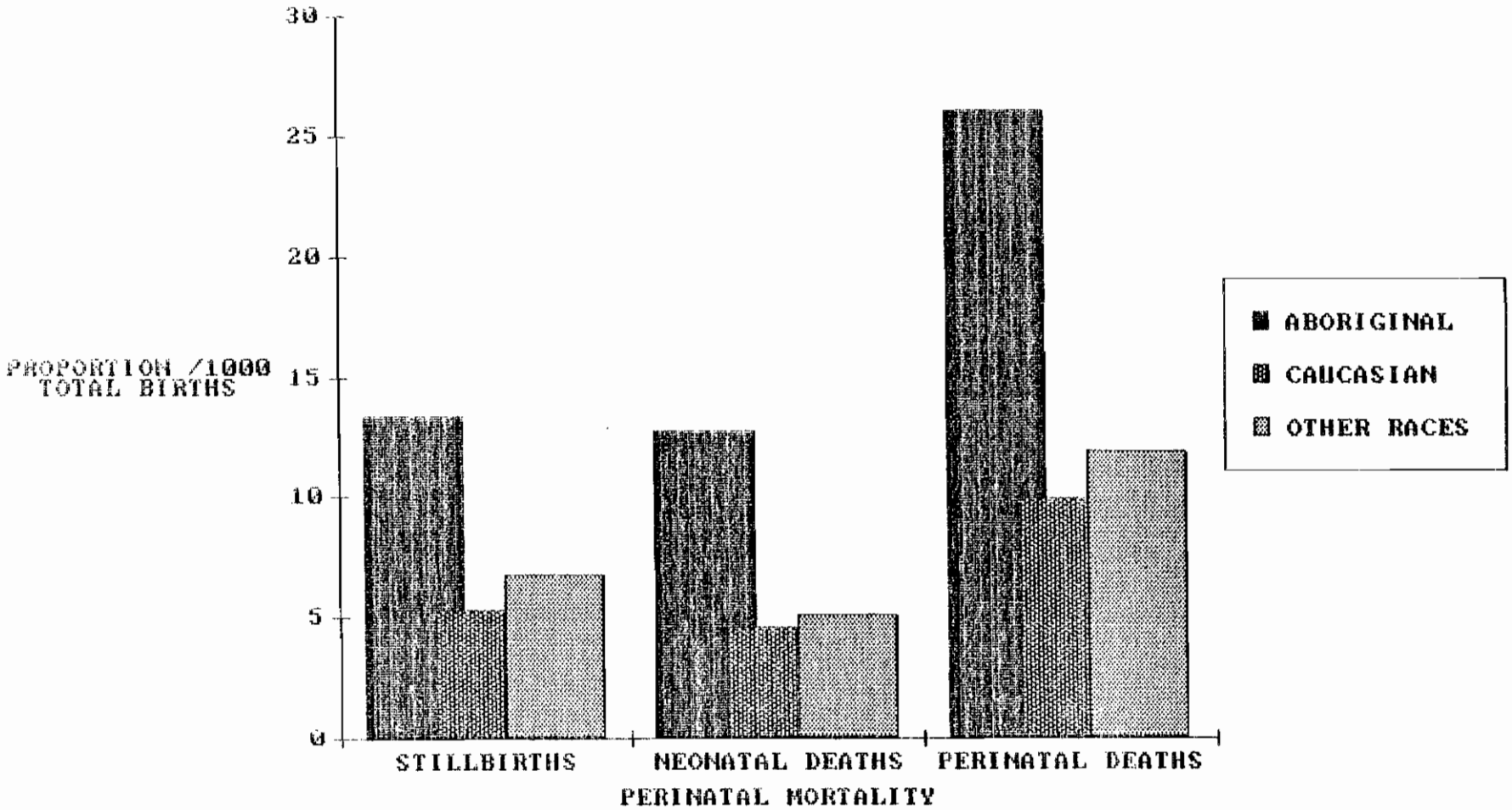
TABLE 22: CAUSES OF POST-NEONATAL DEATH IDENTIFIED BY AGE AT DEATH (IN MONTHS) AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Cause of Death	Age at Death (in months)								Total	
	> 1 - 3		4 - 6		7 - 9		10 - 12			
	No.	%	No.	%	No.	%	No.	%	No.	%
Sudden Infant Death Syndrome	25	53.2	16	34.0	3	6.4	3	6.4	47	100.0
Lethal Congenital Malformations	6	31.6	6	31.6	4	21.2	3	15.8	19	100.0
Infection	1	16.7	3	50.0	1	16.7	1	16.7		
Other	6	40.0	2	13.3	2	13.3	5	33.3	15	100.0
Unknown	1	50.0	1	50.0	0	0.0	0	0.0	2	100.0
TOTAL	39	43.8	28	31.5	10	11.2	12	13.5	89	100.0

Excludes births less than 500 grams birthweight

FIGURE 11

STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
COMMUNITY AND CHILD HEALTH SERVICES

6. Perinatal Mortality Amongst The 1984 Birth Cohort

There were 250 perinatal deaths amongst the 1984 births notified to the Midwives' Notification System. The perinatal death proportion was 10.9/1000 total births.

For aboriginal births the perinatal death proportion of 26.01/1000 total births was almost three times more than for caucasian births (Table 23, Figure II). Perinatal deaths to women of 'other races' showed a proportion of 11.93/1000 total births.

TABLE 23: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Type of Death	Maternal Race			Total Births
	Caucasian	Aboriginal	Other	
Stillbirth/ 1000 total births	5.35	13.42	6.81	5.8
Neonatal/ 1000 livebirths	4.65	12.76	5.15	5.1
Perinatal/ 1000 total births	9.98	26.01	11.93	10.9

Excludes births less than 500 grams birthweight

The overall decline in perinatal mortality in Western Australia is encouraging and although there has been improvements in the provision of maternal and child health services such as the special program for aboriginal mothers and their babies which commenced in 1980, the overall status of the aborigines in relation to the non-aboriginal subpopulation remains poor.[3]

The highest proportion of perinatal deaths were to women whose usual residence was outside the metropolitan area (Table 1, Figure 1). In particular, the Kimberley Statistical Division with a perinatal mortality proportion of 29.41/1000 total births was the highest. This area has a third of the aboriginal population in the State.

Four in every ten women who experienced a perinatal death were less than 25 years of age, but amongst the aboriginal women it was almost seven in ten. (Table 24).

TABLE 24: PERINATAL DEATHS IDENTIFIED BY MATERNAL RACE AND AGE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Maternal Age	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
15 - 19	14	6.8	12	38.7	0	0.0	26	10.4
20 - 24	61	29.8	11	35.5	2	14.3	74	29.6
25 - 29	54	26.3	6	19.4	5	35.7	65	26.0
30 - 34	50	24.4	2	6.5	4	28.6	56	22.4
35 - 39	16	7.8	0	0.0	2	14.3	18	7.2
40 - 44	7	3.4	0	0.0	1	17.1	8	3.2
≥ 45	3	1.5	0	0.0	0	0.0	3	1.2
TOTAL	205	100.0	31	100.0	14	100.0	250	100.0

Excludes births less than 500 grams birthweight

Two thirds of all perinatal deaths in Western Australia in 1984 were of low birthweight (<2500 grams). The adverse low birthweight distribution of aboriginal infants accounted for the major part of the excess in the aboriginal mortality rate[9] (Table 25).

TABLE 25: PERINATAL DEATHS IDENTIFIED BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Birthweight (Grams)	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
500 - 999	61	29.8	15	48.4	3	21.4	79	31.6
1000 - 1499	30	14.6	5	16.1	4	28.6	39	15.6
1500 - 1999	20	9.8	3	9.7	1	7.1	24	9.6
2000 - 2499	22	10.7	1	3.2	2	14.3	25	10.0
		64.9		77.4		71.4		66.8
2500 - 2999	25	12.2	1	3.2	1	7.1	27	10.8
3000 - 3499	30	14.6	4	12.9	2	14.3	36	14.4
3500 - 3999	12	5.9	1	3.2	1	7.1	14	5.6
4000 - 4499	4	2.0	0	0.0	0	0.0	4	1.6
≥ 4500	1	0.5	1	3.2	0	0.0	2	0.8
Total	205	100.0	31	100.0	14	100.0	250	100.0

Excludes births less than 500 grams birthweight

The major causes of perinatal mortality amongst the 1984 births in Western Australia are stillbirths of unknown cause in 38.3% of cases and extremely low birthweight (<1000 grams) in 26.3% (Table 6). For neonatal deaths the major causes were low birthweight (<2500 grams) and lethal congenital malformations. Neonatal mortality is more strongly associated with low birthweight than is the stillbirth rate.[11] (Table 14)

When the month of death was examined for the perinatal deaths amongst the 1984 birth cohort it showed more stillbirths occurred during June (11.9%) and that there were more neonatal deaths during March and April, 22.4%. Overall, perinatal deaths in 1984 were more frequent in March (Table 26).

TABLE 26: MONTH OF PERINATAL DEATH AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Month	Perinatal Death				Total	
	Stillbirth		Neonatal Death			
	No.	%	No.	%	No.	%
January	11	8.2	11	9.5	22	8.8
February	12	9.0	8	6.9	20	8.0
March	13	9.7	13	11.2	26	10.4
April	11	8.2	13	11.2	24	9.6
May	11	8.2	8	6.9	19	7.6
June	16	11.9	8	6.9	24	9.6
July	11	8.2	9	7.8	20	8.0
August	11	8.2	11	9.5	22	8.8
September	3	2.2	11	9.5	14	5.6
October	13	9.7	8	6.9	21	8.4
November	9	6.7	7	6.0	16	6.4
December	13	9.7	9	7.8	22	8.8
Total	134	100.0	116	100.0	250	100.0

Excludes births less than 500 grams birthweight

7. Infant Mortality Amongst the 1984 Birth Cohort

There were 205 infant deaths amongst the 1984 births notified to the Midwives' Notification System (Table 15). Of these, 116 were neonatal deaths and 89 were post-neontal deaths. Neonatal mortality constitutes the larger fraction of infant deaths.[14] The infant mortality proportion was 9.0/1000 livebirths.

The aboriginal infant mortality proportion of 24.7/1000 livebirths was almost three times that of the non-aboriginal sub-population. It is most important that avoidable social and biological factors leading to infant mortality should be identified and prevented where possible.[7]

Similar to the perinatal mortality when examined by statistical division of mother's usual residence, the highest proportion of infant deaths were to women residing outside the metropolitan area and with the largest aboriginal populations (Table 15, Figure I).

Almost half the infant deaths were to women whose age was less than 25 years, and of these women, 15% were teenagers. For the aboriginal infant deaths, almost eight in every ten women were less than 25 years of age and of these 38% were teenagers (Table 27).

TABLE 27: INFANT DEATHS IDENTIFIED BY MATERNAL RACE AND AGE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Maternal Age	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
15 - 19	19	11.4	11	37.9	1	11.1	31	15.1
20 - 24	52	31.1	12	41.4	0	0.0	64	31.2
25 - 29	47	28.1	5	17.2	3	33.3	55	26.8
30 - 34	33	19.8	1	3.4	3	33.3	37	18.0
35 - 39	14	8.4	0	0.0	1	11.1	15	7.3
40 - 44	2	1.2	0	0.0	1	11.1	3	1.5
Total	167	100.0	29	100.0	9	100.0	205	100.0

Excludes births less than 500 grams birthweight

Overall, more than one in five women whose baby was an infant death were identified as unsupported and more than half the aboriginals (Table 28).

TABLE 28: INFANT DEATHS IDENTIFIED BY MATERNAL RACE AND CONJUGAL STATE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Conjugal State	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Single	22	13.2	15	51.7	1	11.1	38	18.5
Married/defacto	139	83.2	14	48.3	7	77.8	160	78.0
*Other	6	3.6	0	0.0	1	11.1	7	3.4
Total	167	100.0	29	100.0	9	100.0	205	100.0

Excludes births less than 500 grams birthweight

* Other includes separated, divorced and widowed

Thirty six percent of infant deaths occurred to mothers who had had their first baby (Table 29).

TABLE 29: INFANT DEATHS IDENTIFIED BY MATERNAL RACE AND PARITY AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Parity	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
0	60	3.5	8	27.6	5	55.6	73	35.6
1 - 2	82	49.1	13	44.8	3	33.3	98	47.8
3 - 5	22	13.2	8	27.6	1	11.1	31	15.1
>/ 6	2	1.2	0	0.0	0	0.0	2	1.0
Unknown	1	0.6	0	0.0	0	0.0	1	0.5
Total	167	100.0	29	100.0	9	100.0	205	100.0

Excludes births less than 500 grams birthweight

There were 11 multiple births amongst the infant deaths of these 10 were caucasian and one baby was aboriginal (Table 30).

TABLE 30: INFANT DEATHS IDENTIFIED BY MATERNAL RACE AND PLURALITY AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Maternal Race	Plurality				Total	
	Singleton		Multiple			
	No.	%	No.	%	No.	%
Caucasian	157	80.9	10	90.9	167	81.5
Aboriginal	28	14.4	1	8.1	29	14.1
Other	9	4.6	0	0.0	9	4.4
Total	194	100.0	11	100.0	205	100.0

Excludes births less than 500 grams birthweight

There were more male infant deaths than female (Table 31).

TABLE 31: INFANT DEATHS IDENTIFIED BY MATERNAL RACE AND SEX AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Sex	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
Male	84	50.3	16	55.2	5	55.6	105	51.2
Female	83	49.7	13	44.8	4	44.4	100	48.8
Total	167	100.0	29	100.0	9	100.0	205	100.0

Excludes births less than 500 grams birthweight

Almost half of the infant deaths were of low birthweight (<2500 grams). Amongst the aboriginal infant deaths six in every ten babies were of low birthweight. Aboriginals tend to have a disadvantaged life style and this possibly more than adequacy of health care, seems to be responsible for the excessive mortality rates.[14] (Table 32).

TABLE 32: INFANT DEATHS IDENTIFIED BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Birthweight (Grams)	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
500 - 999	31	18.6	8	27.6	0	0.0	39	19.0
1000 - 1499	17	10.2	1	3.4	2	22.2	20	9.8
1500 - 1999	14	8.4	6	20.7	0	0.0	20	9.8
2000 - 2499	16	9.6	2	6.9	1	11.1	19	9.3
		46.8		58.6		33.3		47.9
2500 - 2999	21	12.6	5	17.2	2	22.2	28	13.7
3000 - 3499	45	26.9	6	20.7	3	33.3	54	26.3
3500 - 3999	15	9.0	1	3.4	1	11.1	17	8.3
4000 - 4499	7	4.2	0	0.0	0	0.0	7	3.4
>/ 4500	1	0.6	0	0.0	0	0.0	1	0.5
Total	167	100.0	29	100.0	9	100.0	205	100.0

Excludes births less than 500 grams birthweight

The major causes of infant death amongst the 1984 births in Western Australia are low birthweight (<2500 grams), lethal congenital malformations and Sudden Infant Death Syndrome (cot death). The caues of Sudden Infant Death Syndrome are actively being sought around the world[4] whereas the cause of low birthweight and congenital malformations are priority areas for resources and research (Tables 14 & 22).

More than half the infant deaths occurred in the neonatal period and almost 90% in the first six months of life (Table 33).

TABLE 33: INFANT DEATHS IDENTIFIED BY MATERNAL RACE AND AGE AT DEATH AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Age at Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
0 - 28 days	95	56.8	15	51.7	6	66.7	116	56.6
> 1 - 3 months	30	18.0	7	24.1	2	22.2	39	19.0
4 - 6 months	22	13.2	5	17.2	1	11.1	28	13.7
7 - 9 months	10	6.0	0	0.0	0	0.0	10	4.9
10 - 12 months	10	6.0	2	6.9	0	0.0	12	5.9
Total	167	100.0	29	100.0	9	100.0	205	100.0

Excludes births less than 500 grams birthweight

8. BIRTHS IN WESTERN AUSTRALIA IN 1984

8.1 Births

During 1984 there were 22,917 babies born in Western Australia. These births were all 500 grams or more in birthweight and notified to the Midwives' Notification System.

The majority of births occurred in hospital and of these 21.7% were in the metropolitan teaching hospital. Another 27% of births occurred in country hospitals and 161, or 0.7% of the total were non-hospital births. The non-hospital births included 65 babies born before arrival at hospital (B.B.A.) and 96 who were planned home births.[6]

Maternal race was identified for the births in 1984 and showed 89.7% of the total were caucasian, 5.2% aboriginal and 5.1% of 'other races' (e.g. Asian, Indian, Polynesian, etc) (Table 34).

TABLE 34: CONDITION AT BIRTH IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Race	Condition at Birth				Total Births		Stillbirth Proportion/1000 total births
	Stillbirth		Livebirth				
	No.	%	No.	%	No.	%	
Caucasian	110	82.1	20441	89.7	20551	89.7	5.35
Aboriginal	16	11.9	1176	5.2	1192	5.2	13.42
Other	8	6.0	1166	5.1	1174	5.1	6.81
Total	134	100.0	22783	100.0	22917	100.0	

Excludes births less than 500 grams birthweight

Of the 22,917 total births there were 22,412 (97.8%) singleton and 505 (2.2%) multiple births. Included in the multiple births were six sets of triplets and three single twin babies whose birthweight was more than 500 grams.

Amongst the births were 22,287 liveborn singleton babies, of whom 19,994 were caucasian, 1,146 aboriginal and 1,147 of 'other races' and of the 125 singleton stillbirths, 103 were caucasian, 16 aboriginal and six were of 'other races'. Of the multiple stillbirths there were seven caucasian babies and two of 'other races' (Table 35).

TABLE 35: PLURALITY AND CONDITION AT BIRTH IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Plurality and Condition at Birth	Maternal Race						Total	
	Caucasian		Aboriginal		Total			
	No.	(4)	No.	(5)	No.	(6)	No.	(7)
SINGLETON								
Livebirths	19994		1146		1147		22287	
(1) Stillbirths	103	5.13	16	13.77	6	5.20	125	5.58
Total	20097		1162		1153		22412	
* MULTIPLE								
Livebirths	447		30		19		496	
(2) Stillbirths	7	15.42	0	-	2	-	9	17.82
Total	454		30		21		505	
TOTAL								
LIVEBIRTHS	20441		1176		1166		22783	
(3) STILLBIRTHS	110	5.35	16	13.42	8	6.81	134	5.85
Total	20551		1192		1174		22917	

Excludes births less than 500 grams birthweight

* Includes 3 single twin babies whose birthweight was 500 grams or more

Where totals are less than five proportions have not been calculated

(1) Singleton stillbirth proportion/1000 total singleton births
(2) Multiple stillbirth proportion/1000 total multiple births
(3) Total stillbirth proportion/1000 total births
(4) Caucasian stillbirth proportion
(5) Aboriginal stillbirth proportion
(6) Other races' stillbirth proportion
(7) Total, singleton and multiple stillbirth proportion

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE

TABLE 36: CONDITION AT BIRTH IDENTIFIED BY STATISTICAL DIVISION OF MATERNAL RESIDENCE AND RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

STATISTICAL DIVISION	MATERNAL RACE																TOTAL BIRTHS						
	CAUCASIAN						ABORIGINAL						OTHER										
	LIVEBORN		STILLBORN		TOTAL		LIVEBORN		STILLBORN		TOTAL		LIVEBORN		STILLBORN		TOTAL		LIVEBORN		(1)	STILLBORN		TOTAL	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%		NO.	%	NO.	%
Perth	13840	67.7	70	63.6	13910	67.7	283	24.1	0	0.0	283	23.7	909	78.0	4	50.0	913	77.8	15032	66.0	15.3	74	55.2	15106	65.9
Southwest	1906	9.3	13	11.8	1919	9.3	34	2.9	0	0.0	34	2.9	32	2.7	0	0.0	32	2.7	1972	8.7	17.8	13	9.7	1985	8.7
Lower Great Southern	756	3.7	3	2.7	759	3.7	46	3.9	1	6.3	47	3.9	32	2.7	0	0.0	32	2.7	834	3.7	18.2	4	3.0	838	3.7
Upper Great Southern	440	2.2	5	4.5	445	2.2	27	2.3	0	0.0	27	2.3	7	0.6	0	0.0	7	0.6	474	2.1	19.7	5	3.7	479	2.1
Midlands	846	4.1	4	3.6	850	4.1	41	3.5	0	0.0	41	3.4	15	1.3	0	0.0	15	1.3	902	4.0	17.7	4	3.0	906	4.0
South Eastern	867	4.2	5	4.5	872	4.2	99	8.4	5	31.3	104	8.7	17	1.5	0	0.0	17	1.4	983	4.3	21.3	10	7.5	993	4.3
Central	836	4.1	4	3.6	840	4.1	188	16.0	3	18.8	191	16.0	33	2.8	0	0.0	33	2.8	1057	4.6	19.8	7	5.2	1064	4.6
Pilbara	736	3.6	4	3.6	740	3.6	126	10.7	0	0.0	126	10.6	109	9.3	4	50.0	113	9.6	971	4.3	19.9	8	6.0	979	4.3
Kimberley	193	0.9	2	1.8	195	0.9	331	28.1	7	43.8	338	28.4	11	0.9	0	0.0	11	0.9	535	2.3	26.7	9	6.7	544	2.4
W.A. unspecified	4	0.0	0	0.0	4	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	4	0.0	-	0	0.0	4	0.0
Outside W.A.	14	0.1	0	0.0	14	0.1	1	0.1	0	0.0	1	0.1	1	0.1	0	0.0	1	0.1	16	0.1	-	0	0.0	16	0.1
Unknown	3	0.0	0	0.0	3	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	3	0.0	-	0	0.0	3	0.0
TOTAL	20441	100.0	110	100.0	20551	100.0	1176	100.0	16	100.0	1192	100.0	1166	100.0	8	100.0	1174	100.0	22783	100.0	16.5	134	100.0	22917	100.0

Excludes births less than 500 grams birthweight

(1) Crude Birthrate - livebirths/1000 person-years

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE

The majority of births in 1984 were to women whose usual residence was within the Perth Statistical Division (66%), however, the crude birth rate was highest outside the metropolitan area (Table 36, Figure 1).

Almost seven percent of all births were to women whose age was less than 20 years and of these women 27.6% were aboriginal. Births to aborigines and teenagers are known to be a higher risk of low birthweight.[13]

Of the total 22,991 births, 6.1% were of low birthweight (<2500 grams) and 1.2% of these were very low birthweight (<1500 grams). The birthweight distribution of all births and particularly the proportion which is of low birthweight (<2500 grams) are becoming more widely used as an indices of the reproductive health of a community.[8]

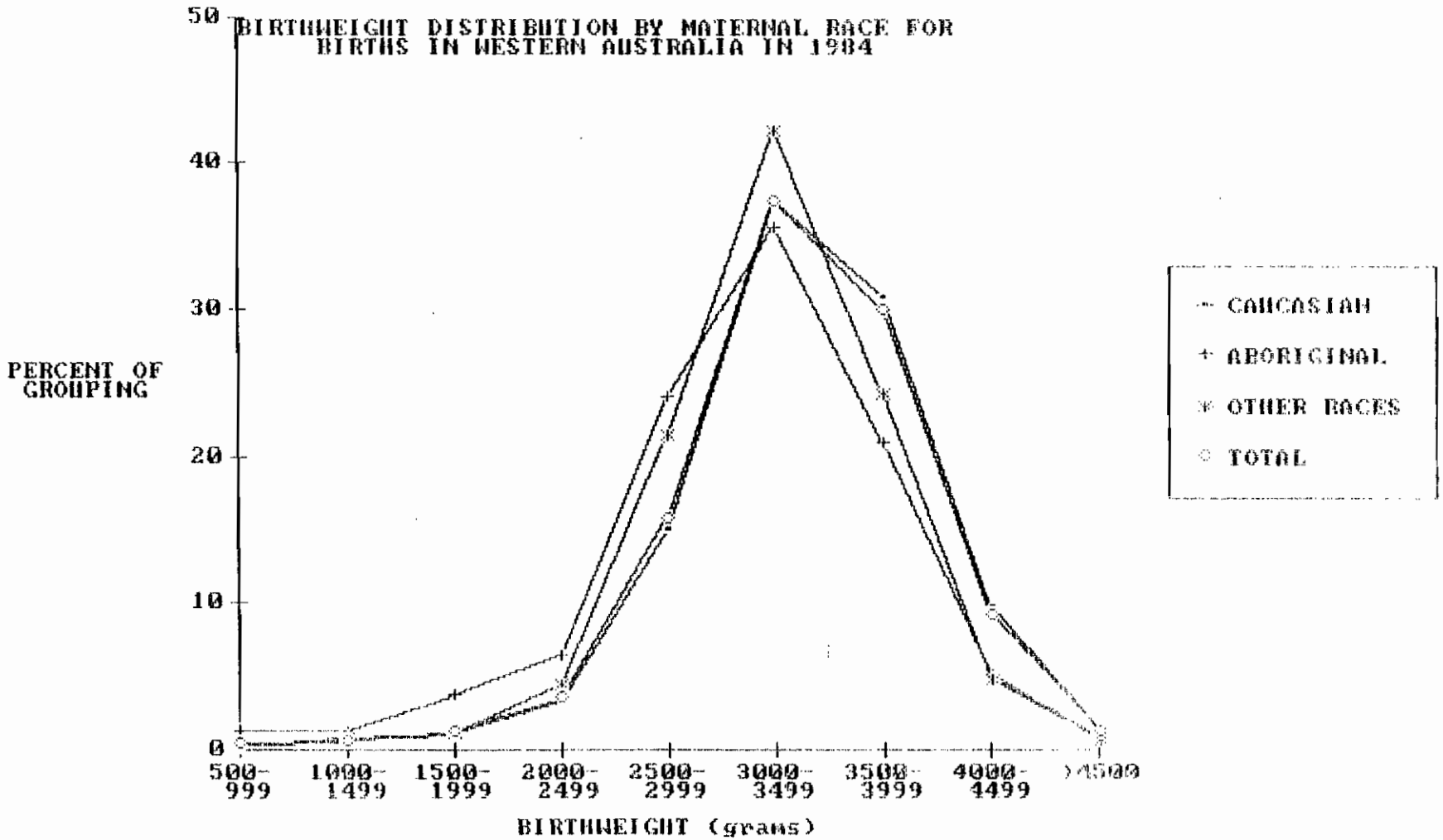
Low birthweight (<2500 grams) amongst the aboriginal births was 13.1%. This was more than double that of the caucasian births. Babies of low birthweight to women of 'other races' represented 6.8% (Table 37, Figure III).

TABLE 37: BIRTHWEIGHT DISTRIBUTION IDENTIFIED BY MATERNAL RACE AMONGST 1984 BIRTHS IN WESTERN AUSTRALIA

Birthweight (Grams)	Maternal Race						Total		
	Caucasian		Aboriginal		Other				
	No.	%	No.	%	No.	%	No.	%	(1983 %)
500 - 999	85	0.4	17	1.4	3	0.3	105	0.5	(0.6)
1000 - 1499	135	0.7	17	1.4	9	0.8	161	0.7	(0.6)
1500 - 1999	230	1.1	45	3.8	14	1.2	289	1.3	(1.2)
2000 - 2499	696	3.4	78	6.5	53	4.5	827	3.6	(3.9)
		5.6		13.1		6.8		6.1	(6.4)
2500 - 2999	3098	15.1	287	24.1	252	21.5	3637	15.9	(15.6)
3000 - 3499	7684	37.4	425	35.7	495	42.2	8604	37.5	(37.2)
3500 - 3999	6343	30.9	250	21.0	284	24.2	6877	30.0	(30.3)
4000 - 4499	1987	9.7	62	5.2	56	4.8	2105	9.2	(9.1)
≥ 4500	293	1.4	11	0.9	8	0.7	312	1.4	(1.4)
Total	20551	100.0	1192	100.0	1174	100.0	22917	100.0	(100.0)

Excludes births less than 500 grams birthweight

FIGURE III



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES' NOTIFICATION SYSTEM

8.2 Livebirths

There were 22,783 livebirths in Western Australia in 1984 notified to the Midwives' Notification System. The number of livebirths to caucasian women were 20,441, aboriginal 1,176 and other races 1,166 (Table 35).

Information on the registration of livebirths, from the Western Australian Branch of the Bureau of Statistics, identified 21,625 livebirths in 1984 (Figure IV). This figure differs from the number in the Midwives' Notification System as it is based on the birth registrations received in the calendar year by the Registrar General's Office.

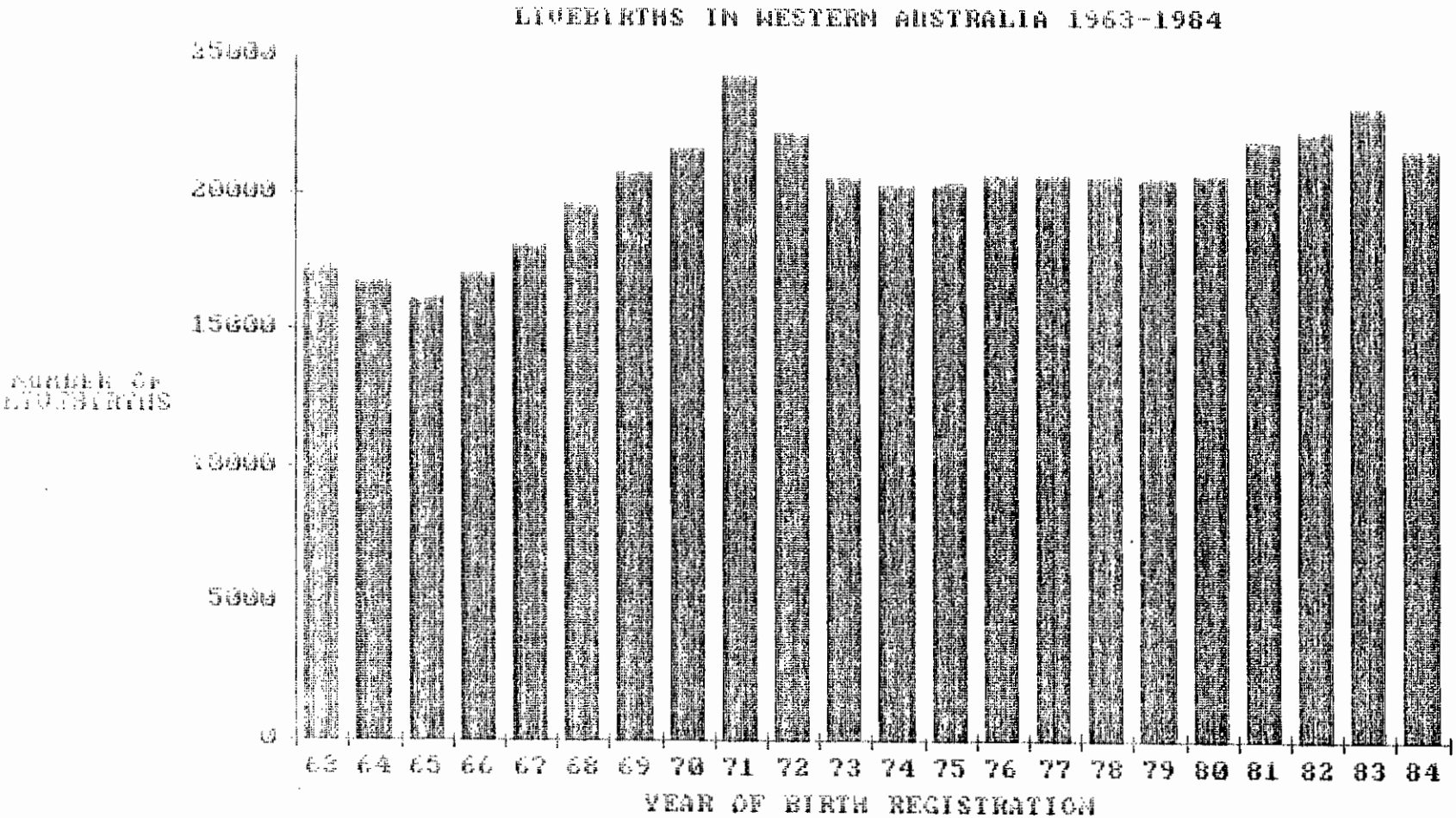
8.3 Crude Birth Rate

The data from the Midwives' Notification System and the population figures from the Australian Bureau of Statistics showed the crude birth rate for Western Australia in 1984 was 16.5 livebirths/1000 person years (Table 36).

When the number of birth registrations were used, the crude birth rate was 15.6 livebirths/1000 person years.

Using the usual residential address of the mother identified from the Midwives' Notification System, the statistical divisions outside the metropolitan area generally had a higher crude birth rate. The highest rates occurred in these areas with the largest aboriginal population such as the Kimberley South Eastern, Pilbara and Central (Table 36, Figure I).

FIGURE IV



For years 1963-77 numbers are based on usual residence
For years 1978-84 numbers are based on state of residence

SOURCE: REGISTRAR GENERAL'S OFFICE
AUSTRALIAN BUREAU OF STATISTICS

8.4 Fertility Rates

Age specific fertility rates for the aboriginal and non-aboriginal subpopulations are shown in Table 38 and Figure V.

Overall the aboriginal fertility rate was more than double that for non-aboriginals and aboriginal teenage fertility was nine times greater than for the non-aboriginal teenagers.

Fertility rates for women of 'other races' has not been reported as denominator information is not available.

TABLE 38: FERTILITY RATES FOR ABORIGINAL AND NON-ABORIGINAL WOMEN IN WESTERN AUSTRALIA IN 1984

Maternal Age	Aboriginal			Non-Aboriginal		
	Births	Population	Fertility Rate (1)	Births	Population	Fertility Rate (1)
15 - 19	412	2237	184.18	1110	55507	20.00
20 - 24	415	1860	223.12	5946	57852	102.78
25 - 29	208	1487	139.88	8510	57286	148.55
30 - 34	94	1139	82.53	4602	56677	81.20
35 - 39	30	922	32.54	1159	51355	22.57
40 - 44	7	733	9.55	142	39676	3.58
TOTAL	1166	8378	139.17	21469	318353	67.44

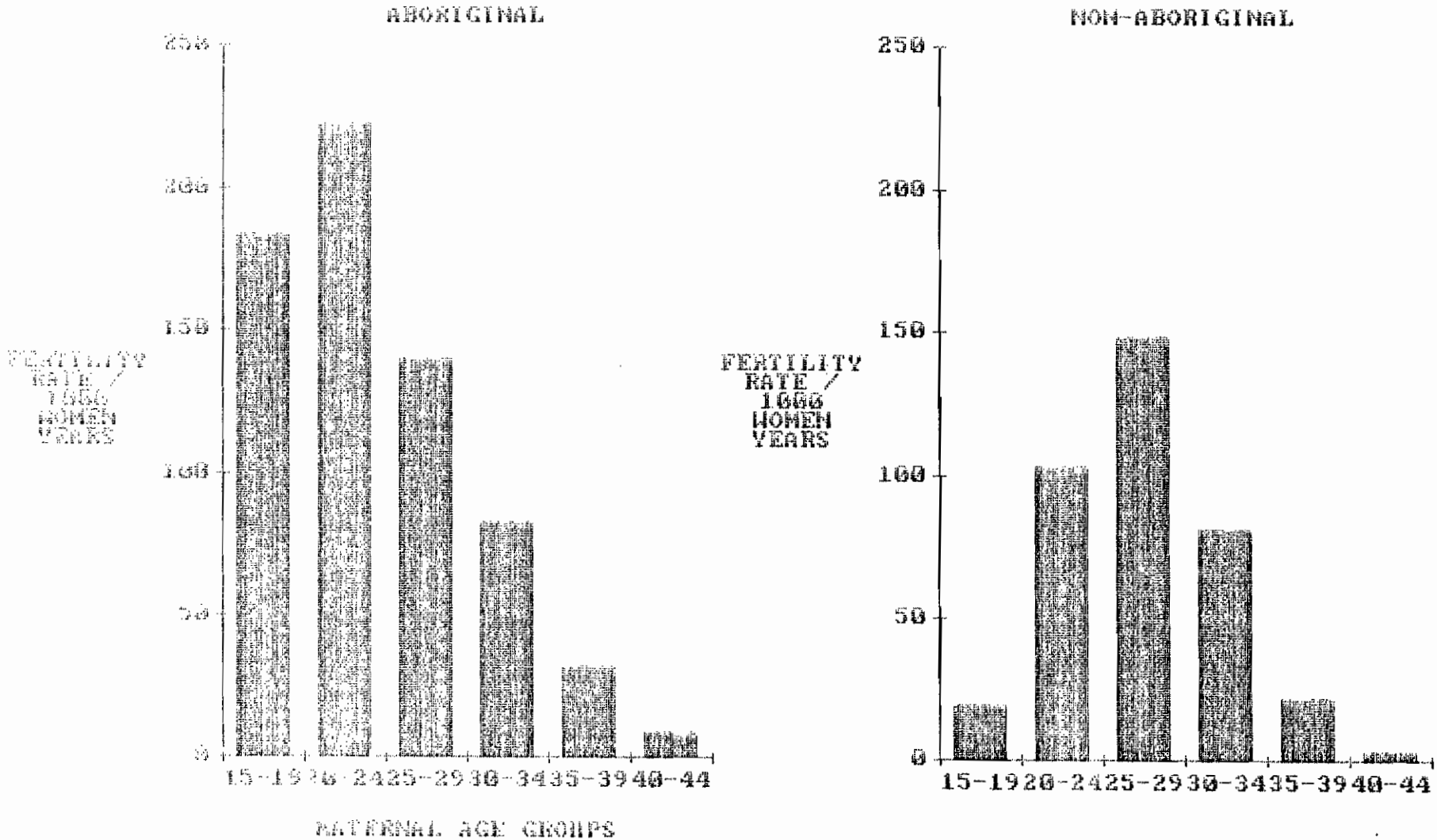
Excludes births less than 500 grams birthweight

(1) Fertility rate-total births/1000 women-years

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
DR D. HICKS' WESTERN AUSTRALIAN ABORIGINAL STATISTICS, 1983
AUSTRALIAN BUREAU OF STATISTICS

FIGURE V

FERTILITY RATES FOR ABORIGINAL AND NON-ABORIGINAL WOMEN CONFINED IN WESTERN AUSTRALIA IN 1984



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
[5]DR D. HICKS' WESTERN AUSTRALIAN ABORIGINAL STATISTICS 1983
AUSTRALIAN BUREAU OF STATISTICS

TABLE 39: LIVEBIRTHS, STILLBIRTHS AND TOTAL BIRTHS IDENTIFIED AS ABORIGINAL, NON-ABORIGINAL AMONGST BIRTHS IN WESTERN AUSTRALIA IN 1980-1984

YEAR	LIVEBIRTHS				STILLBIRTHS						TOTAL BIRTHS					
	ABORIGINAL	NON-ABORIGINAL	TOTAL		ABORIGINAL		NON-ABORIGINAL		TOTAL		ABORIGINAL		NON-ABORIGINAL		TOTAL	
	NO.	NO.	NO.	(1)	NO.	(2)	NO.	(2)	NO.	(2)	NO.	%	NO.	%	NO.	%
1980	1029	19595	20624	16.2	12	11.5	143	7.2	155	7.5	1041	5.0	19738	95.0	20779	100.0
1981	1093	20948	22041	18.8	22	19.7	131	6.2	153	6.9	1115	5.0	21079	95.0	22194	100.0
1982	1113	21071	22184	16.3	16	14.2	139	6.6	155	6.9	1129	5.1	21210	94.9	22339	100.0
1983	1135	21737	22872	16.9	14	12.2	143	6.5	157	6.8	1149	5.0	21880	95.0	23029	100.0
1984	1176	21607	22783	15.6	16	13.4	118	5.4	134	5.8	1192	5.2	21725	94.8	22917	100.0

Excludes births less than 500 grams birthweight

1980-1983 based on year of death
1984 based on year of birth

(1) CRUDE BIRTH RATE - livebirths/1000 person years (ABS)
(2) STILLBIRTH PROPORTION/1000 total births

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
CHILD AND COMMUNITY HEALTH SERVICES

9. BIRTHS, PERINATAL AND INFANT MORTALITY IN WESTERN AUSTRALIA 1980-1984

9.1 Livebirths, Stillbirths and Total Births 1980-1984

The aboriginal and non-aboriginal subpopulations have been identified amongst the total births in Western Australia for 1980 to 1984. These births were notified to the Midwives' Notification System (Table 39).

Additional information from the Western Australian branch of the Bureau of Statistics on the registration of livebirths by calendar year are included in Figure II. There was a steady increase in the number of livebirth registrations from 1980 to 1983 then in 1984 there was quite a dramatic fall. This is thought to be mainly due to administrative changes in the method of registration as births which occurred late in the year have not been registered until the following year.

The number of births notified to the Midwives' Notification System have increased from 20,779 in 1980 to 22,917 in 1984, while the number of stillbirths have decreased (Figure VI).

The Australian Bureau of Statistics information shows that the crude birth rate continues to fall and in 1984 in Western Australia it was 15.6/1000 person-years.

9.2 Stillbirths, Neonatal and Perinatal Mortality 1980-1984

The aboriginal and non-aboriginal subpopulations have been identified amongst the perinatal deaths in Western Australia for 1980 to 1984. These data were notified to the Midwives' Notification System either by Notification of Case Attended Form 2 or from additional information from the Registrar General's Office and/or the Community and Child Health Services (Table 40).

TABLE 40: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY IDENTIFIED AS ABORIGINAL, NON-ABORIGINAL AMONGST BIRTHS IN WESTERN AUSTRALIA IN 1980-1984

YEAR	STILLBIRTHS						NEONATAL DEATHS						PERINATAL DEATHS					
	ABORIGINAL		NON-ABORIGINAL		TOTAL		ABORIGINAL		NON-ABORIGINAL		TOTAL		ABORIGINAL		NON-ABORIGINAL		TOTAL	
	NO.	(1)	NO.	(1)	NO.	(1)	NO.	(2)	NO.	(2)	NO.	(2)	NO.	(1)	NO.	(1)	NO.	(1)
1980	12	11.5	143	7.2	155	7.5	21	20.4	104	5.3	125	6.1	33	31.7	247	12.5	280	13.5
1981	22	19.7	131	6.2	153	6.9	15	13.7	103	4.9	118	5.4	37	33.2	234	11.1	271	12.2
1982	16	14.2	139	6.6	155	6.9	17	15.3	101	4.8	118	5.3	33	29.2	240	11.3	273	12.2
1983	14	12.2	143	6.5	157	6.8	11	9.7	97	4.5	108	4.7	25	21.8	240	11.0	265	11.5
1984	16	13.42	118	5.4	134	5.8	15	12.8	101	4.7	116	5.1	31	26.0	219	10.1	250	10.9

Excludes births less than 500 grams birthweight

1980-1983 based on year of death
1984 based on year of birth

(1) Stillbirth and Perintal Death Proportions/1000 total births
(2) Neonatal Death Proportion/1000 livebirths

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
CHILD AND COMMUNITY HEALTH SERVICES

The proportions of stillbirths has decreased from 7.5/1000 in 1980 to 5.8/1000 total births in 1984, however, there appeared to be a slight increase in the 1984 aboriginal stillbirth proportion which was 13.4/1000 total births (Figure VI). This may have been due to a more complete ascertainment of deaths linking them to the birth cohort or perhaps an underestimate of the 1983 deaths.

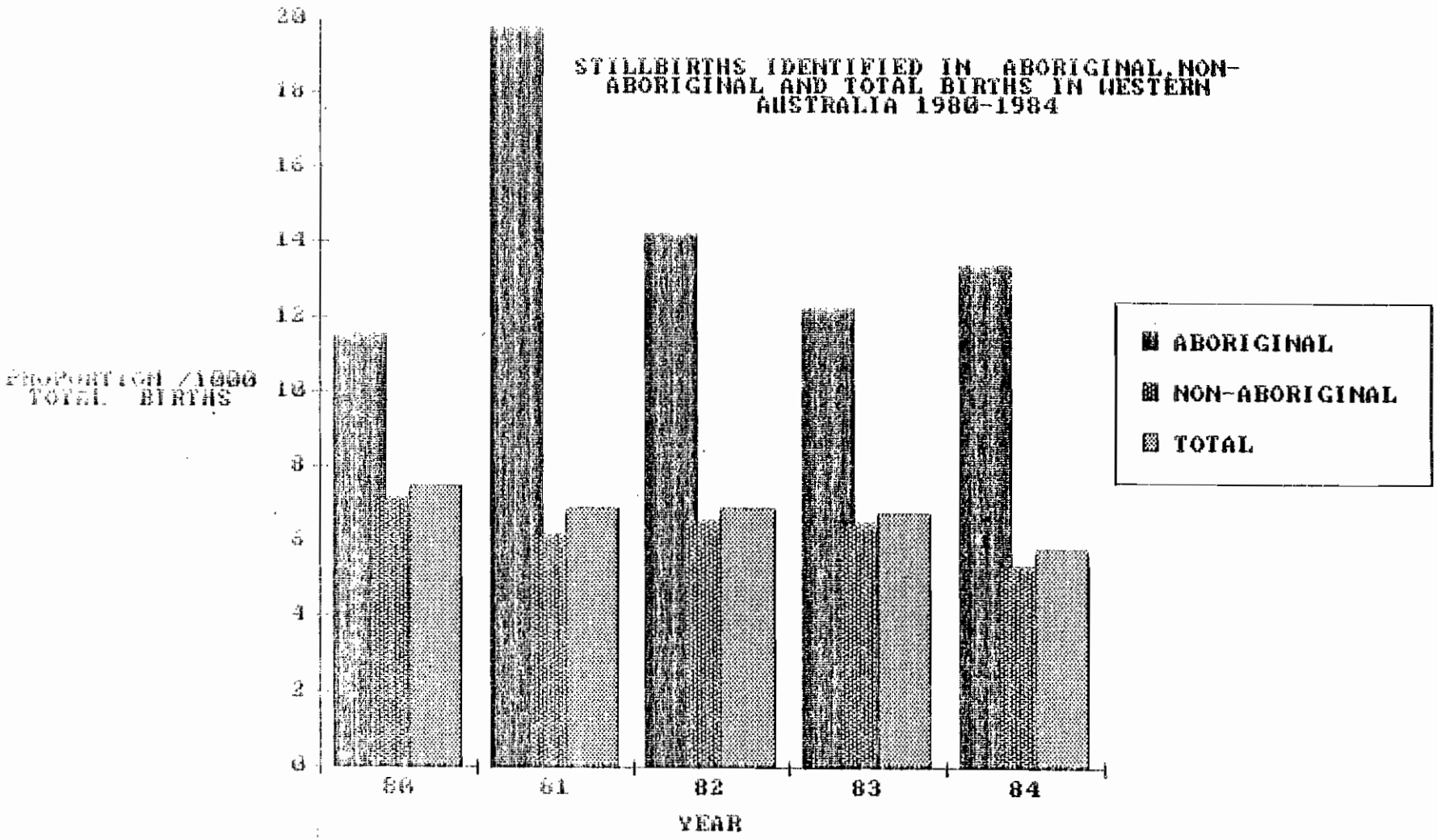
An increase in the overall neonatal death proportion was noted in 1984, which was 5.1/1000 livebirths. This was greater than for 1983, which was 4.7/1000 livebirths. Both the aboriginal and non-aboriginal neonatal death proportions had increased from 1983 (Figure VII). The aboriginal neonatal and perinatal mortality proportion was almost three times greater than for the non-aboriginal sub-population.

Aboriginal infants are more at risk of low birthweight and perinatal mortality than caucasian infants.[9] The aboriginal perinatal mortality proportion for 1984 was 26/1000 total births, compared to the 1983 figure of 21.8/1000 total births (Figure VIII). The increase, like that of the stillbirths, may be due to more complete recording of death information.

9.3 Neonatal, Postneonatal and Infant Mortality 1980-1984

The aboriginal and non-aboriginal subpopulations have been identified amongst the infant deaths in Western Australia for 1980 to 1984. These deaths were notified to the Midwives' Notification System either by Notification of Case Attended Form 2 or from additional information from the Registrar General's Office and/or the Community Child Health Services (Table 41).

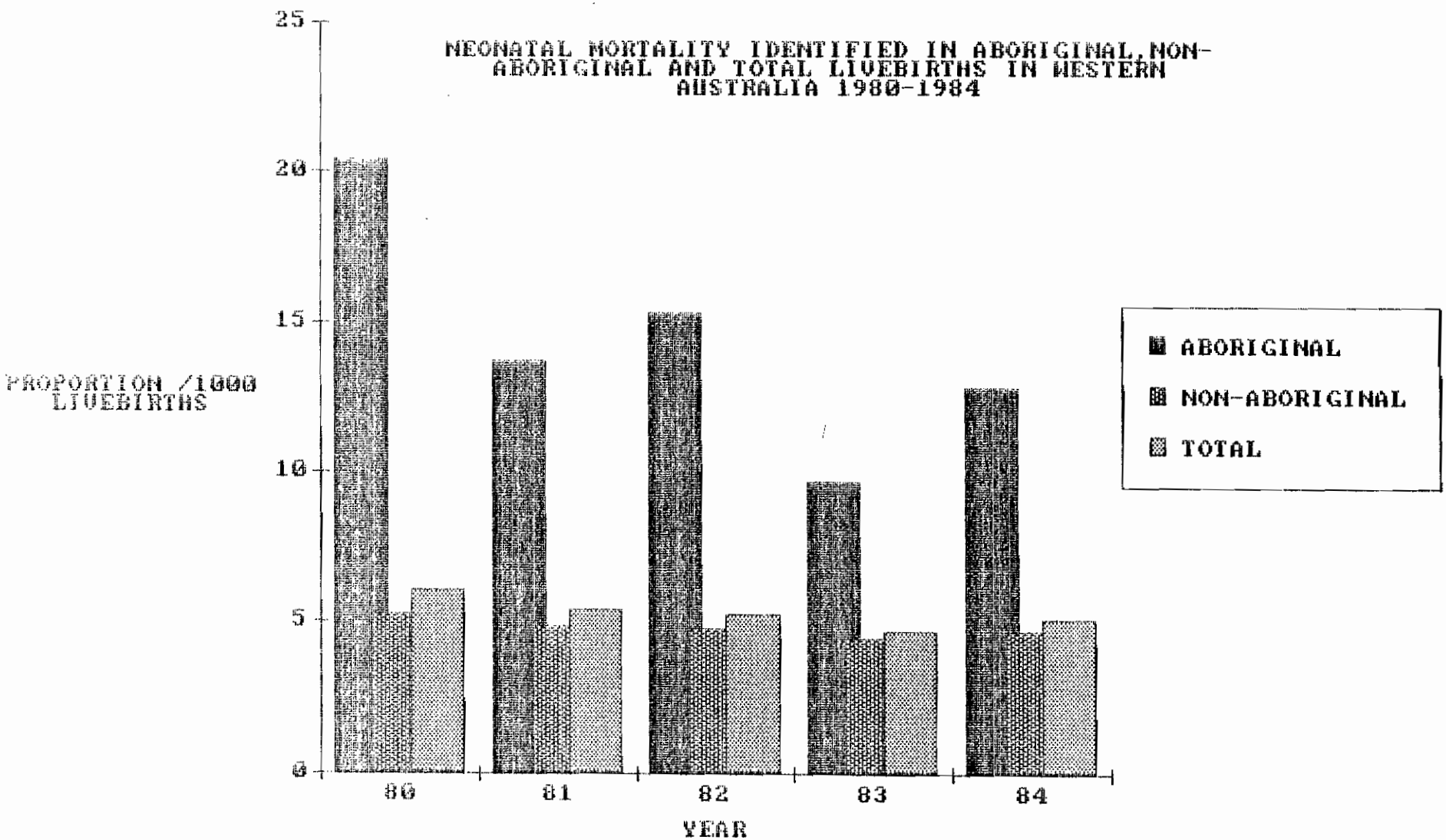
FIGURE VI



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
COMMUNITY AND CHILD HEALTH SERVICES

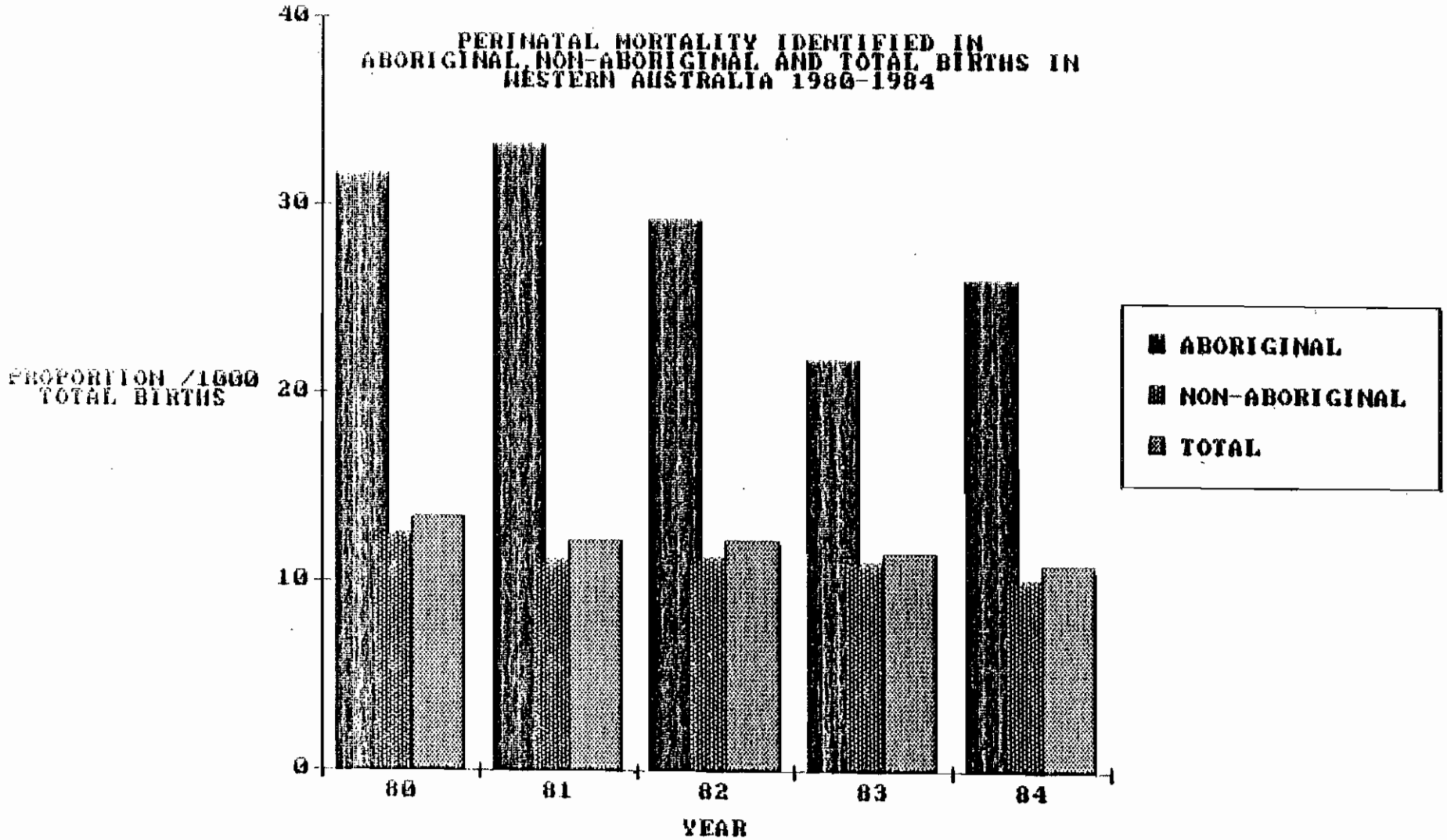
FIGURE VII



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES" NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
COMMUNITY AND CHILD HEALTH SERVICES

FIGURE



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
COMMUNITY AND CHILD HEALTH SERVICES

TABLE 41: NEONATAL, POST-NEONATAL AND INFANT MORTALITY IDENTIFIED AS ABORIGINAL, NON-ABORIGINAL AMONGST BIRTHS IN WESTERN AUSTRALIA IN 1980-1984

YEAR	NEONATAL DEATHS						POST-NEONATAL DEATHS						INFANT DEATHS					
	ABORIGINAL		NON-ABORIGINAL		TOTAL		ABORIGINAL		NON-ABORIGINAL		TOTAL		ABORIGINAL		NON-ABORIGINAL		TOTAL	
	NO.	(1)	NO.	(1)	NO.	(1)	NO.	(1)	NO.	(1)	NO.	(1)	NO.	(1)	NO.	(1)	NO.	(1)
1980	21	20.4	104	5.3	125	6.1	11	10.7	55	2.8	66	3.2	32	31.1	159	8.1	191	9.3
1981	15	13.7	103	4.9	118	5.4	6	5.5	63	3.0	69	3.1	21	19.2	166	7.9	187	8.5
1982	17	15.3	101	4.8	118	5.3	11	9.9	69	3.3	80	3.6	28	25.2	170	8.1	198	8.9
1983	11	9.7	97	4.5	108	4.7	17	15.0	59	2.7	76	3.3	28	24.7	156	7.2	184	8.0
1984	15	12.8	101	4.7	116	5.1	14	11.9	75	3.5	89	3.9	29	24.7	176	8.1	205	9.0

Excludes births less than 500 grams birthweight

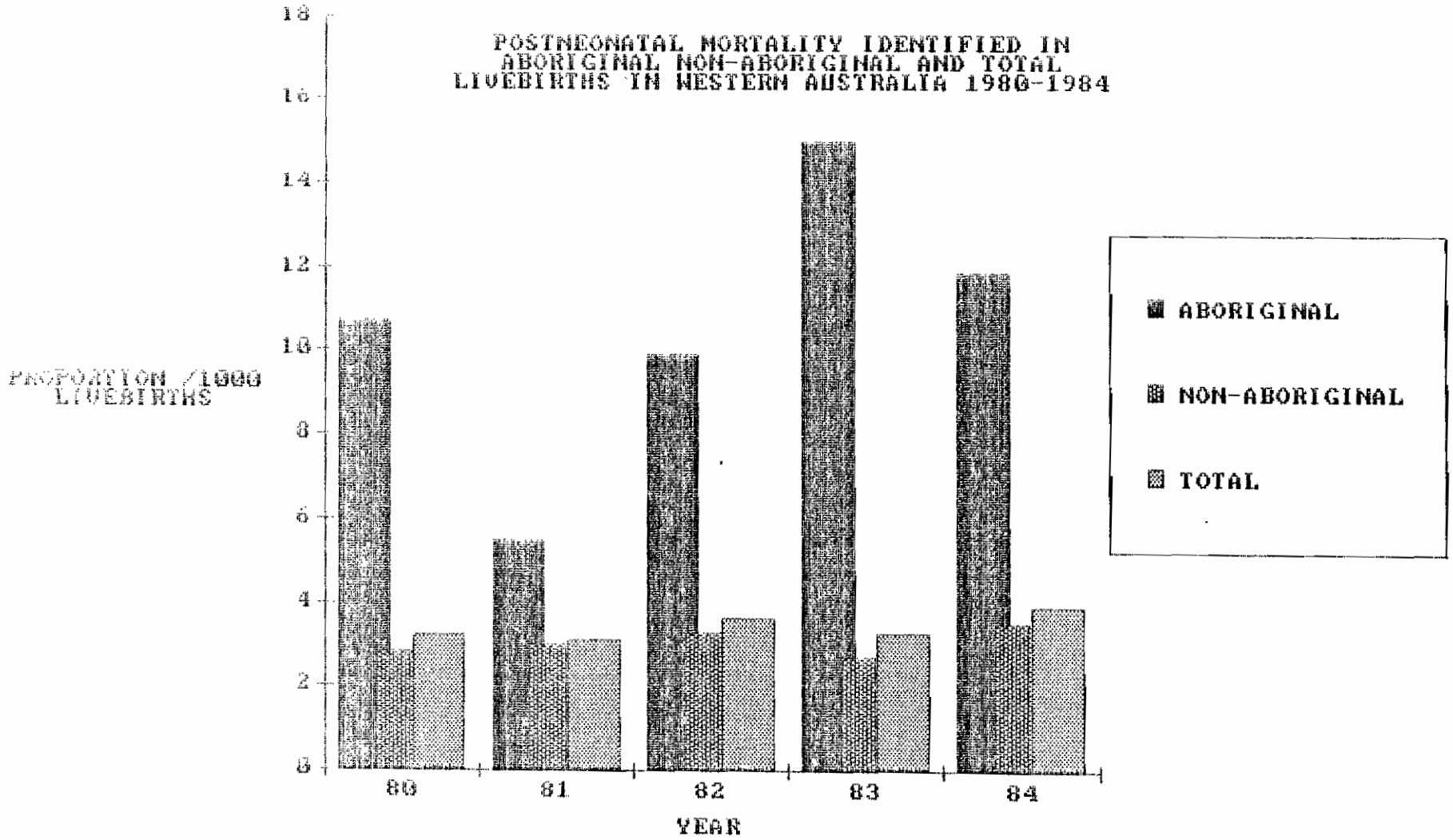
1980-1983 based on year of death
1984 based on year of birth

(1) Neonatal, Postneonatal and Infant Death Proportion/1000 livebirths

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
CHILD AND COMMUNITY HEALTH SERVICES

The non-aboriginal post-neonatal mortality had increased amongst the 1984 births to 3.5/1000 livebirths from 2.7/1000 livebirths in 1983 (Figure IX). With the increase in post-neonatal mortality and neonatal mortality in 1984, the infant death proportions for non-aboriginals was 8.1/1000 livebirths. This is the highest infant mortality proportion for Western Australia since 1980 (Figure X). Infant mortality rates are frequently quoted as an index of health status of a country or racial group.[9] The aboriginal infant mortality proportion for 1984 remained the same as in 1983.

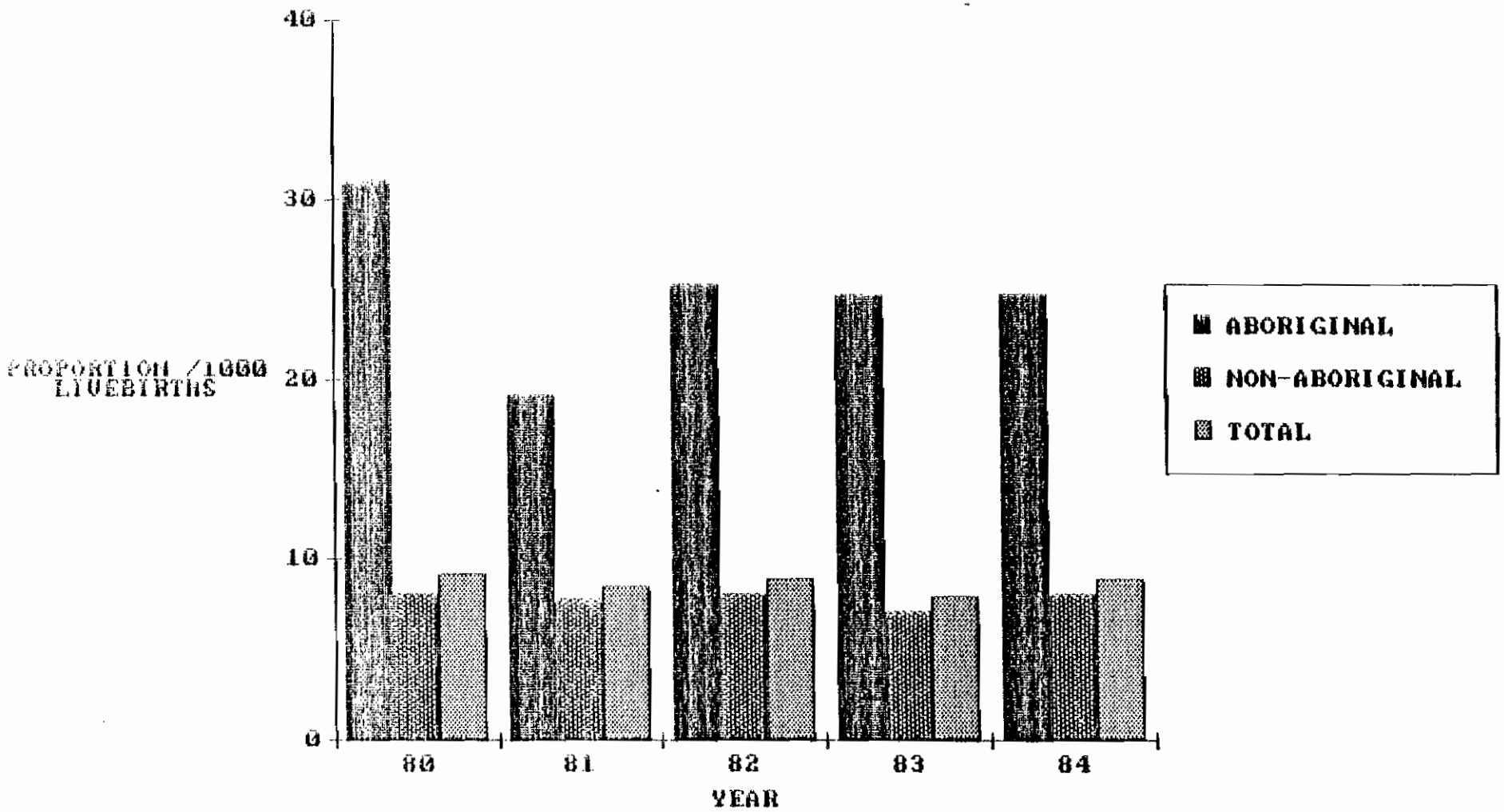
FIGURE IX



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
COMMUNITY AND CHILD HEALTH SERVICES

INFANT MORTALITY IDENTIFIED IN ABORIGINAL, NON-ABORIGINAL AND TOTAL LIVEBIRTHS IN WESTERN AUSTRALIA 1980-1984



Excludes births less than 500 grams birthweight

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE
COMMUNITY AND CHILD HEALTH SERVICES

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