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# THE 1989 WESTERN AUSTRALIAN BIRTH COHORT

## PERINATAL AND INFANT MORTALITY IDENTIFIED BY MATERNAL RACE

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## SUMMARY

The Midwives' Notification System of Western Australia identified 25481 births of  $\geq 500$  grams birthweight to 25100 women during 1989. Of these babies, 138 were stillborn and a further 198 liveborn babies died within the first twelve months.

The overall stillborn proportion was 5.4/1000 total births. Among babies born to Caucasian women the proportion was 5.1/1000, for babies of Aboriginal women 11.7/1000 and for babies of women of other races the proportion was 4.2/1000 total births. The stillbirth proportion of 5.2/1000 among singleton births was less than half that (13.6/1000) for multiple births (Tables 3 and 6).

Of babies born to teenage women 10 (6.3/1000) were stillborn. Consideration of maternal parity showed a higher stillbirth proportion for primiparous women (5.6/1000) than among babies of women whose parity was 3 or more (7.6/1000) (Table 5).

The causes of stillbirths were unexplained for 48 (34.8%) babies and the deaths of 42 (30.4%) babies were attributed to complications arising from extremely low birth weight ( $< 1000$  grams). Lethal Congenital Abnormalities were the cause of death for 20 (14.5%) stillbirths (Table 8).

There were 121 neonatal deaths, giving a neonatal mortality proportion of 4.8/1000 livebirths; for babies of Caucasian women the proportion was 4.4/1000, for babies of Aboriginal mothers 7.7/1000 and for babies of women of other races 6.6/1000 (Table 3).

Post neonatal deaths numbered 77 (3.0/1000 livebirths) babies. Thirty nine (50.6%) of these were attributed to Sudden Infant Death Syndrome and 11 (14.3%) to lethal congenital malformations (Table 21).

The perinatal mortality proportion was 10.2/1000 total births. For babies of Caucasian women the proportion was 9.5/1000, for babies of Aboriginal women 19.4/1000 and babies of women of other races 10.8/1000. Perinatal deaths amongst babies born to Aboriginal teenage mothers (16.5/1000) was greater than for babies born to Caucasian women in the same age group (11.7/1000) (Table 24). The proportion of perinatal mortality among babies of single women (15.5/1000) and of babies of separated, divorced or widowed women (17.2/1000) was noticeably higher than the proportion (9.5/1000) for babies of women reported to be socially supported by a male partner (Table 28).

Infant deaths numbered 198 being 121 neonatal deaths and 77 post neonatal deaths. These numbers provide an overall proportion of 7.8/1000 livebirths (Table 37).

Among babies of Aboriginal women the infant death proportion (22.4/1000) was almost three times the overall proportion (7.8/1000). The fraction of infant deaths attributed to Sudden Infant Death Syndrome among babies of Aboriginal women was 31.3% (Table 36).

The major causes of infant deaths remain Lethal Congenital Malformation (30.3%), Sudden Infant Death Syndrome (20.7%) and low birthweight related disorders (26.8%) (Table 36).

In accord with perinatal deaths, overall the proportion of infant deaths was higher where mothers were socially unsupported by a male partner (Table 30).

Babies born to Aboriginal mothers have higher proportions of perinatal and infant mortality than those babies born to non-Aboriginal women. Although the infant mortality proportion among babies of Aboriginal women has substantially decreased over the past seven years from 31.3/1000 in 1980 to 22.4/1000 in 1989, it still remains almost three times that of the overall infant mortality proportion (7.8/1000) of livebirths in 1989 (Table 41).

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## **1. INTRODUCTION**

This report is the sixth in a continuing series examining perinatal and infant mortality. The aim of compiling the data in this report is to measure relationships of mortality among infants with consideration of variables such as maternal race, maternal age, parity, conjugal state and infant plurality, gestation and birthweight.

This report relates to the cohort of babies that was born in Western Australia in 1989 and includes information on their outcomes up to the age of twelve months. Prior to 1984, mortality data was calculated according to year of death rather than year of birth.

Epidemiological studies in the area of infant mortality are naturally long term and this report compiles basic factual data which will assist research aimed to limit human loss in future years.

## **2. DATA COLLECTION**

The Western Australian Midwives' Notification System forms the basis of this sixth annual report of perinatal and infant mortality.

Although this System collects data for babies  $\geq 20$  weeks gestation or  $\geq 400$  grams birthweight, this report includes only those babies whose birthweight was  $\geq 500$  grams. There were 3 additional post neonatal deaths of babies born outside Western Australia during 1989 not included in this report. Two were babies of Caucasian mothers and one, the baby of an Aboriginal mother. The cause of death for two of the babies was Sudden Infant Death Syndrome at 4 weeks and 20 weeks. The third baby died aged 26 weeks, as a result of lethal congenital malformation.

Information related to deaths of liveborn babies was obtained from the Registrar General's Office, the Hospital Morbidity System, the Community and Child Health Services and the Australian Bureau of Statistics (Western Australian Branch). As far as can be determined from the above-mentioned sources, the data relating to number of deaths in this report are complete.

A computer file of deaths was created and linked to the Midwives' Notification System. This provided a comprehensive data base from which this report was written. After all follow up procedures were complete, linkage was 100% successful for babies  $\geq 500$  grams. Intercensal estimates of total population of Western Australia and Statistical Divisions, and female populations by age were supplied by the Australian Bureau of Statistics (Western Australian Branch).

Aboriginal population statistics were supplied by the Community and Child Health Services of the Health Department of Western Australia.

### 3. 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.

Post-neonatal 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 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, not that of the baby or of the father of the baby.  
Caucasian - includes all people of caucasoid (European) heritage.

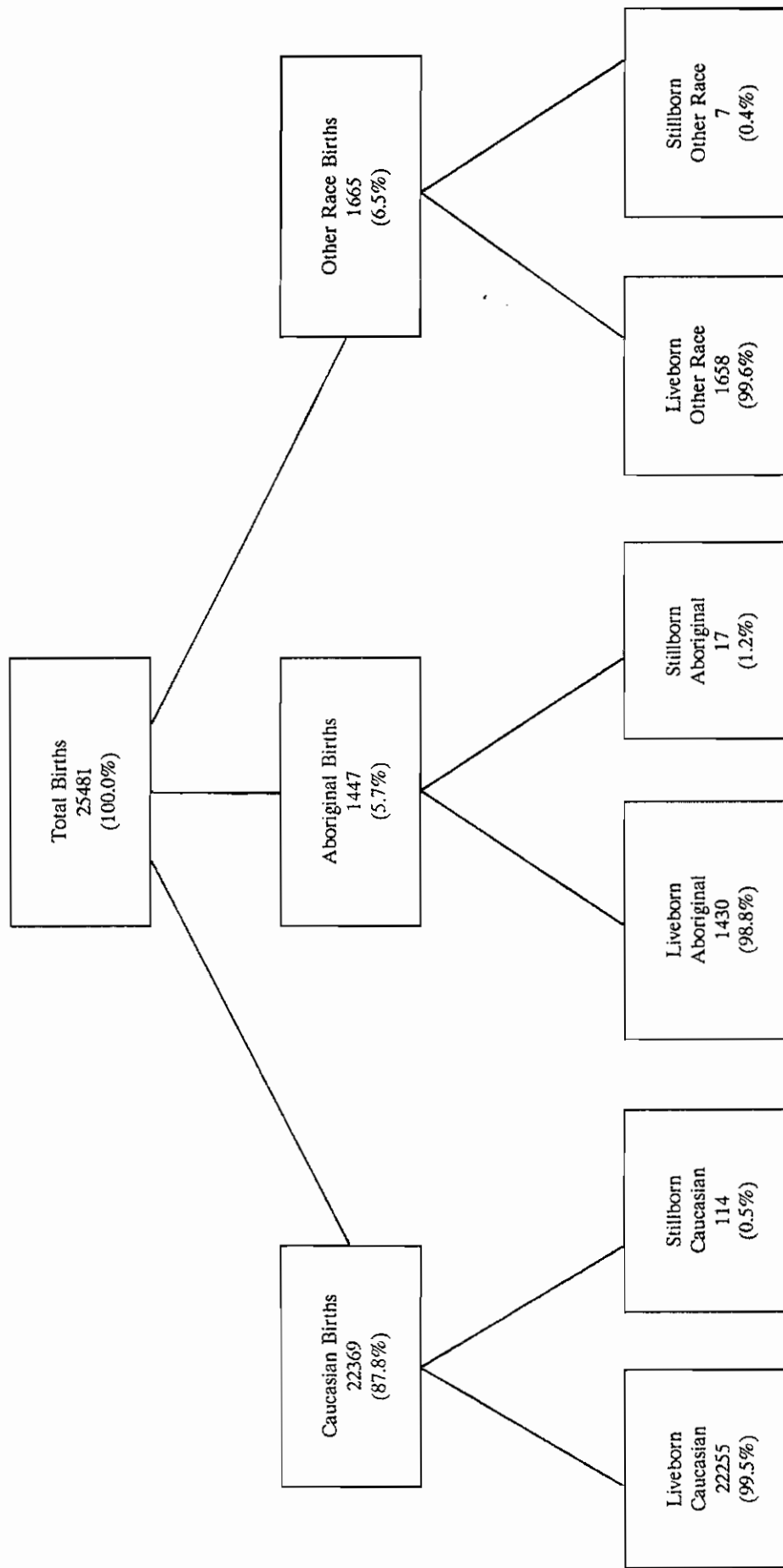
Aboriginal - includes persons of Australian - Aboriginal heritage (Australoid) or of mixed Aboriginal-caucasian heritage.

Other - includes Asian, Indian, Negroid, 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.

TABLE 1 : MATERNAL RACE AND CONDITION OF BIRTHS IN WESTERN AUSTRALIA IN 1989



Excludes births <500 grams birthweight.

#### 4. BIRTHS IN WESTERN AUSTRALIA IN 1989

##### 4.1 Births Incidence

Midwives' forms received by this department indicate that 25481 babies were born to 25100 women during 1989. This report includes statistics only on those babies whose birthweight was equal to or greater than 500 grams.

Examination of births showed that 22369 (87.8%) were born to Caucasian women, 1447 (5.7%) to Aboriginal women and 1665 (6.5%) to women of other racial groups (Table 1).

##### 4.2 Place of Birth

The majority of births, 25231 (99.0%), occurred in hospital. Of these, births in metropolitan hospitals numbered 18892 (74.1%) and non-metropolitan hospital births were 6339 (24.9%).

There were 250 (1.0%) non hospital births including 74 (0.3%) born before arrival at hospital and 176 (0.7%) planned supervised homebirths. <sup>1</sup>

##### 4.3 Maternal Place of Residence

Assessment of location of women bearing children throughout the State shows that the majority of births 17333 (68.0%) were to women whose usual place of residence was in the Perth Metropolitan Health Service Management Regions (Table 2).

##### 4.4 Crude Birth Rate

An overall crude birth rate of 15.9/1000 total population was identified for Western Australia during 1989. The area with the lowest crude birth rate (14.8/1000 total population) was the Perth Statistical Division (Figure 1).

##### 4.5 Condition of Births

Analysis of the condition at birth showed 25343 (99.5%) babies were liveborn and 138 (0.5%) babies were stillborn. <sup>1</sup> Livebirths to Caucasian women numbered 22255 (99.5%) and stillbirths 114 (0.5%). Among Aboriginal women there were 1430 (98.8%) liveborn and 17 (1.2%) stillborn babies. For women of other races there were 1658 (99.6%) livebirths and 7 (0.4%) stillbirths (Table 1).

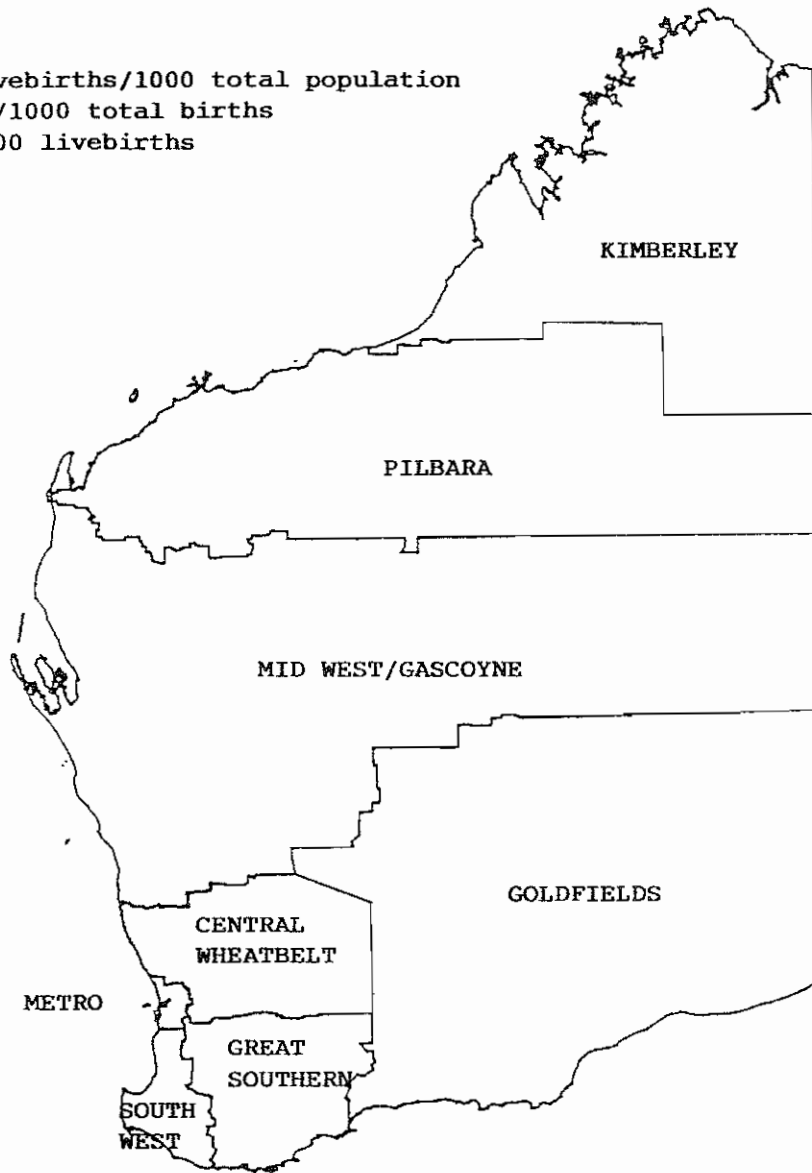
##### 4.6 Maternal Age

Consideration of maternal age shows that the highest number of women confined, 9583 (38.2%), were in the 25 to 29 year age category. Women in their teenage years accounted for 1581 (6.3%) of total confinements. Almost a third (29.2%) of Aboriginal women confined were teenagers. This contrasts with Caucasian women of whom 5.0% were teenagers and women of other races with 3.6% teenage confinements. Women aged 40 years or more represented 1.0% of all women confined.

FIGURE I

CRUDE BIRTH RATE, PERINATAL AND INFANT MORTALITY  
 BY HEALTH SERVICE MANAGEMENT REGION OF MATERNAL RESIDENCE  
 FOR BIRTHS IN WESTERN AUSTRALIA IN 1989

Crude Birth Rate-livebirths/1000 total population  
 Perinatal Mortality/1000 total births  
 Infant Mortality/1000 livebirths



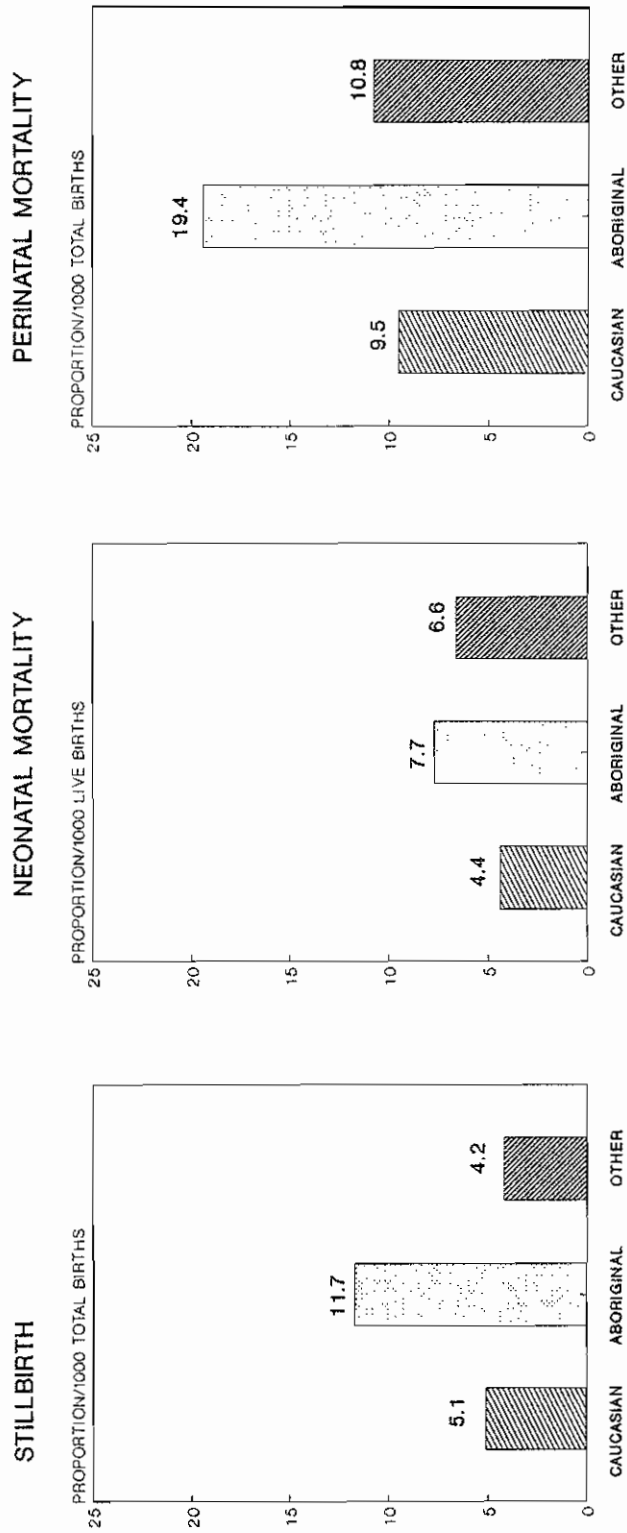
Regions	Crude Birth Rate	Perinatal Mortality	Infant Mortality
Kimberley	25.3	16.2	14.8
Pilbara	21.2	11.8	7.9
Mid West/Gascoyne	17.5	11.9	14.7
Goldfields	21.4	15.0	11.6
Central Wheatbelt	18.9	9.5	8.4
Great Southern	18.4	10.5	14.6
Metropolitan	14.8	9.9	6.6
South West	16.0	8.2	5.8
Total WA	15.9	10.2	7.8





FIGURE II

# STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY, ABORIGINAL AND NON-ABORIGINAL, WESTERN AUSTRALIA, 1989



Excludes births less than 500 grams birthweight

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

TABLE 3 : STILLBIRTHS, NEONATAL AND PERINATAL DEATHS BY HEALTH SERVICE MANAGEMENT REGION OF MATERNAL RESIDENCE AND MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Health Service Management Region of Maternal Residence	Maternal Race																								
	Caucasian						Aboriginal						Other						Total						
	Stillbirths		Neonatal		Perinatal		Stillbirths		Neonatal		Perinatal		Stillbirths		Neonatal		Perinatal		Stillbirths		Neonatal		Perinatal		
	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	
<u>Metropolitan</u>																									
North	22	2.8	14	2.8	36	7.2	-	-	2	(20.8)	2	(20.8)	-	-	3	(8.2)	3	(8.2)	22	4.1	19	3.5	41	7.6	
North East	22	5.5	24	6.1	46	11.5	-	-	-	-	-	-	3	(7.5)	-	-	3	(7.5)	25	5.5	24	5.4	49	10.9	
South	39	5.9	25	3.8	64	91.7	2	(11.0)	1	(5.2)	3	(16.5)	3	(4.8)	6	9.7	9	14.5	44	5.9	32	4.3	76	10.3	
<u>Non Metropolitan</u>																									
South West	8	4.0	7	3.5	15	7.6	1	(14.7)	1	(14.9)	2	(29.4)	-	-	-	-	-	-	9	4.3	8	3.9	17	8.2	
Great Southern	3	(2.7)	8	7.1	11	9.8	-	-	-	-	-	-	1	(41.7)	1	(43.5)	2	(83.3)	4	(3.2)	9	7.3	13	10.5	
Central Wheatbelt	2	(2.3)	4	(4.6)	6	6.8	1	(18.5)	2	(37.7)	3	(55.6)	-	-	-	-	-	-	3	(3.2)	6	6.3	9	9.5	
Goldfields	7	7.2	6	6.2	13	13.4	3	(22.7)	1	(7.8)	4	(30.3)	-	-	-	-	-	-	10	8.8	7	6.2	17	15.0	
Mid West Gascoyne	6	6.8	5	5.7	11	12.5	1	(5.6)	1	(5.7)	2	(11.3)	-	-	-	-	-	-	7	6.4	6	5.5	13	11.9	
Pilbara	4	(5.3)	4	(2.7)	8	10.6	2	(13.0)	1	(6.6)	3	(19.5)	-	-	1	(9.3)	1	(9.3)	6	5.9	6	6.0	12	11.8	
Kimberley	-	-	2	(9.0)	2	(9.0)	7	18.6	1	(2.7)	8	21.2	-	-	-	-	-	-	7	11.4	3	(4.9)	10	16.2	
<u>Outside WA</u>																									
	1	(66.7)	-	-	1	(66.7)	-	-	1	-	1	-	-	-	-	-	-	-	1	(58.8)	1	(62.5)	2	(117.6)	
<b>TOTAL</b>	114	5.1	99	4.4	213	66.7	17	11.7	11	7.7	28	19.4	7	4.2	11	6.6	18	10.8	138	5.4	121	4.8	259	10.2	

Excludes births <500 grams birthweight.

- 1 Stillbirth & Perinatal Death proportion/1000 total births.
  - 2 Neonatal Death proportion/1000 livebirths.
- () Where n<5 proportion has been bracketed.

SOURCE: MIDWIVES' NOTIFICATION SYSTEM  
REGISTRAR GENERAL'S OFFICE

## 5. STILLBIRTHS, NEONATAL AND POST-NEONATAL MORTALITY IN WESTERN AUSTRALIA IN THE 1989 BIRTH COHORT

### 5.1 Stillbirths

There were 138 stillbirths in Western Australia during the 1989 year which were equal to or greater than 500 grams birthweight. The stillbirth proportion for the State was 5.4/1000 total births (Table 4).

The stillbirth proportion for babies of Aboriginal women (11.7/1000) was high compared to that for babies of Caucasian women (5.1/1000) and for babies of women of other racial groups (4.2/1000).

Stillbirth proportions relating to Health Service Management Regions of maternal residence are shown on Table 2. It should be noted, however, that due to small numbers of births in each country division the proportions do vary from year to year and may be considered unrepresentative on an annual basis (Table 2, Figure I).

#### 5.1.1 Maternal Race and Maternal Age

Among babies of all teenage mothers, the proportion was 6.3/1000 and for babies of Aboriginal teenage mothers the proportion was 9.5/1000 total births. Among women aged 25-29 years, the group with the highest number of births overall, the stillbirth proportion was lower at 4.9/1000 total births. Among babies of women aged 35 years and over 11 (4.9/1000) stillbirths occurred. (Table 4).

TABLE 4: STILLBIRTHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1989

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total	Prop <sup>a</sup>	No.	Total	Prop <sup>a</sup>	No.	Total	Prop <sup>a</sup>	No.	Total	Prop <sup>a</sup>
≤ 15	-	30	-	-	39	-	-	1	-	-	70	-
16	1	85	11.8	1	75	13.3	-	6	-	2	166	12.0
17	1	203	4.9	-	100	-	-	6	-	1	309	3.2
18	3	345	8.7	2	109	18.3	-	19	-	5	473	10.6
19	1	445	2.2	1	100	10.0	-	28	-	2	573	3.5
≤ 19	6	1108	5.4	4	423	9.5	-	60	-	10	1591	6.3
20-24	32	4660	6.9	6	515	11.7	2	249	8.0	40	5424	7.4
25-29	42	8861	4.7	4	325	12.3	2	547	3.7	48	9733	4.9
30-34	26	5812	4.5	2	141	14.2	1	547	1.8	29	6500	4.5
35-39	7	1709	4.1	1	40	25.0	2	218	9.2	10	1967	5.1
40-44	1	211	4.7	-	2	-	-	42	-	1	255	3.9
≥ 45	-	8	-	-	1	-	-	2	-	-	11	-
TOTAL	114	22369	5.1	17	1447	11.7	7	1665	4.2	138	25481	5.4

Excludes births <500 grams birthweight.

<sup>a</sup> Proportion/1000 total births.

### 5.1.2 Maternal Race and Parity

Fifty Six (5.6/1000) stillborn babies were to primiparous women compared with 50 (5.2/1000) in the 1988 birth cohort. For babies of women whose parity was three or more, the stillbirth proportion rose from 17 (6.8/1000) in 1988 to 20 (7.6/1000) in 1989. (Table 5).

TABLE 5: STILLBIRTHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1989

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>
0	49	8990	5.5	3	416	7.2	4	659	6.1	56	10065	5.6
1 - 2	52	11337	4.6	9	619	14.5	1	836	1.2	62	12792	4.8
3 - 4	13	1831	7.1	2	292	6.8	2	153	13.1	17	2276	7.5
≥ 5	-	211	-	3	120	25.0	-	17	-	3	348	8.6
<b>TOTAL</b>	<b>114</b>	<b>22369</b>	<b>5.1</b>	<b>17</b>	<b>1447</b>	<b>11.7</b>	<b>7</b>	<b>1665</b>	<b>4.2</b>	<b>138</b>	<b>25481</b>	<b>5.4</b>

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 total births.

### 5.1.3 Maternal Race, Condition and Plurality

The stillbirth proportion for all multiple births (13.6/1000) compares to a 5.2/1000 stillbirth proportion for all singleton births. For singleton births the proportion of stillbirths among babies of Aboriginal women (12.0/1000) is higher than for total births (5.2/1000) (Table 6).

TABLE 6: CONDITION, PLURALITY AND MATERNAL RACE OF BIRTHS IN WESTERN AUSTRALIA 1989

Plurality	Maternal Race												Total			
	Caucasian				Aboriginal				Other							
	Total Births	Live Births	Still Births	Prop <sup>a</sup>	Total Births	Live Births	Still Births	Prop <sup>a</sup>	Total Births	Live Births	Still Births	Prop <sup>a</sup>	Total Births	Live Births	Still Births	Prop <sup>a</sup>
Singleton	21698	21594	104	4.8	1416	1399	17	12.0	1629	1622	7	4.3	24743	24615	128	5.2
Multiple	671	661	10	14.9	31	31	-	-	36	36	-	-	738	728	10	13.6
<b>TOTAL</b>	<b>22369</b>	<b>22255</b>	<b>114</b>	<b>5.1</b>	<b>1447</b>	<b>1430</b>	<b>17</b>	<b>11.7</b>	<b>1665</b>	<b>1658</b>	<b>7</b>	<b>4.3</b>	<b>25481</b>	<b>25343</b>	<b>138</b>	<b>5.4</b>

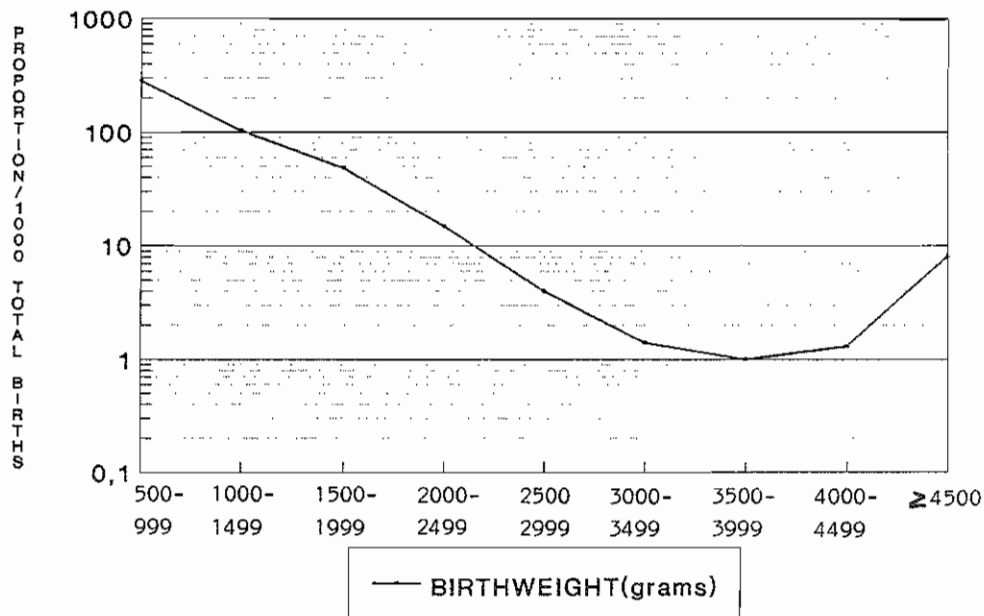
Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 total births.

### 5.1.4 Maternal Race and Birthweight

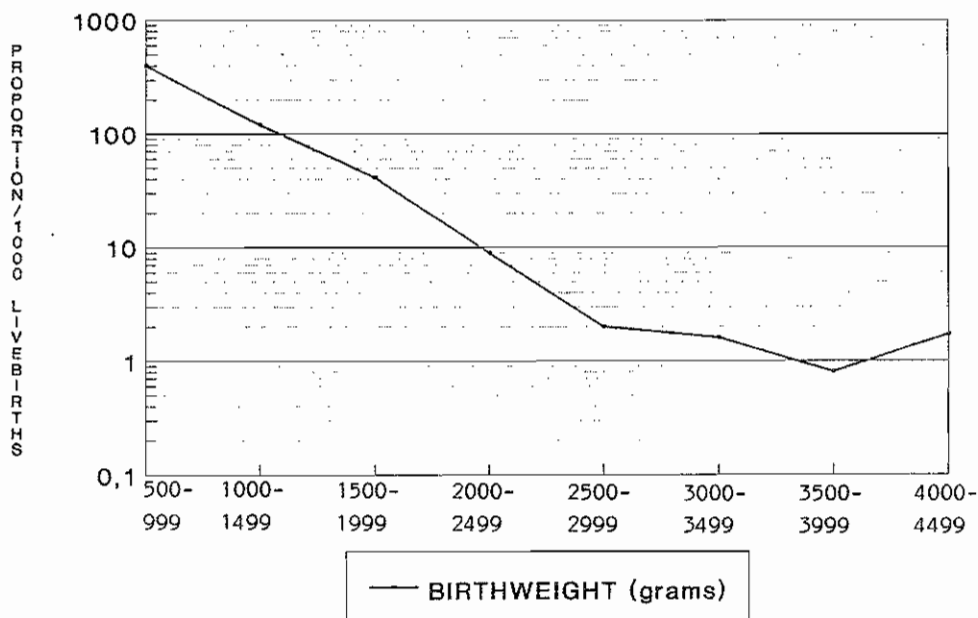
The proportion of stillbirths in low birthweight babies was 56.8/1000. The lowest stillbirth proportion (1.0/1000) was for babies with birthweight 3500-3999 grams. (Table 7, Figure III).

**FIGURE III BIRTHWEIGHT DISTRIBUTION OF STILLBIRTHS IN WESTERN AUSTRALIA IN 1989.**



Excludes births less than 500 grams birthweight  
SOURCE : MIDWIVES NOTIFICATION SYSTEM

**FIGURE IV BIRTHWEIGHT DISTRIBUTION OF NEONATAL DEATHS IN WESTERN AUSTRALIA IN 1989.**



Excludes births less than 500 grams birthweight.  
SOURCE: MIDWIVES' NOTIFICATION SYSTEM

TABLE 7 : STILLBIRTH PROPORTION BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1989

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Total Births	Prop <sup>a</sup>
	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>			
500 - 999	39	141	276.6	5	16	312.5	3	11	(272.7)	47	168	279.8
1000 - 1499	14	141	99.3	3	16	(187.5)	-	9	-	17	166	102.4
1500 - 1999	12	273	44.0	3	32	(93.8)	1	25	(40.0)	16	330	48.5
2000 - 2499	12	835	14.4	3	92	(32.6)	-	83	-	15	1010	14.9
< 2500	77	1390	55.4	14	156	89.7	4	128	(31.3)	95	1674	56.8
2500 - 2999	14	3357	4.2	1	339	(2.9)	1	332	(3.0)	16	4028	4.0
3000 - 3499	12	8182	1.5	-	555	-	1	681	(1.5)	13	9418	1.4
3500 - 3999	6	6975	0.9	1	303	(3.3)	1	422	(2.4)	8	7700	1.0
4000 - 4499	3	2125	(1.4)	-	81	-	-	88	-	3	2294	(1.3)
≥ 4500	2	340	(5.9)	1	13	(76.9)	-	14	-	3	367	(8.2)
TOTAL	114	22369	5.1	17	1447	11.7	7	1665	4.2	138	25481	5.4

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 total births.

( ) Where n<5 proportion has been bracketed.

### 5.1.5 Causes of Stillbirth

There were 48 (34.8%) stillborn babies with cause unknown and 42 (30.4%) stillbirths had an extremely low birthweight. Lethal congenital malformations resulted in 20 (14.5%) stillbirths and a further 16 (11.6%) stillbirths resulted from complications of placenta and/or cord (Table 8).

The high percentage of unexplained stillbirths would be reduced if autopsies were performed on more babies. Of the 138 stillborn babies, it is known that 85 (61.6%) had autopsies and 40 (29.0%) did not. It is not known whether the remaining 13 (9.4%) stillborn babies underwent autopsy.

Ninety three (67.4%) stillbirths were recorded as antepartum deaths, 34 (24.6%) were recorded as intrapartum deaths and for 11 (8.0%) the time of death was unknown.

TABLE 8 : CAUSE OF STILLBIRTH BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Cause of Death	Maternal Race						Total		Total	
	Caucasian		Aboriginal		Other		1989		1988	
	No.	%	No.	%	No.	%	No.	%	No.	%
Lethal Congenital Malformation	19	16.7	1	5.9	-	-	20	14.5	17	14.5
Extremely Low Birth Weight (<1000g)*	34	29.8	5	29.4	3	42.9	42	30.4	30	25.6
Unknown	39	34.2	5	29.4	4	57.1	48	34.8	43	36.8
Maternal:										
Obstetric	2	1.8	1	5.9	-	-	3	2.2	1	0.9
Medical	2	1.8	3	17.7	-	-	5	3.6	3	2.6
Hypertension	1	0.9	-	-	-	-	1	0.7	5	4.3
Placenta and Cord	14	12.3	2	11.8	-	-	16	11.6	18	15.4
Other	3	2.6	-	-	-	-	3	2.2	-	-
<b>TOTAL</b>	<b>114</b>	<b>100.0</b>	<b>17</b>	<b>100.0</b>	<b>7</b>	<b>100.0</b>	<b>138</b>	<b>100.0</b>	<b>117</b>	<b>100.0</b>

Excludes births < 500 grams birthweight.

\* Any non-malformed stillbirth of birthweight 500-999 grams was included in the extremely low birthweight category.

## 5.2 Neonatal Deaths

There were 121 neonatal deaths among the 25343 livebirths in 1989.<sup>1</sup> The overall neonatal mortality proportion was 4.8/1000 livebirths. For babies of Aboriginal women neonatal mortality was 7.7/1000 livebirths which is much higher than for babies of Caucasian women (4.4/1000) and slightly higher than the proportion for babies of women of other races (6.6/1000). (Table 3).

The figures for neonatal mortality by Health Service Management Region of maternal residence are provided in Table 3. However, it should be noted that due to small numbers of births in each country Region, the proportions do fluctuate markedly.<sup>3</sup>

### 5.2.1 Maternal Race and Maternal Age

Of the 121 liveborn babies who died within the first 28 days of life, 11 (7.0/1000) were born to teenage mothers. In the age group where the highest number of births occurred (25-29 years) the neonatal mortality proportion was 3.7/1000. The proportion of neonatal deaths (7.2/1000) among babies of Aboriginal teenage mothers is higher than that for babies of Caucasian teenage women (6.4/1000) (Table 9).



TABLE 9: NEONATAL DEATHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1989

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>
≤ 15	-	30	-	-	39	-	-	1	-	-	70	-
16	1	84	12.0	-	74	-	-	6	-	1	164	6.1
17	-	202	-	-	100	-	-	6	-	-	308	-
18	2	342	5.8	3	107	28.0	-	19	-	5	468	10.7
19	4	444	9.0	-	99	-	1	28	35.7	5	571	8.8
≤ 19	7	1102	6.4	3	419	7.2	1	60	16.7	11	1581	7.0
20 - 24	15	4628	3.2	3	509	5.9	4	247	16.2	22	5384	4.1
25 - 29	34	8819	3.9	2	321	6.2	-	545	-	36	9685	3.7
30 - 34	29	5786	5.0	2	139	14.4	3	546	5.5	34	6471	5.3
35 - 39	11	1702	6.5	1	39	25.6	3	216	13.9	15	1957	7.7
40 - 44	3	210	14.3	-	2	-	-	42	-	3	254	11.8
≥ 45	-	8	-	-	1	-	-	2	-	-	11	-
TOTAL	99	22255	4.4	11	1430	7.7	11	1658	6.6	121	25343	4.8

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

## 5.2.2 Maternal Race and Parity

Fifty three (4.2/1000) neonatal deaths were to women with a previous parity of one or two. The highest overall proportion was for babies of women with parity of five or more (8.7/1000) (Table 10).

TABLE 10: NEONATAL DEATHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1989

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>
0	44	8941	4.9	-	413	11.5	5	655	7.6	49	10009	4.9
1 - 2	41	11285	3.6	7	610	11.5	5	835	6.0	53	12730	4.2
3 - 4	11	1818	6.1	4	290	13.8	1	151	6.6	16	2259	7.1
≥ 5	3	211	14.2	-	117	-	-	17	-	3	345	8.7
TOTAL	99	22255	4.4	11	1430	11.5	11	1658	6.6	121	25343	4.8

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

### 5.2.3 Maternal Race and Plurality

These data show that a neonatal death proportion of 3.7/1000 livebirths for singleton births and 39.8/1000 livebirths for multiple births. There were no neonatal deaths among triplet births of babies of either Aboriginal women or women of other races (Table 11).

TABLE 11: NEONATAL DEATHS BY MATERNAL RACE AND PLURALITY IN WESTERN AUSTRALIA IN 1989

Plurality	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>
Singleton	76	21594	3.5	7	1399	5.0	9	1622	5.5	92	24615	3.7
Twins	22	597	36.9	4	30	133.3	2	36	55.6	28	663	42.2
Triplets	1	64	15.6	-	1	-	-	-	-	1	65	15.4
TOTAL	99	22255	4.4	11	1430	7.7	11	1658	6.6	121	25343	4.8

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

### 5.2.4 Maternal Race and Birthweight

In broad terms and as reported for stillbirths, neonatal mortality proportions for all races fell as birthweight rose. The proportion of low birthweight neonatal deaths among babies born to Aboriginal mothers (70.4/1000) is higher than for low birthweight neonatal deaths of babies born to Caucasian women (52.6/1000) (Table 12, Figure IV).

TABLE 12: NEONATAL MORTALITY BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1989

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>
500 - 999	38	102	372.5	6	11	545.5	4	8	(500.0)	48	121	396.7
1000 - 1499	15	127	118.1	2	13	(153.8)	1	9	(111.1)	18	149	120.8
1500 - 1999	9	261	34.5	2	29	(69.0)	2	24	(83.3)	13	314	41.4
2000 - 2499	7	823	8.5	-	89	-	2	83	(24.1)	9	995	9.0
< 2500	69	1313	52.6	10	142	70.4	9	124	72.6	88	1579	55.7
2500 - 2999	6	3343	1.8	-	338	-	2	331	(6.0)	8	4012	2.0
3000 - 3499	14	8170	1.7	1	555	(1.8)	-	680	-	15	9405	1.6
3500 - 3999	6	6969	0.9	-	302	-	-	421	-	6	7692	0.8
4000 - 4499	4	2122	(1.9)	-	81	-	-	88	-	4	2291	(1.7)
≥ 4500	-	338	-	-	12	-	-	14	-	-	364	-
TOTAL	99	22255	4.4	11	1430	7.7	11	1658	6.6	121	25343	4.8

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

( ) Where n<5 proportion has been bracketed.

### 5.2.5 Maternal Race and Age at Neonatal Death

The majority (85.1%) of neonatal deaths occurred in the first week of life, 66.1% occurring within the first 48 hours of life. Among babies of Aboriginal women all neonatal deaths occurred in the first seven days of life compared with 82.8% of babies born to Caucasian women (Table 13).

TABLE 13 : AGE AT NEONATAL DEATH BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Age at Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	%	No.	%	No.	%	No.	%
< day 1	29	29.3	9	81.8	4	36.4	42	34.7
day 1	24	24.2	1	9.1	3	27.3	28	23.1
day 2	9	9.1	-	-	1	9.1	10	8.3
day 3	5	5.1	-	-	1	9.1	6	5.0
day 4	7	7.1	1	9.1	1	9.1	9	7.4
day 5	4	4.0	-	-	-	-	4	3.3
day 6	2	2.0	-	-	-	-	2	1.7
day 7	2	2.0	-	-	-	-	2	1.7
day ≤ 7	82	82.8	11	100.0	10	90.9	103	85.1
day 8 - 14	8	8.1	-	-	-	-	8	6.6
day 15 - 21	7	7.1	-	-	-	-	7	5.8
day 22 - 28	2	2.0	-	-	1	9.1	3	2.5
TOTAL	99	100.0	11	100.0	11	100.0	121	100.0

Excludes births <500 grams birthweight

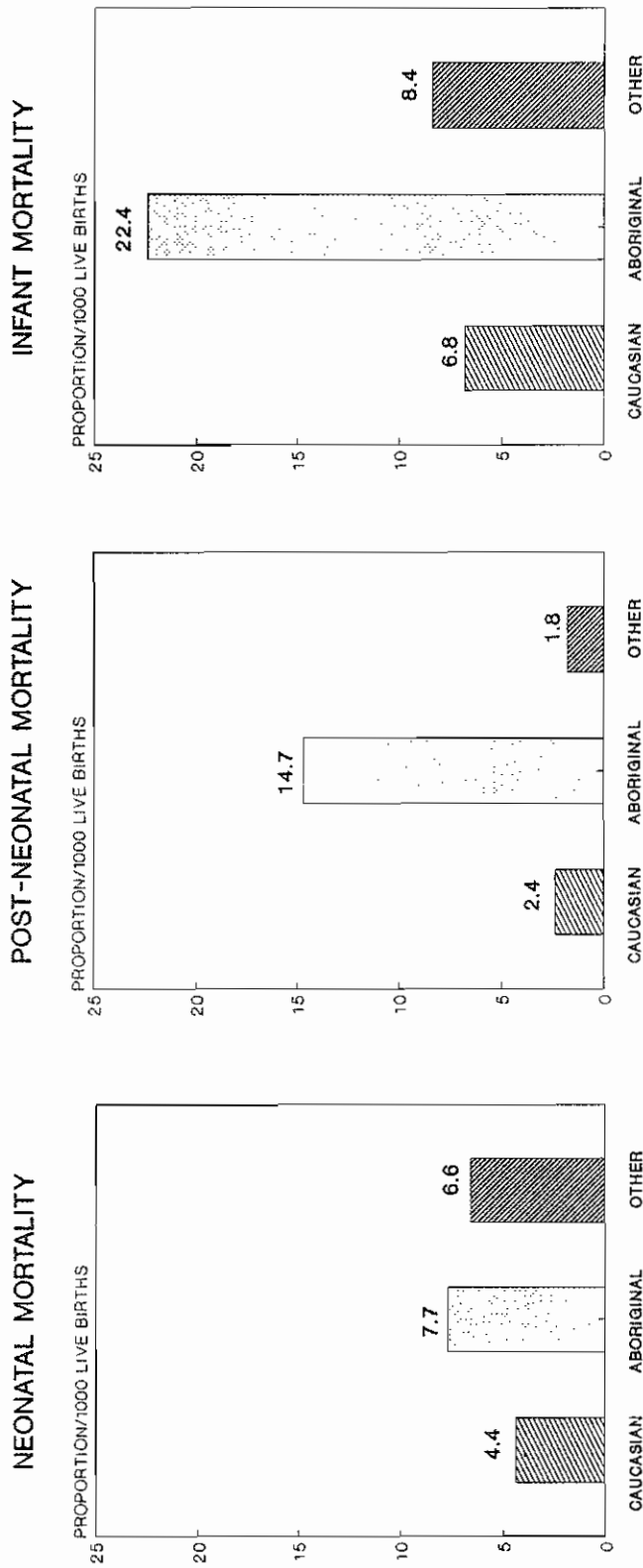
### 5.2.6 Causes of Neonatal Deaths

Lethal congenital malformation in 49 babies (40.5%) and low birthweight in 53 babies (43.8%) were the main causes of neonatal death in the 1989 birth cohort.

The cause of more than half (54.6%) of neonatal deaths among babies of Aboriginal mothers were recorded as complications arising from low birthweight (Table 14).

FIGURE V

# NEONATAL, POST-NEONATAL AND INFANT MORTALITY, ABORIGINAL AND NON-ABORIGINAL, WESTERN AUSTRALIA, 1989



Excludes births less than 500 grams birthweight

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

TABLE 14 : CAUSE OF NEONATAL DEATH BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Cause of Death	Maternal Race						Total 1989		Total 1988	
	Caucasian		Aboriginal		Other		No.	%	No.	%
	No.	%	No.	%	No.	%				
Lethal Congenital Malformation	39	39.4	3	27.3	7	63.6	49	40.5	38	36.5
Low Birthweight (< 2500grams)	44	44.4	6	54.6	3	27.3	53	43.8	45	43.3
Asphyxia	5	5.1	1	9.1	-	-	6	5.0	9	8.7
Pregnancy conditions	3	3.0	-	-	-	-	3	2.5	-	-
Infections	2	2.0	-	-	-	-	2	1.7	2	1.9
Hydrops fetalis	-	-	-	-	-	-	-	-	-	-
Other	2	2.0	1	9.1	-	-	3	2.5	2	1.9
Sudden Infant Deaths	2	2.0	-	-	-	-	2	1.7	8	7.7
Unknown	2	2.0	-	-	1	9.1	3	2.5	-	-
<b>TOTAL</b>	<b>99</b>	<b>100.0</b>	<b>11</b>	<b>100.0</b>	<b>11</b>	<b>100.0</b>	<b>121</b>	<b>100.0</b>	<b>104</b>	<b>100.0</b>

Excludes births < 500 grams birthweight.

### 5.3 Post Neonatal Deaths

There were 77 post-neonatal deaths identified amongst the 1989 livebirths, a proportion of 3.0/1000 livebirths (Table 15 and Table 37).

Post-neonatal mortality for babies of Aboriginal women was 14.7/1000 livebirths which is six times the proportion of 2.4/1000 for babies of Caucasian women. For babies born to women of other races the proportion was 1.8/1000 (Table 15, Table 30 and Figure IV).

Post-neonatal deaths in relation to Health Service Management Region of maternal residence are shown in Table 15. It should be noted however, that due to small numbers of births in each country Region the proportions do vary from year to year and may be considered unrepresentative.

TABLE 15 : POST-NEONATAL AND INFANT MORTALITY BY HEALTH SERVICE MANAGEMENT REGION OF MATERNAL RESIDENCE AND MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Health Service Management Region of Maternal Residence	Maternal Race												Total				
	Caucasian				Aboriginal				Other								
	Post-Neonatal		Infant		Post-Neonatal		Infant		Post-Neonatal		Infant		Post-Neonatal		Infant		
	No.	Prop <sup>n</sup>	No.	Prop <sup>n</sup>	No.	Prop <sup>n</sup>	No.	Prop <sup>n</sup>	No.	Prop <sup>n</sup>	No.	Prop <sup>n</sup>	No.	Prop <sup>n</sup>	No.	Prop <sup>n</sup>	
<u>METROPOLITAN</u>																	
North	9	1.8	23	4.7	-	-	2	(20.8)	-	-	3	(8.2)	9	1.7	28	5.2	
North East	10	2.5	34	8.6	5	40.3	5	40.3	1	(2.5)	1	(2.5)	16	3.6	40	8.9	
South	10	1.5	35	5.3	2	(11.0)	3	(16.6)	2	(3.2)	8	12.9	14	1.9	46	6.2	
<u>NON-METROPOLITAN</u>																	
South West	3	(1.5)	10	5.1	1	(14.9)	2	(29.9)	-	-	-	-	4	(1.9)	12	5.8	
Great Southern	8	7.1	16	14.2	1	(12.3)	1	(12.3)	-	-	1	(43.5)	9	7.3	18	14.6	
Central Wheatbelt	2	(2.3)	6	6.8	-	-	2	(37.7)	-	-	-	-	2	(2.1)	8	8.4	
Goldfields	4	(4.2)	10	10.4	2	(15.5)	3	(23.3)	-	-	-	-	6	5.3	13	11.6	
Mid West Gascoyne	6	6.9	11	12.6	4	(22.7)	5	28.4	-	-	-	-	10	9.2	16	14.7	
Pilbara	1	(1.3)	5	6.7	1	(6.6)	2	(13.2)	-	-	1	(9.3)	2	(2.0)	8	7.9	
Kimberley	-	-	2	(9.0)	5	13.5	7	18.9	-	-	-	-	5	8.2	9	14.8	
<b>TOTAL</b>	<b>53</b>	<b>2.4</b>	<b>152</b>	<b>6.8</b>	<b>21</b>	<b>14.7</b>	<b>32</b>	<b>22.4</b>	<b>3</b>	<b>(1.8)</b>	<b>14</b>	<b>8.4</b>	<b>77</b>	<b>3.0</b>	<b>198</b>	<b>7.8</b>	

Excludes births <500 grams birthweight.

<sup>1</sup> Post-neonatal death proportion/1000 livebirths.

<sup>2</sup> Infant death proportion/1000 livebirths.

( ) Where n < 5 proportion has been bracketed.

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

### 5.3.1 Maternal Race and Maternal Age

The proportion of post-neonatal deaths among babies of teenage women was 8.2/1000 livebirths. Among post-neonatal deaths of babies born to Aboriginal women however, a third were to teenage mothers with a proportion of 14.3/1000 livebirths (Table 16).

TABLE 16 : POST-NEONATAL DEATHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1989

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>
≤ 15	-	30	-	2	39	51.3	-	1	-	2	70	28.6
16	-	84	-	1	74	13.5	-	6	-	1	164	6.1
17	3	202	14.9	2	100	20.0	-	6	-	5	308	16.2
18	2	342	5.8	1	107	9.3	-	19	-	3	468	6.4
19	2	444	4.5	-	99	-	-	28	-	2	571	3.5
≤ 19	7	1102	6.4	6	419	14.3	-	60	-	13	1581	8.2
20 - 24	15	4628	3.2	8	509	15.7	-	247	-	23	5384	4.3
25 - 29	20	8819	2.3	4	321	12.5	1	545	1.8	25	9685	2.6
30 - 34	10	5786	1.7	3	139	21.6	1	546	1.8	14	6471	2.2
35 - 39	1	1702	0.6	-	39	-	1	216	4.6	2	1957	1.0
40 - 44	-	210	-	-	2	-	-	42	-	-	254	-
≥ 45	-	8	-	-	1	-	-	2	-	-	11	-
TOTAL	53	22255	2.4	21	1430	14.7	3	1658	1.8	77	25343	3.0

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

### 5.3.2 Maternal Race and Conjugal State

Higher proportions of post-neonatal mortality were recorded for babies of single women (6.0/1000) and babies of separated, divorced or widowed women (8.7/1000), than for women socially supported by a male partner in a marriage or defacto relationship (2.7/1000) (Table 17).

TABLE 17 : POST-NEONATAL DEATHS BY MATERNAL RACE AND CONJUGAL STATE IN WESTERN AUSTRALIA IN 1989

Conjugal State	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>
Single	7	1879	3.7	8	527	15.2	-	89	-	15	2495	6.0
Married/defacto	45	20175	2.3	12	889	13.5	3	1553	1.9	60	22617	2.7
Other	1	201	5.0	1	14	71.4	-	16	-	2	231	8.7
TOTAL	54	22255	2.4	21	1430	14.7	3	1658	1.8	77	25343	3.0

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

<sup>2</sup> Other includes separated, divorced and widowed.

### 5.3.3 Maternal Race and Parity

Almost one third (31.2%) of babies who died in the post-neonatal period were born to primiparous mothers, and a further 45.5% were to women with a parity of 1-2. The proportions for these groups were 2.4/1000 for primiparous women, 2.7/1000 for women with parity 1-2, 6.2/1000 for women with parity 3-4 and 11.6/1000 for women with parity of 5 or more. (Table 18).

TABLE 18: POST-NEONATAL DEATHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1989

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Prop <sup>a</sup>
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>			
0	18	8941	2.0	5	413	12.1	1	655	1.5	24	10009	2.4
1 - 2	27	11285	2.4	7	610	11.5	1	835	1.2	35	12730	2.7
3 - 4	8	1818	4.4	5	290	17.2	1	151	6.6	14	2259	6.2
≥ 5	-	211	-	4	117	34.2	-	17	-	4	345	11.6
TOTAL	53	22255	2.4	21	1430	14.7	3	1658	1.8	77	25343	3.0

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

### 5.3.4 Maternal Race and Plurality

Examination of the 77 post-neonatal deaths in 1989 by plurality revealed that for singleton births the proportion was 2.9/1000 and for multiple births the proportion was 6.9/1000 livebirths. Among twin babies the post-neonatal death proportion was 7.5/1000. (Table 19).

TABLE 19: POST-NEONATAL DEATHS BY MATERNAL RACE AND PLURALITY IN WESTERN AUSTRALIA IN 1989.

Plurality	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Prop <sup>a</sup>
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>			
Singleton	49	21594	2.3	21	1399	15.0	2	1622	1.2	72	24615	2.9
Twins	4	597	6.7	-	30	-	1	36	27.8	5	663	7.5
Triplets	-	64	-	-	1	-	-	-	-	-	65	-
TOTAL	53	22255	2.4	21	1430	14.7	3	1658	1.8	77	25343	3.0

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.



### 5.3.5 Maternal Race and Birthweight

Overall the trend was for post-neonatal mortality proportions to increase as birthweight fell. The post-neonatal proportion for low birthweight babies of Aboriginal mothers (35.2/1000) was higher than the proportion for low birthweight babies of Caucasian women (12.9/1000) (Table 20).

TABLE 20: POST-NEONATAL MORTALITY BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1989

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Prop <sup>n</sup>
	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>	No.	Live Births	Prop <sup>n</sup>			
500 - 999	5	102	49.0	1	11	(90.1)	-	8	-	6	121	49.6
1000 - 1499	3	127	(23.6)	-	13	-	1	9	(111.1)	4	149	(26.8)
1500 - 1999	3	261	(11.5)	1	29	(34.5)	-	24	-	4	314	(12.7)
2000 - 2499	6	823	7.3	3	89	(33.7)	-	83	-	9	995	9.0
< 2500	17	1313	12.9	5	142	35.2	1	124	(8.1)	23	1579	14.6
2500 - 2999	11	3343	3.3	6	338	17.8	-	331	-	17	4012	4.2
3000 - 3499	13	8170	1.6	7	555	12.6	1	680	(1.5)	21	9405	2.3
3500 - 3999	5	6969	0.7	2	302	(6.6)	1	421	(2.4)	8	7692	1.0
4000 - 4499	6	2122	2.8	1	81	(12.3)	-	88	-	7	2291	3.1
≥ 4500	1	338	(3.0)	-	12	-	-	14	-	1	364	(2.7)
TOTAL	53	22255	2.4	21	1430	14.7	3	1658	(1.8)	77	25343	3.0

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

( ) Where n<5 proportion has been bracketed.

### 5.3.6 Causes of Post Neonatal Death

The major cause of post-neonatal deaths in Western Australia continued to be Sudden Infant Death Syndrome (50.6%) (Table 21). Sudden Infant Death Syndrome is largely responsible for an increase in the proportion of post neonatal deaths of babies of Aboriginal mothers from 6.8/1000 in 1987, 12.6/1000 in 1988 to 14.7/1000 in 1989.

Lethal congenital malformation remained the second highest known cause, to which 11 (14.3%) post-neonatal deaths were attributed. The percentage of post-neonatal deaths due to infection was 13.5% in 1988 to 13.0% in 1989 (Table 21).

TABLE 21 : CAUSE OF POST-NEONATAL DEATH BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Cause of Death	Maternal Race						Total 1989		Total 1988	
	Caucasian		Aboriginal		Other		No.	%	No.	%
	No.	%	No.	%	No.	%				
Sudden Infant Death Syndrome	27	50.9	10	47.6	2	66.7	39	50.6	48	58.5
Lethal Congenital Malformation	10	18.9	1	4.8	-	-	11	14.3	13	15.9
Infection - Respiratory	2	3.8	2	9.5	-	-	4	5.2	4	4.9
Meningitis	-	-	4	19.0	-	-	4	5.2	4	4.9
Other	1	1.9	1	4.8	-	-	2	2.6	3	3.7
Other	7	13.2	-	-	1	33.3	8	10.4	7	8.5
Unknown	6	11.3	3	14.3	-	-	9	11.7	3	3.7
TOTAL	53	100.0	21	100.0	3	100.0	77	100.0	82	100.0

Excludes births <500 grams birthweight.

### 5.3.7 Seasonal Incidence of Post-Neonatal Deaths

There is little variation in percentages of post-neonatal deaths by seasonal quarters of the year (Table 22).

TABLE 22 : CAUSE OF POST-NEONATAL DEATH BY SEASONAL INCIDENCE IN WESTERN AUSTRALIA IN 1989

Cause of Death	Jan - Mar		Apr - Jun		Jul - Sep		Oct - Dec		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sudden Infant Death Syndrome	8	44.4	8	44.4	12	57.1	12	60.0	40	51.9
Lethal Congenital Malformation	3	16.7	3	16.7	2	9.5	4	20.0	12	15.6
Infection	4	22.2	2	11.1	3	14.3	1	5.0	10	13.0
Other/Unknown	3	16.7	5	27.8	4	19.0	3	15.0	15	19.5
TOTAL	18	100.0	18	100.0	21	100.0	20	100.0	77	100.0

Excludes births <500 grams birthweight.

SOURCE: MIDWIVES' NOTIFICATION SYSTEM  
REGISTRAR GENERAL'S OFFICE

## 6. PERINATAL MORTALITY IN WESTERN AUSTRALIA IN THE 1989 BIRTH COHORT

### 6.1 Perinatal Mortality

There were 259 perinatal deaths identified in the 1989 birth cohort which gave a perinatal mortality proportion of 10.2/1000 total births (Table 3 and Table 23). This compares with proportions of 9.8/1000 in 1987, and 8.8/1000 in 1988. Among babies born to Aboriginal women the proportion (19.4/1000) was higher than for perinatal deaths of babies of Caucasian women (9.5/1000) and for perinatal deaths of babies born to women of other races (10.8/1000) (Table 23).

TABLE 23 : STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Type of Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other		No.	Prop <sup>a</sup>
	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>		
Stillbirths	114	5.1	17	11.7	7	4.2	138	5.4
Neonatal Mortality	99	4.4	11	7.7	11	6.6	121	4.8
Perinatal Mortality	213	9.5	28	19.4	18	10.8	259	10.2

Excludes births <500 grams birthweight.

<sup>1</sup> Stillbirth & Perinatal Death proportion/1000 total births.

<sup>2</sup> Neonatal Death proportion/1000 livebirths.

Perinatal deaths in relation to Health Service Management Regions of maternal residence are shown in Table 3. It should be noted however, that due to small numbers of births in each country division the proportions do vary on an annual basis (Table 3).

### 6.2 Maternal Race and Maternal Age

Perinatal mortality is lowest for babies of women aged 25-29 years, (8.6/1000) and the risk increases toward the extremes of the fertile age group.

Twenty one (13.2/1000) perinatal deaths were among babies of women in their teenage years. Another 29 (13.0/1000) perinatal deaths were among babies of women aged 35 years or more (Table 24).

TABLE 24 : PERINATAL DEATHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1989

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>
≤ 15	-	30	-	-	39	-	-	1	-	-	70	-
16	2	85	23.5	1	75	13.3	-	6	-	3	166	18.1
17	1	203	4.9	-	100	-	-	6	-	1	309	3.2
18	5	345	114.5	5	109	45.9	-	19	-	10	473	21.1
19	5	445	11.2	1	100	10.0	1	28	35.7	7	573	12.2
≤ 19	13	1108	11.7	7	423	16.5	1	60	16.7	21	1591	13.2
20 - 24	47	4660	10.1	9	515	17.5	6	249	24.1	62	5424	11.4
25 - 29	76	8861	8.6	6	325	18.5	2	547	3.7	84	9733	8.6
30 - 34	55	5812	9.5	4	141	28.4	4	547	7.3	63	6500	9.7
35 - 39	18	1709	10.5	2	40	50.0	5	218	22.9	25	1967	12.7
40 - 44	4	211	19.0	-	2	-	-	42	-	4	255	15.7
≥ 45	-	8	-	-	1	-	-	2	-	-	11	-
TOTAL	213	22369	9.5	28	1447	19.4	18	1665	10.8	259	25481	10.2

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 total births.

### 6.3 Maternal Race and Parity

The perinatal mortality proportion of babies born to primiparous women was 10.4/1000 and the proportion for babies born to women with a parity of 1 - 2 was 9.0/1000. The highest proportion of perinatal deaths (17.2/1000) was recorded among babies of women with a parity of 5 or more (Table 25).

TABLE 25 : PERINATAL DEATHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1989

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>
0	93	8990	10.3	3	416	7.2	9	659	13.7	105	10065	10.4
1 - 2	93	11337	8.2	16	619	25.8	6	836	7.2	115	12792	9.0
3 - 4	24	1831	13.1	6	292	20.5	3	163	19.6	33	2276	14.5
≥ 5	3	211	14.2	3	120	25.0	-	17	-	6	348	17.2
TOTAL	213	22369	9.5	28	1447	19.4	18	1665	10.8	259	25481	10.2

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 total births.

#### 6.4 Maternal Race and Birthweight

More than two thirds (70.7%) of all perinatal deaths (183 109.3/1000) were babies of low birthweight (<2500 grams).

In general terms the perinatal mortality in all racial groups increased as birthweight fell, the exception being for babies in  $\geq 4000$  gram categories. Proportions in races other than for babies of Caucasian women are based on small numbers and therefore statistically unreliable. (Table 26).

TABLE 26: PERINATAL DEATHS BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1989

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Total Births	Prop <sup>a</sup>
	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>			
500 - 999	77	141	546.1	11	16	688.0	7	11	636.4	95	168	565.6
1000 - 1499	29	141	205.7	5	16	313.0	1	9	(111.1)	35	166	210.8
1500 - 1999	21	273	76.9	5	32	156.3	3	25	(120.0)	29	330	87.9
2000 - 2499	19	835	22.8	3	92	(32.6)	2	83	(24.1)	24	1010	23.8
< 2500	146	1390	105.0	24	156	153.8	13	128	101.6	183	1674	109.3
2500 - 2999	20	3357	6.0	1	339	(2.9)	3	332	(9.0)	24	4028	6.0
3000 - 3499	26	8182	3.2	1	555	(1.8)	1	681	(1.5)	28	9418	3.0
3500 - 3999	12	6975	1.7	1	303	(3.3)	1	422	(2.4)	14	7700	1.8
4000 - 4499	7	2125	3.3	-	81	-	-	88	-	7	2294	3.1
$\geq 4500$	2	340	(5.9)	1	13	(76.9)	-	14	-	3	367	(8.2)
TOTAL	213	22369	9.5	28	1447	19.4	18	1665	10.8	259	25481	10.2

Excludes births <500 grams birthweight.

<sup>a</sup> Proportion/1000 total births.

( ) Where  $n < 5$  proportion has been bracketed.

#### 6.5 Maternal Race and Babies' Sex

There were 156 (12.0/1000) male and 103 (8.3/1000) female perinatal deaths among those babies born in 1989.

Among babies born to Caucasian women the perinatal death proportion for males (10.3/1000) was higher than for the perinatal death proportion for females (8.7/1000). For babies of Aboriginal women all perinatal deaths were males with a proportion of 36.8/1000 male births. It is most unexpected that all 28 Aboriginal perinatal deaths were male babies and it is likely that this is a chance occurrence. Normally, the distribution is equal. The proportion of perinatal deaths among male babies of women of other races (11.9/1000) was higher than the perinatal death proportion for females (9.7/1000) (Table 27).

TABLE 27 : PERINATAL DEATHS BY MATERNAL RACE AND SEX IN WESTERN AUSTRALIA IN 1989

Sex	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>
Male	118	11413	10.3	28	760	36.8	10	840	11.9	156	13013	12.0
Female	95	10956	8.7	-	687	-	8	825	9.7	103	12467	8.3
TOTAL	156	22369	7.0	28	1447	19.4	18	1665	10.8	259	25481	10.2

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 total births.

### 6.6 Maternal Race and Conjugal State

One sixth (15.6/1000) of perinatal deaths were among babies of women reported as socially unsupported by a male partner. This represents an increase since the 1988 cohort report (14.0/1000). The increased social acceptance of defacto relationships may have influenced reporting (Table 28).

TABLE 28 : PERINATAL DEATHS BY MATERNAL RACE AND CONJUGAL STATE IN WESTERN AUSTRALIA IN 1989

Conjugal State	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>	No.	Total Births	Prop <sup>a</sup>
Single	28	1895	14.8	9	532	16.9	2	90	22.2	39	2517	15.5
Married/defacto	181	20272	8.9	19	901	21.1	16	1559	10.3	216	22732	9.5
<sup>2</sup> Other	4	202	19.8	-	14	-	-	16	-	4	232	17.2
TOTAL	213	22369	9.5	28	1447	19.4	18	1665	10.8	259	25481	10.2

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 total births.

<sup>2</sup> Other includes separated, divorced and widowed.

## 7. INFANT MORTALITY IN WESTERN AUSTRALIA IN THE 1989 BIRTH COHORT

### 7.1 Infant Deaths

There were 198 infant deaths identified amongst the 25343 livebirths in 1989. Of these, 121 were neonatal deaths and 77 were post-neonatal deaths. The infant mortality proportion for Western Australia in 1989 was 7.8/1000 livebirths (Tables 15 and 29).

Infant mortality among babies born to Aboriginal women (22.4/1000) was more than three times that for babies born to non-Aboriginal women (Table 41, Figure V). The difference between these groups was 18.9/1000 in 1985, 12.5/1000 in 1986, 11.7/1000 in 1987, 22.5/1000 in 1988 and 15.5/1000 in 1989. (Table 41).

### 7.2 Maternal Race and Maternal Age

The infant mortality proportion is greatest for babies of teenage women (15.2/1000). The infant mortality proportion for babies of Aboriginal teenage mothers (21.5/1000) was almost double that for babies of Caucasian teenage mothers (12.7/1000) (Table 29).

TABLE 29 : INFANT DEATHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1989

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Prop <sup>a</sup>
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>			
< 15	-	30	-	2	39	51.3	-	1	-	2	70	28.6
16	1	84	11.9	1	74	13.5	-	6	-	2	164	12.2
17	3	202	14.9	2	100	20.0	-	6	-	5	308	16.2
18	4	343	11.7	4	107	37.4	-	19	-	8	468	17.1
19	6	444	13.5	-	99	-	1	28	35.7	7	571	12.3
< 19	14	1102	12.7	9	419	21.5	1	60	16.7	24	1581	15.2
20 - 24	30	4628	6.5	11	509	21.6	4	247	16.2	45	5384	8.4
25 - 29	54	8819	6.1	6	321	18.7	1	545	1.8	61	9685	6.3
30 - 34	39	5786	6.7	5	139	36.0	4	546	7.3	48	6471	7.4
35 - 39	12	1702	7.1	1	39	25.6	4	216	18.5	17	1957	8.7
40 - 44	3	210	14.3	-	2	-	-	42	-	3	254	11.8
≥ 45	-	8	-	-	1	-	-	2	-	-	11	-
TOTAL	152	22255	6.8	32	1430	22.4	14	1658	8.4	198	25343	7.8

Excludes births <500 grams birthweight.

<sup>a</sup> Proportion/1000 livebirths.

### 7.3 Maternal Race and Conjugal State

The infant mortality proportion (12.8/1000) among babies born to single women is far greater than the proportion for babies of women in a marriage or defacto relationship (7.1/1000) (Table 30).

TABLE 30 : INFANT DEATHS BY MATERNAL RACE AND CONJUGAL STATE IN WESTERN AUSTRALIA IN 1989

Conjugal State	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Prop <sup>a</sup>
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>			
Single	19	1879	10.1	12	527	22.8	1	89	11.2	32	2495	12.8
Married/defacto	129	20175	6.4	19	889	21.4	13	1553	8.4	161	22617	7.1
<sup>2</sup> Other	4	201	20.0	1	14	71.4	-	16	-	5	231	21.6
TOTAL	152	22255	6.8	32	1430	22.4	14	1658	8.4	198	25343	7.8

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

<sup>2</sup> Other includes separated, divorced and widowed.

#### 7.4 Maternal Race and Parity

The highest proportion of infant deaths was among babies of women whose parity was 3 to 4 (13.3/1000) and 5 or more (20.3/1000). Four of these infant deaths were babies of Aboriginal mothers raising their proportion for parity 5 or more to 34.2/1000 livebirths (Table 31).

TABLE 31 : INFANT DEATHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1989.

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Prop <sup>a</sup>
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>			
0	62	8941	6.9	5	413	12.1	6	655	9.2	73	10009	7.3
1 - 2	68	11285	6.0	14	610	23.0	6	835	7.2	88	12730	6.9
3 - 4	19	1818	10.5	9	290	31.0	2	151	13.2	30	2259	13.3
≥ 5	3	211	14.2	4	117	34.2	-	17	-	7	345	20.3
TOTAL	152	22255	6.8	32	1430	22.4	14	1658	8.4	198	25343	7.8

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

#### 7.5 Maternal Race and Plurality

Infant mortality for multiple births (46.7/1000) was seven times the proportion for singleton births (6.7/1000). The infant death proportion (43.6/1000) for twin babies born to Caucasian women in 1989 was higher than the proportion (28.3/1000) in 1988 (Table 32).



TABLE 32: INFANT DEATHS BY MATERNAL RACE AND PLURALITY IN WESTERN AUSTRALIA IN 1989.

Plurality	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>
Singleton	125	21594	5.8	28	1399	20.0	11	1622	6.8	164	24615	6.7
Twins	26	597	43.6	4	30	133.3	3	36	83.3	33	663	49.8
Triplets	1	64	15.6	-	1	-	-	-	-	1	65	15.4
TOTAL	152	22255	6.8	32	1430	22.4	14	1658	8.4	198	25343	7.8

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

### 7.6 Maternal Race and Babies' Sex

Infant deaths were proportionately 9.0/1000 male and 6.6/1000 female. Among babies born to Caucasian women the infant death proportion for males (7.6/1000) was higher than the infant death proportion for females (6.1/1000). For babies of Aboriginal mothers the infant death proportion for males (29.6/1000) was higher than the infant death proportion for females (14.6/1000) and for infants of women of other races the infant death proportion for males (9.6/1000) was also higher than the infant death proportion for females (7.3/1000) (Table 33).

TABLE 33 : INFANT DEATHS BY MATERNAL RACE AND SEX IN WESTERN AUSTRALIA IN 1989

Sex	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>
Male	86	11351	7.6	22	743	29.6	8	835	9.6	116	12929	9.0
Female	66	10904	6.1	10	687	14.6	6	823	7.3	82	12414	6.6
TOTAL	152	22255	6.8	32	1430	22.4	14	1658	8.4	198	25343	7.8

Excludes births < 500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

### 7.7 Maternal Race and Birthweight

Low birthweight (less than 2500 grams) babies comprised more than half of all infant deaths. A proportion of 70.3/1000 livebirths was recorded for low birthweight babies. Babies with birthweight of 3500-3999 grams had the highest chance of survival with an infant mortality proportion of 1.8/1000. An infant mortality proportion (105.6/1000) for low birth weight babies of Aboriginal women was much higher than the proportion (65.5/1000) for low birth weight babies of Caucasian women (Table 34).

TABLE 34: INFANT MORTALITY BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1989

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Prop <sup>a</sup>
	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>	No.	Live Births	Prop <sup>a</sup>			
500 - 999	43	102	421.6	7	11	636.4	4	8	(500.0)	54	121	446.3
1000 - 1499	18	127	141.7	2	13	(153.8)	2	9	(222.2)	22	149	147.7
1500 - 1999	12	261	46.0	3	29	(103.4)	2	24	(83.3)	17	314	54.1
2000 - 2499	13	823	15.8	3	89	(33.7)	2	83	(24.1)	18	995	18.1
< 2500	86	1313	65.5	15	142	105.6	10	124	80.6	111	1579	70.3
2500 - 2999	17	3343	5.1	6	338	17.8	2	331	(6.0)	25	4012	6.2
3000 - 3499	29	8170	3.5	8	555	14.4	1	680	(1.5)	36	9405	3.8
3500 - 3999	11	6969	1.6	2	302	(6.6)	1	421	(2.4)	14	7692	1.8
4000 - 4499	10	2122	4.7	1	81	(12.3)	-	88	-	11	2291	4.8
≥ 4500	1	338	(3.0)	-	12	-	-	14	-	1	364	(2.7)
TOTAL	152	22255	6.8	32	1430	22.4	14	1658	8.4	198	25343	7.8

Excludes births <500 grams birthweight.

<sup>1</sup> Proportion/1000 livebirths.

( ) Where n<5 proportion has been bracketed.

## 7.8 Maternal Race and Age at Infant Death

Over half (61.1%) of the infant deaths occurred in the neonatal period, with most (91.4%) deaths occurring within 24 weeks of birth (Table 35).

TABLE 35: INFANT DEATHS BY MATERNAL RACE AND AGE AT DEATH IN WESTERN AUSTRALIA IN 1989

Age at Death in Weeks	Maternal Race						Total	
	Caucasian		Aboriginal		Other		No.	%
	No.	%	No.	%	No.	%		
1 - 4 weeks	102	67.1	12	37.5	11	78.6	125	63.1
5 - 8 weeks	16	10.5	6	18.8	-	-	22	11.1
9 - 12 weeks	7	4.6	4	12.5	1	7.1	12	6.1
13 - 16 weeks	7	4.6	5	15.6	1	7.1	13	6.6
17 - 20 weeks	7	4.6	-	-	-	-	7	3.5
21 - 24 weeks	1	0.7	-	-	1	7.1	2	1.0
25 - 52 weeks	12	7.9	5	15.6	-	-	17	8.6
TOTAL	152	100.0	32	100.0	14	100.0	198	100.0

Excludes births <500 grams birthweight.

## 7.9 Causes of Infant Death

The major causes of infant deaths remain lethal congenital malformations for 60 (30.3%) babies, Sudden Infant Death Syndrome for 41 (20.7%) and low birthweight (<2500 grams) for 53 (26.8%) babies. Infection remained a significant cause of infant mortality among babies of Aboriginal mothers (Table 36).

TABLE 36 : CAUSE OF INFANT DEATHS AND MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Cause of Death	Maternal Race						Total		Total	
	Caucasian		Aboriginal		Other		1989		1988	
	No.	%	No.	%	No.	%	No.	%	No.	%
Lethal Congenital Malformation	49	32.2	4	12.5	7	50.0	60	30.3	50	26.9
Low Birthweight (<2500 grams)	44	28.9	6	18.8	3	21.4	53	26.8	45	24.2
Asphyxia	5	3.3	1	3.1	-	-	6	3.0	9	4.8
Pregnancy conditions	3	2.0	-	-	-	-	3	1.5	-	-
Infections	5	3.3	7	21.9	-	-	12	6.1	14	7.5
Hydrops Fetalis	-	-	-	-	-	-	-	-	-	-
Other	9	5.9	1	3.1	1	7.1	11	5.6	9	4.8
Sudden Infant Deaths	29	19.1	10	31.3	2	14.3	41	20.7	56	30.1
Unknown	8	5.3	3	9.4	1	7.1	12	6.1	3	1.6
<b>TOTAL</b>	<b>152</b>	<b>100.0</b>	<b>32</b>	<b>100.0</b>	<b>14</b>	<b>100.0</b>	<b>198</b>	<b>100.0</b>	<b>186</b>	<b>100.0</b>

Excludes births <500 grams birthweight.

TABLE 37 : NEONATAL, POST-NEONATAL AND INFANT MORTALITY BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1989

Type of Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>
Neonatal Mortality	99	4.4	11	7.7	11	6.6	121	4.8
Post-Neonatal Mortality	53	2.4	21	14.7	3	1.8	77	3.0
Infant Mortality	152	6.8	32	22.4	14	8.4	198	7.8

Excludes births <500 grams birthweight.

Neonatal, post-neonatal and infant mortality proportions/1000 livebirths.

TABLE 38 : PERINATAL AND INFANT MORTALITY BY MATERNAL AGE, PLURALITY AND SEX IN WESTERN AUSTRALIA IN 1989

Conjugal	Perinatal Mortality						Infant Mortality					
	Aboriginal		Non-Aboriginal		Total		Aboriginal		Non-Aboriginal		Total	
	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>
Maternal	-	-	-	-	-	-	-	-	-	-	-	-
Age ≤15	39	18.2	31	12.3	70	13.8	39	51.3	31	-	2	28.6
16 - 19	7	384	14	1137	21	1521	7	380	15	1072	22	1452
20 - 29	15	840	131	14317	146	15157	17	830	89	1131	106	1961
30 - 39	6	181	82	8286	88	8467	6	178	59	8250	65	8428
≥40	-	2	4	263 (15.2)	4	265 (15.1)	-	3	3	262 (11.5)	3	265 (11.3)
Plurality	24	1416	196	23327	220	24743	28	1399	136	23216	164	24615
Singleton	4	31 (129.0)	35	697	39	728	4	31 (129.0)	30	697	34	728
Multiple	-	-	-	-	-	-	-	-	-	-	-	-
Sex	28	760	128	12253	156	13013	22	743	94	12186	116	12929
Male	-	687	103	11781	103	12468	10	687	72	11727	82	12414
Female	-	-	-	-	-	-	-	-	-	-	-	-

Excludes births <500 grams birthweight.

<sup>1</sup> Perinatal death proportion/1000 total births.

<sup>2</sup> Infant death proportion/1000 livebirths.

( ) Where n<5 proportion has been bracketed.

## 8. TRENDS IN BIRTHS, PERINATAL AND INFANT MORTALITY IN WESTERN AUSTRALIA 1980 - 1989

### 8.1 Crude Birth Rates and Total Births 1980 - 1989

The crude birth rate for Western Australia has remained relatively stable from 1980 - 1989 at between 15.9/1000 and 16.9/1000 person-years of total population.

Consideration of racial groups shows similar stability. The crude birth rate among Aboriginal women (32.8/1000) in 1989 showed little change from 1988 (33.9/1000). Among non-Aboriginal women the crude birth rate ranged between 16.5/1000 in 1980 and 15.4/1000 in 1989 (Table 39, Figure VI).

TABLE 39 : CRUDE BIRTH RATES FOR ABORIGINAL AND NON-ABORIGINAL WESTERN AUSTRALIAN BIRTHS 1980 - 1989

Year	Aboriginal			Non-Aboriginal			Total		
	Live Births	Pop <sup>a</sup>	Crude Birth Rate	Live Births	Pop <sup>a</sup>	Crude Birth Rate	Live Births	Pop <sup>a</sup>	Crude Birth Rate
1980	1029	32598	31.6	19595	1236470	15.8	20624	1269068	16.2
1981	1093	33547	32.6	20948	1266509	16.5	22041	1300056	16.9
1982	1113	34552	32.2	21071	1304347	16.1	22184	1338899	16.6
1983	1135	35464	32.0	21737	1333586	16.3	22872	1369050	16.7
1984	1176	36724	32.0	21607	1354513	15.9	22783	1391237	16.4
1985	1235	37992	32.5	21903	1380572	15.9	23138	1418564	16.3
1986	1230	39285	31.3	22463	1419734	15.8	23693	1459019	16.2
1987	1328	40926	32.5	22676	1455133	15.6	24004	1496059	16.0
1988	1428	42165	33.9	23534	1502641	15.7	24962	1544806	16.2
1989	1430	43527	32.8	23913	1551218	15.4	25343	1594745	15.9

SOURCE : MIDWIVES' NOTIFICATION SYSTEM  
 AUSTRALIAN BUREAU OF STATISTICS - Cat. No. 3201.0.  
 CHILD AND COMMUNITY HEALTH SERVICES - Aboriginal Population Data.

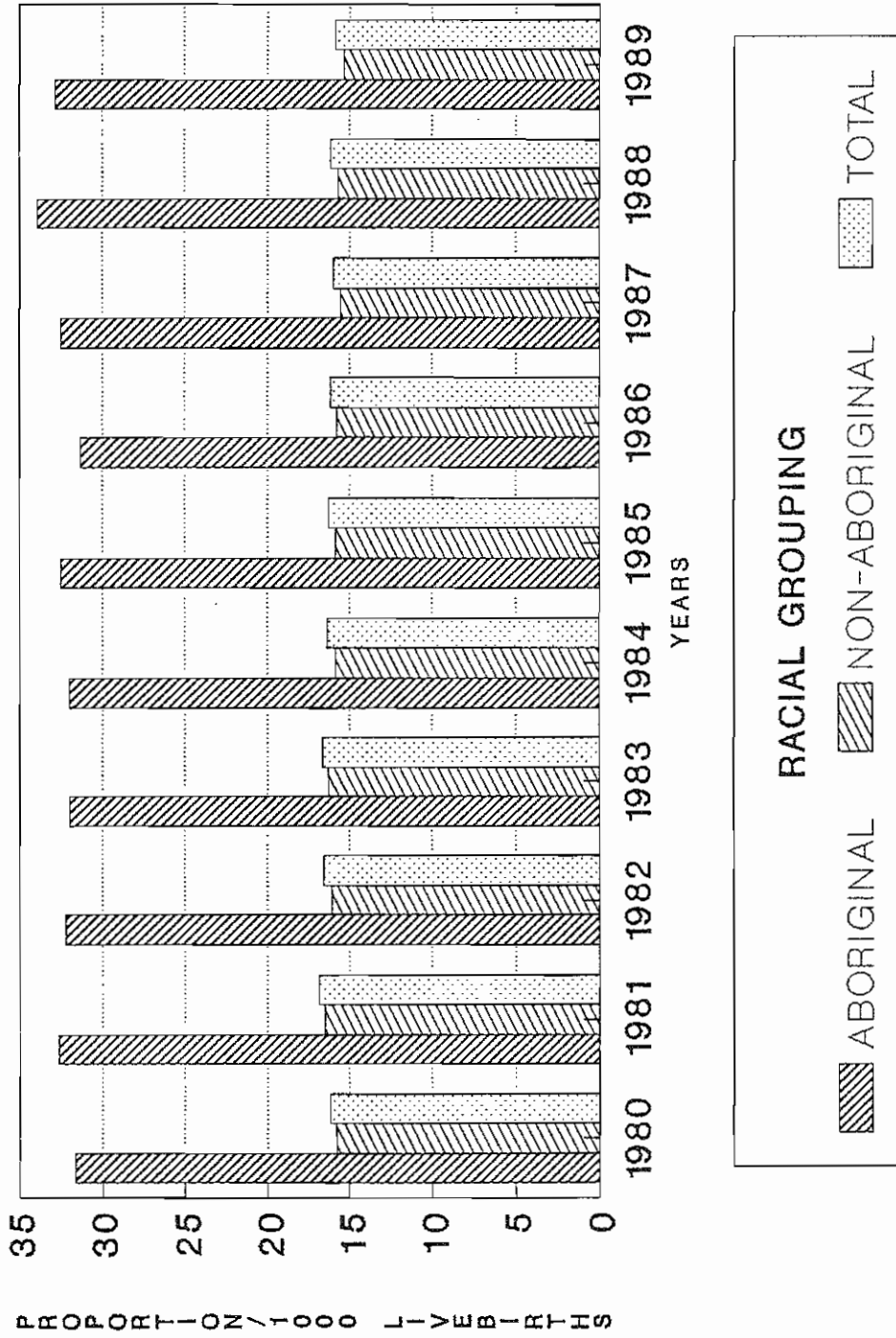
### 8.2.1 Stillbirths, Neonatal and Perinatal Mortality 1980 - 1989

Western Australian stillbirth proportions showed a general downward trend from 7.5/1000 total births in 1980 to 4.7/1000 in 1988 (Table 40).

Consideration of stillbirth proportions and racial groups showed stillbirths among babies of non-Aboriginal women followed this trend while the proportions decreased from 7.2/1000 in 1980 to 4.4/1000 in 1988. Among babies of Aboriginal women, stillbirth proportions were less consistent in their decline and remained approximately double the proportion for stillbirths among babies of non-Aboriginal women (Table 40).

# CRUDE BIRTH RATES AND RACIAL GROUPING FOR WESTERN AUSTRALIAN BIRTHS, 1980-1989

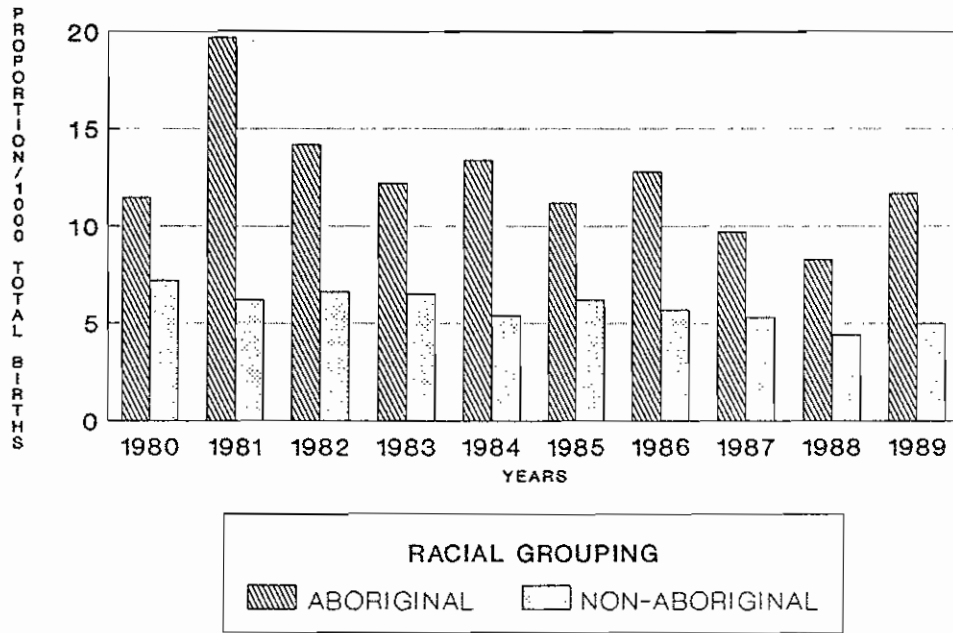
FIGURE VI



Excludes births < 500 grams birthweight.

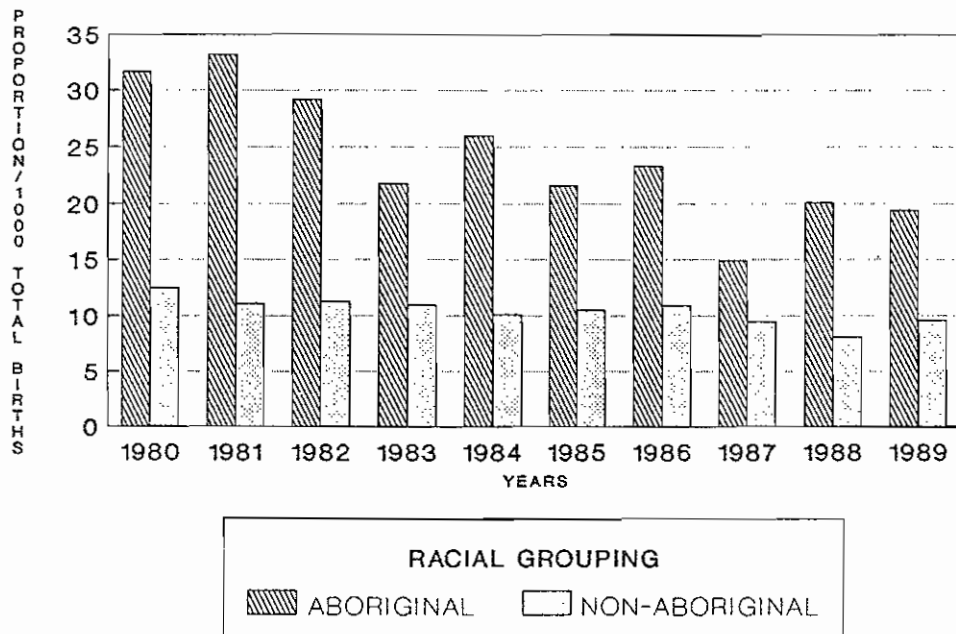
FIGURE VII

STILLBIRTH PROPORTIONS AND RACIAL GROUPING OF BIRTHS IN WA. 1980-89.



Excludes births <500 grams birthweight.

FIGURE VIII PERINATAL MORTALITY AND RACIAL GROUPING FOR WESTERN AUSTRALIAN BIRTHS, 1980-89



Excludes births <500 grams birthweight.

TABLE 40 : STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY FOR ABORIGINAL AND NON-ABORIGINAL BIRTHS IN WESTERN AUSTRALIA 1980 - 1989

Year	Stillbirths			Neonatal Mortality			Perinatal Mortality		
	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. (3)	No. (3)	No. (3)
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 13.4	118 5.4	134 5.8	15 12.8	101 4.7	116 5.1	31 26.0	219 10.1	250 10.9
1985	14 11.2	136 6.2	150 6.4	13 10.5	96 4.4	109 4.7	27 21.6	232 10.5	259 11.1
1986	16 12.8	130 5.7	146 6.1	13 10.6	116 5.2	129 5.4	29 23.3	246 10.9	275 11.5
1987	13 9.7	121 5.3	134 5.6	7 5.3	96 4.2	103 4.3	20 14.9	217 9.5	237 9.8
1988	12 8.3	105 4.4	117 4.7	17 11.9	87 3.7	104 4.2	29 20.1	192 8.1	221 8.8
1989	17 11.7	121 5.0	138 5.4	11 7.7	110 4.6	121 4.8	28 19.4	231 9.6	259 10.2

Excludes births <500 grams birthweight.

1980 - 1983 based on year of death.

1984 - 1989 based on year of birth.

(1) Stillbirth Proportions/1000 total births.

(2) Neonatal Mortality Proportion/1000 livebirths.

(3) Perinatal Mortality Proportion/1000 total births.

SOURCE : MIDWIVES' NOTIFICATION SYSTEM  
REGISTRAR GENERAL'S OFFICE



### 8.2.2 Neonatal Mortality

The neonatal mortality proportion for babies born to Aboriginal women remained higher than the neonatal mortality proportion for babies born to non-Aboriginal women.

The proportion of neonatal mortality among babies of Aboriginal women has reduced during the ten year period from 1980-1989. The proportion of 20.4/1000 livebirths in 1980 reduced to 7.7/1000 livebirths in 1989. For babies of non-Aboriginal women, neonatal mortality proportions reduced from 5.3/1000 in 1980 to 4.6/1000 in 1989 (Table 40, Figure IX).

### 8.2.3 Perinatal Mortality

Comparison of perinatal mortality for 1984-89, the six years where the birth cohort method was employed, showed that overall the proportion has decreased from 10.9/1000 total births in 1984 to 10.4/1000 in 1989. An overall reduction of 3.3/1000 (13.5 in 1980 to 10.2 in 1989) occurred over ten years. It was apparent that the reduction in the perinatal mortality among babies of Aboriginal women from 33.2/1000 in 1981 to 14.9/1000 in 1987, was greater than among babies born to non-Aboriginal women over the same period (Table 40).

## 8.3 Neonatal, Post-neonatal and Infant Mortality 1980 - 1989

Over the ten year period from 1980 to 1989 neonatal and infant mortality proportions reduced in Western Australia. Post-neonatal mortality proportions showed minimal change over the same period. The neonatal mortality proportion reduced from 6.1/1000 in 1980 to 4.8/1000 in 1989. Proportions for post-neonatal deaths decreased slightly from 3.2/1000 in 1980 to 3.0/1000 in 1989 and infant mortality proportions reduced from 9.3/1000 in 1980 to 7.8/1000 in 1989 (Table 41, Figure X, Figure XI).

Among babies of aboriginal women a reduction in infant mortality from 31.1/1000 in 1980 to 18.8/1000 in 1987 was shown but for 1989 the proportion has increased to 22.4/1000 (Table 41).

Infant death proportions among babies of Aboriginal women at more than three times the proportion for babies of non-aboriginal women, should be noted for the differences in age at death (Table 35) and the cause of death (Table 36). The proportion of deaths of babies born to Aboriginal women during the post-neonatal period was six times that of deaths among babies of non-Aboriginal women.

TABLE 41: NEONATAL, POST-NEONATAL AND INFANT MORTALITY FOR ABORIGINAL AND NON-ABORIGINAL BIRTHS IN WESTERN AUSTRALIA 1980 - 1989

Year	Neonatal Mortality				Post-Neonatal Mortality				Infant Mortality									
	Aboriginal		Non-Aboriginal		Aboriginal		Non-Aboriginal		Aboriginal		Non-Aboriginal		Total					
	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>	No.	Prop <sup>a</sup>				
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	31.7	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
1985	13	10.5	96	4.4	109	4.7	19	15.4	58	2.6	77	3.3	32	25.9	154	7.0	186	8.0
1986	13	10.6	116	5.2	129	5.4	12	9.8	59	2.6	71	3.0	25	20.3	175	7.8	200	8.4
1987	7	5.3	96	4.2	103	4.3	18	13.6	64	2.8	82	3.4	25	18.8	160	7.1	185	7.7
1988	17	11.9	87	3.7	104	4.2	24	16.8	58	2.5	82	3.3	41	28.7	145	6.2	186	7.5
1989	11	7.7	110	4.6	121	4.8	21	14.7	56	2.3	77	3.0	32	22.4	166	6.9	198	7.8

Excludes births <500 grams birthweight.

1980 - 1983 based on year of death.

1984 - 1989 based on year of birth.

(1) Neonatal, Post-Neonatal and Infant Mortality Proportion/1000 livebirths.

SOURCE: MIDWIVES' NOTIFICATION SYSTEM  
REGISTRAR GENERAL'S OFFICE

FIGURE IX

### NEONATAL MORTALITY AND RACIAL GROUPING FOR WESTERN AUSTRALIAN BIRTHS, 1980-1989

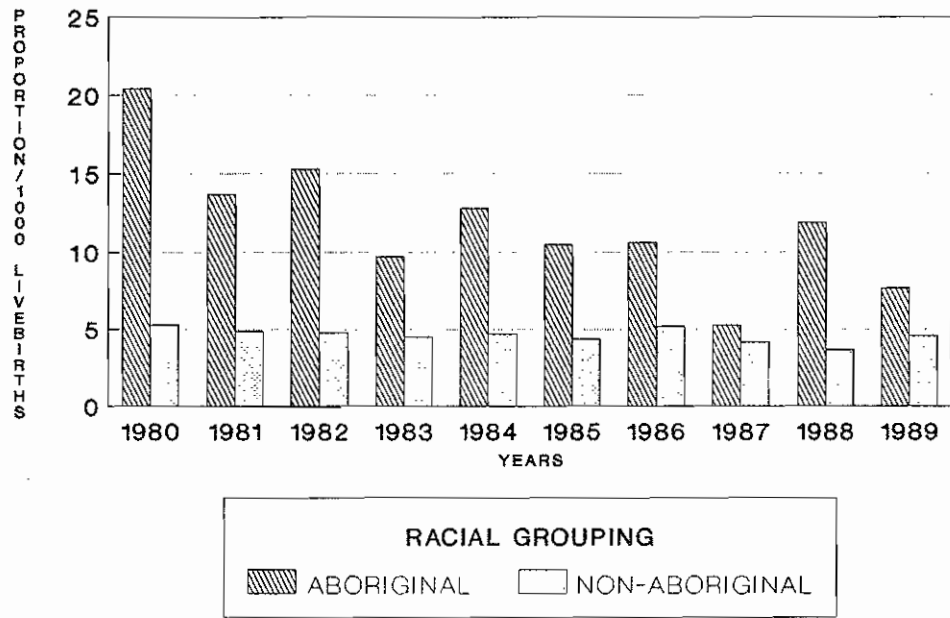


FIGURE X

### POSTNEONATAL MORTALITY, RACIAL GROUPING FOR WESTERN AUSTRALIAN BIRTHS, 1980-1989

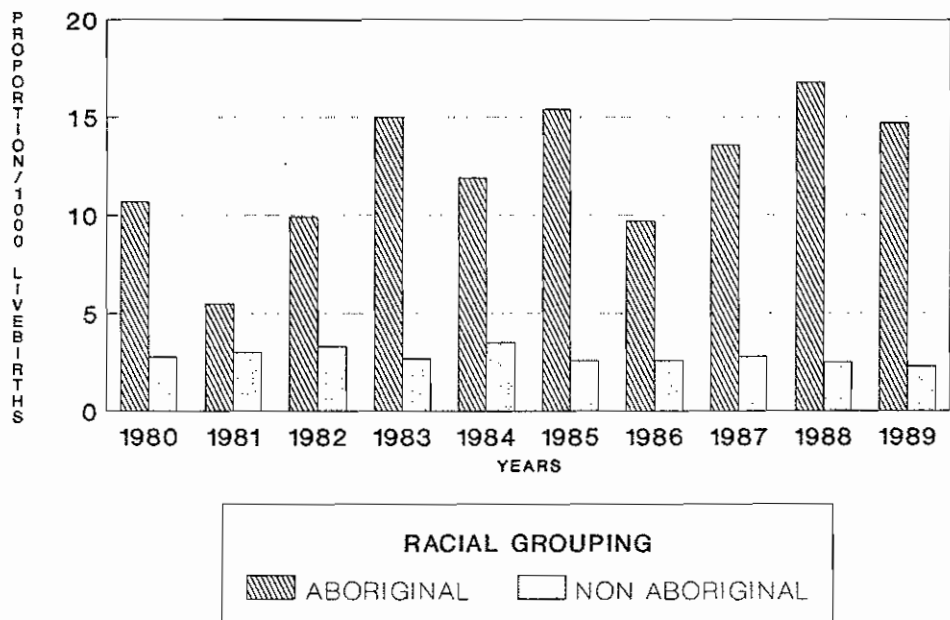
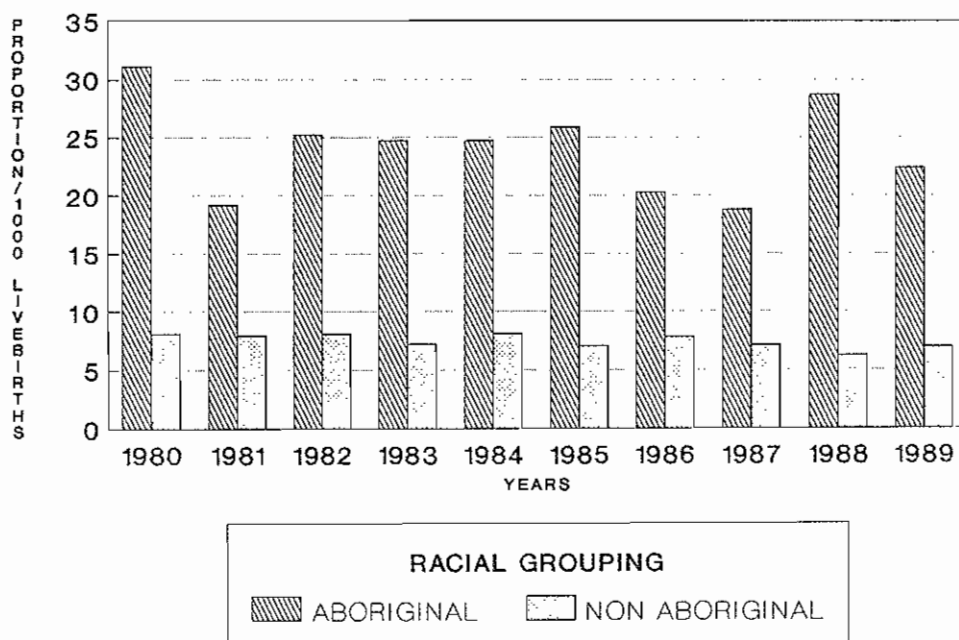


FIGURE XI

INFANT MORTALITY AND RACIAL GROUPING  
FOR WESTERN AUSTRALIAN BIRTHS, 1980-89



Excludes births < 500 grams birthweight.

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1. Gee, V. Perinatal Statistics in Western Australia. Seventh Annual Report of the Midwives' Notification System for 1989. Health Department of Western Australia, Perth. 1990.
2. Gee, V. Perinatal and Infant Mortality Identified by Maternal Race. The 1988 Western Australian Birth Cohort, Health Department of Western Australia, Perth. 1990.
3. Holman, C.D.J. and Quadros, C.F. Health and Disease in the Aboriginal Population of the Kimberley Region of Western Australia 1980 - 1985. Health Department of Western Australia, Perth. 1986.

NOTIFICATION OF CASE ATTENDED Hospital

PARTICULARS RELATING TO MOTHER

PRINT  
IN  
BLOCK  
LETTERS

2 SURNAME		6 UNIT RECORD No.	
3 FORENAMES		7 BIRTH DATE	
4 ADDRESS OF USUAL RESIDENCE		8 POSTCODE	
5 MAIDEN NAME			

9 Current Conjugal State	
single	( )
married (incl. de facto)	( )
other	( )
10 Race	
Caucasian	( )
Aboriginal (full or part)	( )
Other	( )
11 Height (cms)	
	( ) ( ) ( )

PREGNANCY	
PREVIOUS PREGNANCIES (excluding this pregnancy)	
Total number of	( ) ( )
12 Previous Pregnancies	( ) ( )
13 Previous children now living	( ) ( )
14 born alive, now dead	( ) ( )
15 stillborn	( ) ( )
THIS PREGNANCY	
16 Date of LMP	( ) ( ) ( ) ( ) ( ) ( )
17 This date	certain ( ) ( ) 1 not certain ( ) ( ) 2
18 Expected due date	( ) ( ) ( ) ( ) ( ) ( )
19 Complications of Pregnancy:	
Threatened abortion (under 20 weeks)	( ) ( ) A
urinary tract infection	( ) ( ) B
pre eclampsia	( ) ( ) C
APH - placenta praevia	( ) ( ) D
- abruptio	( ) ( ) E
- other	( ) ( ) F
prem. rupture of membranes	( ) ( ) G
20 other	( ) ( ) H
21 Medical Conditions:	
	( ) ( ) ( ) ( ) ( ) ( )

LABOUR AND DELIVERY	
23 Onset of Labour:	
spontaneous	( ) ( ) A
augmented	( ) ( ) C
induced	( ) ( ) B
no labour	( ) ( ) D
24 Presentation:	
vertex	( ) ( ) 1
braech	( ) ( ) 2
other	( ) ( ) 3
25 Type of Delivery:	
normal	( ) ( ) A
vacuum - successful	( ) ( ) B
- failed	( ) ( ) C
forceps - successful	( ) ( ) D
- failed	( ) ( ) E
braech manoeuvre	( ) ( ) F
caesarean - elective	( ) ( ) G
- emergency	( ) ( ) H
Anaesthesia:	
none	( ) ( )
general	( ) ( ) A
epidural/spinal	( ) ( ) B
other	( ) ( ) C
26 Hours of established labour:	
	( ) ( )
27 Complications of Labour, Delivery:	
(Include reason for Caesarean)	
precipitate delivery	( ) ( ) A
foetal distress	( ) ( ) B
prolapsed cord	( ) ( ) C
cord tight around neck	( ) ( ) D
cephalopelvic disproportion	( ) ( ) E
28 other	( ) ( ) F

BABY	
Separate Form for each Baby	
Adoption	Yes ( ) No ( )
33 Birth Date:	( ) ( ) ( ) ( ) ( ) ( )
34 Time (24 hr. clock)	( ) ( ) ( ) ( )
35 Plurality:	
single birth	( ) ( )
first twin	( ) ( )
second twin	( ) ( )
other multiple birth:	( ) ( )
36 (Specify baby number ___ of ___)	
37 Sex: male	( ) ( )
female	( ) ( )
38 Condition: liveborn ( ) ( )	
stillborn	( ) ( )
39 Birthweight (grams)	
	( ) ( ) ( ) ( ) ( ) ( )
40 Length (cms)	
	( ) ( ) ( ) ( )
41 Time to Spontaneous Respiration (mins)	
	( ) ( ) ( ) ( )
42 Resuscitation:	
none	( ) ( )
intubation	( ) ( )
oxygen only	( ) ( )
other	( ) ( )
43 Apgar Score (5 mins)	
	( ) ( ) ( ) ( )
Estimated Gestation (weeks)	
	( ) ( ) ( ) ( )
44 Congenital Anomalies	
	( ) ( ) ( ) ( ) ( ) ( )
45 Birth Trauma (Eg. cephalhaematoma)	
	( ) ( ) ( ) ( ) ( ) ( )

COMPLETE SECTION ON SEPARATION  
Attach to Mother and Baby's Inpatient Summaries (HA22) Forward to Health Statistics P.O. Box 8172 Stirling Street, PERTH 6001 after discharge of Mother and/or baby whichever is later

MIDWIFE	
Name	( ) ( ) ( ) ( ) ( ) ( )
Signature	( ) ( ) ( ) ( ) ( ) ( )
22	
Req No	Date / /

BABY'S SEPARATION DETAILS	
Date of Discharge	( ) ( ) ( ) ( ) ( ) ( )
29 Transfer or Death	( ) ( ) ( ) ( )
Neonatal Blood Screening	No ( )
30 Type of Separation:	
Discharged home	( ) ( ) 1
Died	( ) ( ) 2
Transferred to	( ) ( ) 3
31 Special Care (wholledays only)	
	( ) ( ) ( ) ( )
32 Separate HA22 for baby:	
yes, attached	( ) ( ) 2

# MEDICAL CERTIFICATE OF CAUSE OF PERINATAL DEATH

To be completed in respect of—  
(i) a child not born alive, of at least 20 weeks gestation or 400 grammes weight  
(ii) a live born child dying within twenty-eight days after birth

Note: Please  in relevant boxes thus   
**PARTICULARS RELATING TO MOTHER**

1. Full Name ..... 2. Age ..... years  
3. Address of usual residence.....  
4. Parity.....

**PARTICULARS RELATING TO CHILD** ABORIGINAL: YES  NO

5. Name, if given.....  
6. Sex: Male  Female   
7. Place of death.....  
8. Time and date of birth ..... a.m.  p.m.  19.....  
9. This birth was: Single  Twin  Triplet   
10. Weight at birth ..... grammes  
11. Period of gestation..... completed weeks from first day of last menstrual period to date of delivery

12. HEART BEAT CEASED:  
(a) Before labour commenced   
(b) During labour but before delivery   
(c) Before delivery but not known whether before or during labour   
(d) After delivery   
(e) Not known whether before or after delivery   
If heart beat ceased before labour commenced, please estimate how long before--  
..... hours or ..... days  
If heart beat ceased after delivery, please state time—  
..... a.m. and date.....  
..... p.m.

13. BREATHING:  
Did the child breathe after complete expulsion or extraction from the mother?  
Yes  No

### CAUSE OF DEATH

14. Post mortem: carried out  ; to be carried out Yes  No   
Is cause of death shown below based on post mortem Yes  No

**PART I**  
**A. CAUSES IN CHILD OR FOETUS**  
Disease or condition directly leading to death.....  
due to f.....  
due to f.....

**B. MATERNAL OR OTHER CONDITIONS OR CAUSES GIVING RISE TO THE UNDERLYING CAUSE ABOVE**  
due to.....  
\* Morbid conditions, if any, giving rise to the above cause, stating the underlying condition last.

**PART II**  
**OTHER SIGNIFICANT CONDITIONS** in child, foetus or mother contributing to the death, but not related to the disease or condition causing it.....

Registration Number  
3  
2  
8  
6  
9  
10  
11  
12  
14  
4  
7

Approximate Interval Between Onset and Death

I hereby certify that the particulars shown above are true to the best of my knowledge.  
Signature ..... Date .....  
Name ..... (Block Letters) Address.....

R.G. 356

WESTERN AUSTRALIA  
REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES ACT, 1961

Registrar to enter No. of death entry. .....
--

## MEDICAL CERTIFICATE OF CAUSE OF DEATH

(For use only by a legally qualified medical practitioner who has been in attendance during deceased's last illness.  
If Deceased less than 29 days old use Form R.G. 364)

Aboriginal: Yes  No

Name of Deceased.....

Sex..... Date of Death..... 19.....

Age as stated to me..... Date last seen alive by me..... 19.....

Place of Death.....

\*Post Mortem Carried Out  ; To be Carried Out  ; Not to be Carried Out

Approximate Interval between onset and death
--

CAUSE OF DEATH (IN BLOCK LETTERS)	
DIRECT CAUSE— Disease or condition directly leading to death	(a)..... due to—
ANTECEDENT CAUSES— Morbid conditions, if any, giving rise to the above cause stating the underlying con- dition last	(b)..... due to—
	(c).....

OTHER SIGNIFICANT CONDITIONS CONTRIBUTING TO DEATH BUT NOT RELATED TO THE DISEASE OR CONDITION CAUSING IT
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\* See Fly Leaf—This means the disease, injury or complication which caused death—NOT the mode of dying, as e.g., heart failure, asthenia, etc.

If operation performed on Deceased within 3 months of Death specify condition for which performed .....

..... and Date of Operation .....

If this case has been reported to the Coroner, enter "Yes" here .....

I hereby certify that I was in medical attendance during the abovenamed Deceased's last illness and that the particulars and cause of death above written are true to the best of my knowledge and belief.

Name .....	(block letters)	Signature .....	
Address .....		Professional Title .....	
Date .....			

NOTE.—SECTION 41 of the abovementioned Act provides that in case of the death of any person who has been attended in his last illness by a duly qualified medical practitioner, such practitioner shall forthwith after the death complete and sign a certificate of the cause of death in the form approved by the Registrar General and give it to the person required by the Act to furnish information concerning such death.

\* Please tick appropriate box.

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