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# THE 1990 WESTERN AUSTRALIAN BIRTH COHORT

## PERINATAL AND INFANT MORTALITY IDENTIFIED BY MATERNAL RACE

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BAppSc.(Nursing Admin.),RN,RM,CHN  
Epidemiology and Research Branch

December 1992



Health Department of Western Australia

Statistical Series /34  
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## SUMMARY

The Midwives' Notification System of Western Australia identified 25944 births of  $\geq 500$  grams birthweight to 25637 women during 1990. Of these babies, 118 were stillborn and a further 174 liveborn babies died within the first twelve months.

The overall stillborn rate was 4.5/1000 total births. Among babies born to Caucasian women the rate was 4.5/1000, for babies of Aboriginal women 7.7/1000 and for babies of women of other races the rate was 2.8/1000 total births. The stillbirth rate of 4.4/1000 among singleton births was less than half that for multiple births (11.4/1000) (Tables 3 and 6).

Of babies born to teenage women 9 (5.4/1000) were stillborn. Consideration of maternal parity showed a higher stillbirth rate for primiparous women (5.8/1000) than among babies of multiparous women (3.7/1000) (Table 5).

The causes of stillbirths were unexplained for 47 (39.8%) babies and the deaths of 23 (19.5%) babies were attributed to complications arising from extremely low birth weight ( $< 1000$  grams). Lethal Congenital Abnormalities were the cause of death for 15 (12.7%) stillbirths (Table 8).

There were 87 neonatal deaths, giving a neonatal mortality rate of 3.4/1000 livebirths; for babies of Caucasian women the rate was 3.2/1000, for babies of Aboriginal mothers 5.9/1000 and for babies of women of other races 4.0/1000 (Table 3).

Post neonatal deaths numbered 87 (3.4/1000 livebirths) babies. Fifty two (59.8%) of these were attributed to Sudden Infant Death Syndrome and 15 (17.2%) to lethal congenital malformations (Table 21).

The perinatal mortality rate was 7.9/1000 total births. For babies of Caucasian women the rate was 7.6/1000, for babies of Aboriginal women 13.6/1000 and babies of women of other races 6.8/1000. Perinatal deaths amongst babies born to Aboriginal teenage mothers (12.0/1000) was slightly greater than for babies born to Caucasian women in the same age group (10.9/1000) (Table 24). The rate of perinatal mortality among babies of single women and of babies of separated, divorced or widowed women (9.4/1000) was noticeably higher than the rate (7.7/1000) for babies of women reported to be socially supported by a male partner (Table 28).

Infant deaths numbered 174 being 87 neonatal deaths and 87 post neonatal deaths. These numbers provide an overall infant mortality rate of 6.7/1000 livebirths (Table 37).

Among babies of Aboriginal women the infant mortality rate (16.3/1000) was twice the overall rate (6.7/1000). The fraction of infant deaths attributed to Sudden Infant Death Syndrome among babies of Aboriginal women (32.0%) showed little difference from the overall fraction of 31.6% (Table 36).

The major causes of infant deaths remain Lethal Congenital Malformation (32.2%), Sudden Infant Death Syndrome (31.6%) and low birthweight related disorders (18.4%) (Table 36).

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

Perinatal and infant mortality rates are higher among babies born to Aboriginal mothers than among babies of non-Aboriginal women. Although the infant mortality rate among babies of Aboriginal women has substantially decreased over the past eleven years from 31.1/1000 in 1980 to 16.3/1000 in 1990, it still remains more than twice that of the overall infant mortality rate (6.7/1000) of livebirths in 1990.

Overall, a positive reduction in perinatal and infant mortality rates occurred over the past eleven years. The perinatal and infant mortality rates for the 1990 birth cohort are the lowest recorded for a decade. (Table 40 and Table 41).

## **ACKNOWLEDGEMENTS**

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## **1. INTRODUCTION**

This report is the seventh 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 1990 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 seventh 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. 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 Rates**

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

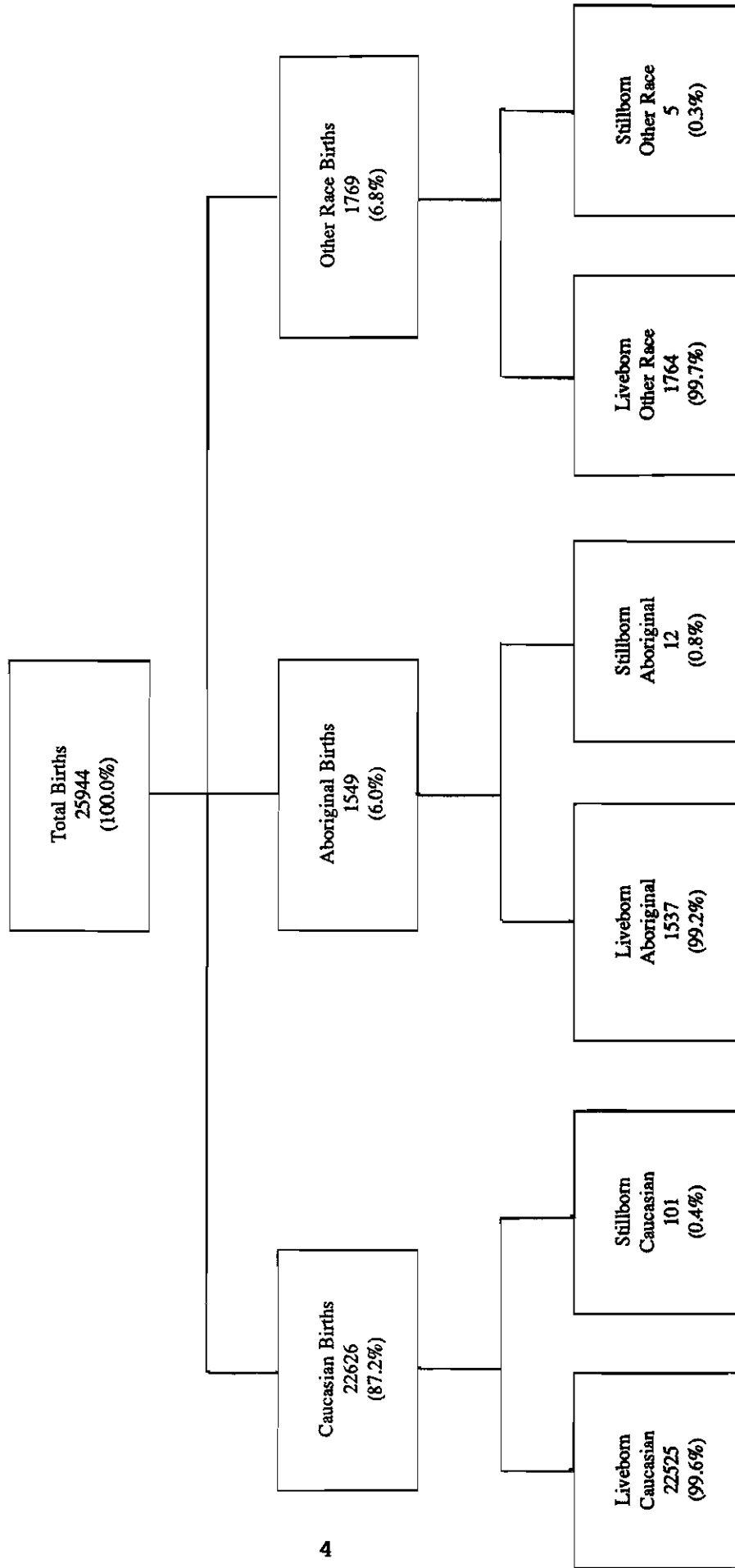
Aboriginal - includes persons of Australian - Aboriginal heritage (Australoid) or of mixed Aboriginal-caucasian heritage.

Other - includes persons of Asian, Indian, Negroid, Polynesian, etc. origin.

### 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 1990**



Excludes births <500 grams birthweight.

## **4. BIRTHS IN WESTERN AUSTRALIA IN 1990**

### **4.1 Births Incidence**

Midwives' forms received by this department indicate that 25944 babies were born to 25637 women during 1990. This report includes statistics only on those babies whose birthweight was equal to or greater than 500 grams.

Examination of births showed that 22626 (87.2%) were born to Caucasian women, 1549 (6.0%) to Aboriginal women and 1769 (6.8%) to women of other racial groups (Table 1).

### **4.2 Place of Birth**

The majority of births, 25701 (99.0%), occurred in hospital. Of these, births in metropolitan hospitals numbered 19051 (74.1%) and non-metropolitan hospital births were 6650 (25.9%).

There were 243 (1.0%) non hospital births including 92 (0.4%) born before arrival at hospital and 151 (0.6%) planned supervised homebirths.

### **4.3 Maternal Place of Residence**

Assessment of location of women bearing children throughout the State shows that the majority of births 17399 (67.9%) 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 15.8/1000 total population was identified for Western Australia during 1990. The area with the lowest crude birth rate (14.7/1000 total population) was the Perth Statistical Division (Figure 1).

### **4.5 Condition of Births**

Analysis of the condition at birth showed 25826 (99.5%) babies were liveborn and 118 (0.5%) babies were stillborn. Livebirths to Caucasian women numbered 22525 (99.6%) and stillbirths 101 (0.4%). Among Aboriginal women there were 1537 (99.2%) liveborn and 12 (0.8%) stillborn babies. For women of other races there were 1764 (99.6%) livebirths and 7 (0.3%) stillbirths (Table 1).

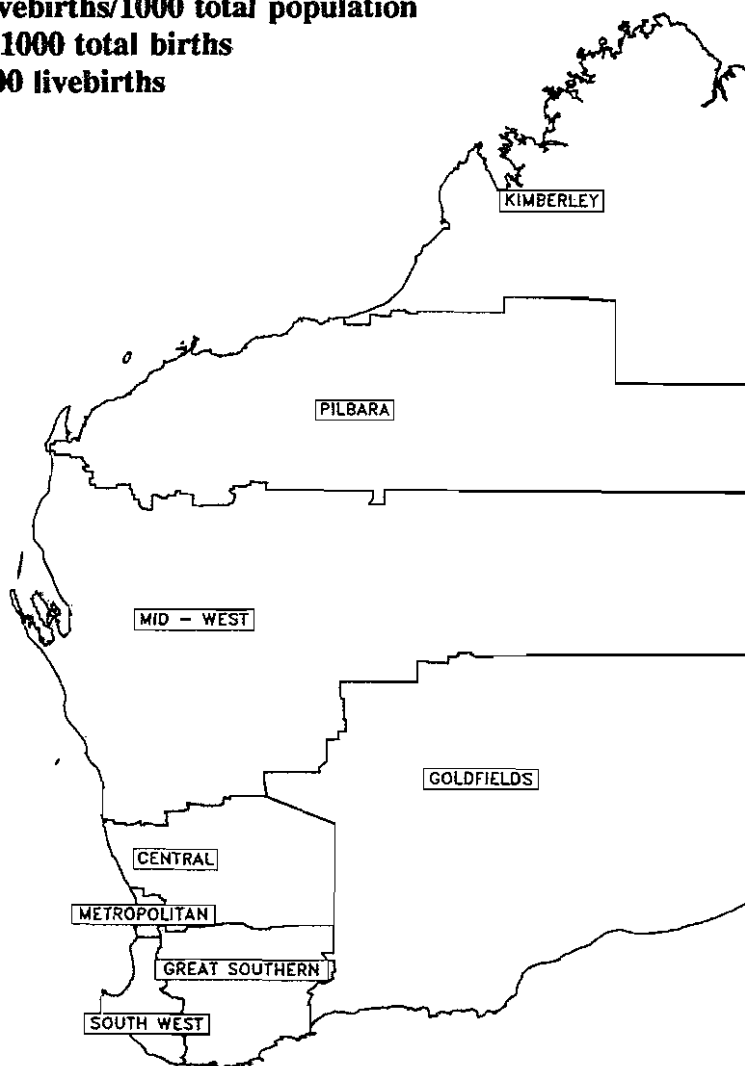
### **4.6 Maternal Age**

Consideration of maternal age shows that the highest percentage of women confined (36.4%), were in the 25 to 29 year age category. Women in their teenage years accounted for 6.5% 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 1.2% of all women confined.<sup>1</sup>

**FIGURE I**

**CRUDE BIRTH RATE, PERINATAL AND INFANT MORTALITY  
BY HEALTH SERVICE MANAGEMENT REGION OF MATERNAL RESIDENCE  
FOR BIRTHS IN WESTERN AUSTRALIA IN 1990**

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



<b>Regions</b>	<b>Crude Birth Rate</b>	<b>Perinatal Mortality</b>	<b>Infant Mortality</b>
Kimberley	26.4	13.6	10.7
Pilbara	21.4	5.0	3.0
Mid West/Gascoyne	18.5	7.6	7.6
Goldfields	22.0	8.4	11.0
Central Wheatbelt	18.0	9.8	7.6
Great Southern	17.0	10.4	10.5
South West	16.8	12.8	8.4
Metropolitan	14.7	6.9	5.9
<b>Total WA</b>	<b>15.8</b>	<b>7.9</b>	<b>6.7</b>



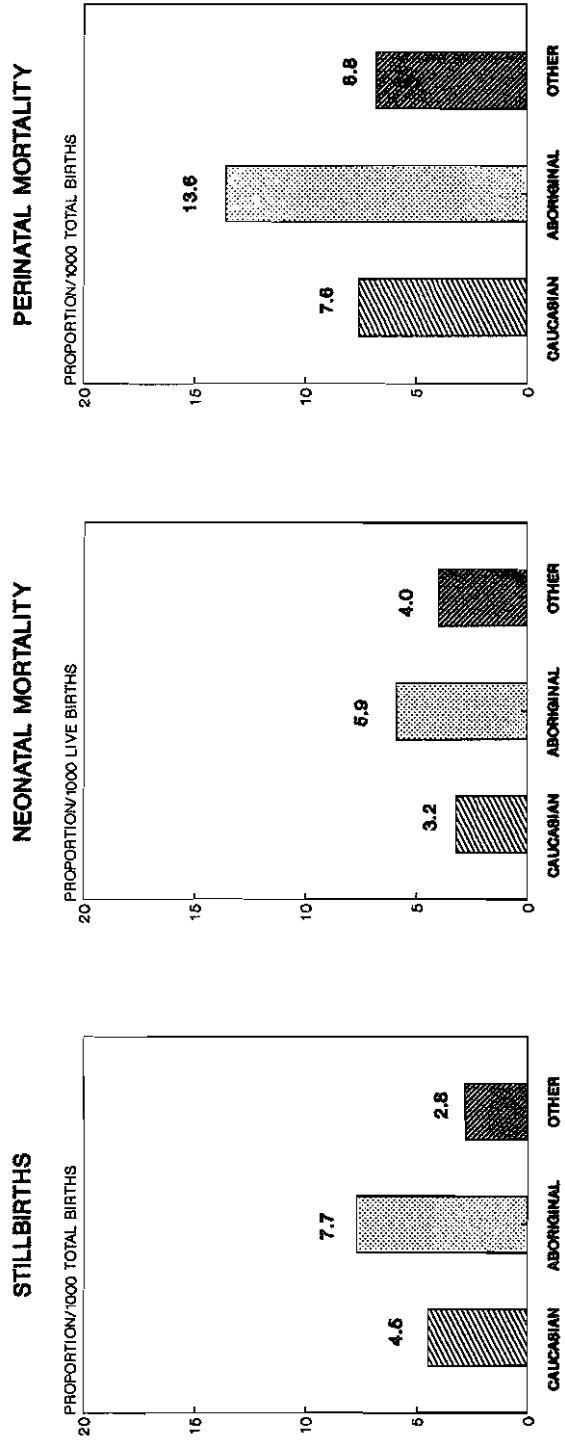
**TABLE 2: LIVEBIRTHS AND TOTAL BIRTHS BY HEALTH SERVICE MANAGEMENT REGION OF MATERNAL RESIDENCE AND MATERNAL RACE IN WESTERN AUSTRALIA 1990**

Health Service Management Region of Maternal Residence	Maternal Race																
	Caucasian				Aboriginal				Other				Total				
	No.	%	Live Births	Total Births	No.	%	Live Births	Total Births	No.	%	Live Births	Total Births	No.	%	Live Births	Total Births	
<u>Metropolitan</u>																	
North	4926	21.9	4944	21.9	117	7.6	409	23.2	410	23.2	5452	21.1	5472	21.1	5472	21.1	
East	4924	21.9	4949	21.9	173	11.3	534	30.3	534	30.2	5631	21.8	5658	21.8	5658	21.8	
South	5724	25.4	5745	25.4	161	10.5	529	30.0	530	30.0	6414	24.8	6436	24.8	6436	24.8	
<u>Non-Metropolitan</u>																	
South West	2143	9.5	2161	9.6	66	4.3	44	2.5	44	2.5	2253	8.7	2272	8.8	2272	8.8	
Great Southern	1035	4.6	1039	4.6	75	4.9	35	2.0	36	2.0	1145	4.4	1150	4.4	1150	4.4	
Central Wheatbelt	844	3.7	849	3.8	57	3.7	14	0.8	14	0.8	915	3.5	920	3.5	920	3.5	
Goldfields	1011	4.5	1014	4.5	130	8.5	40	2.3	40	2.3	1181	4.6	1186	4.6	1186	4.6	
Mid West Gascoyne	956	4.2	961	4.2	191	12.4	31	1.8	31	1.8	1178	4.6	1183	4.6	1183	4.6	
Pilbara	732	3.2	733	3.2	146	9.5	109	6.2	111	6.3	987	3.8	991	3.8	991	3.8	
Kimberley	218	1.0	219	1.0	420	27.3	17	1.0	17	1.0	655	2.5	661	2.5	661	2.5	
<u>Outside WA</u>	12	0.1	12	0.1	1	0.1	2	0.1	2	0.1	15	0.1	15	0.1	15	0.1	
<b>TOTAL</b>	<b>22525</b>	<b>100.0</b>	<b>22626</b>	<b>100.0</b>	<b>1537</b>	<b>100.0</b>	<b>1764</b>	<b>100.0</b>	<b>1769</b>	<b>100.0</b>	<b>25826</b>	<b>100.0</b>	<b>25944</b>	<b>100.0</b>	<b>25944</b>	<b>100.0</b>	

Excludes births <500 grams birthweight.

FIGURE II

STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY,  
ABORIGINAL AND NON-ABORIGINAL,  
WESTERN AUSTRALIA, 1990



Excludes births less than 500 grams birthweight

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



## 5. STILLBIRTHS, NEONATAL AND POST-NEONATAL MORTALITY IN WESTERN AUSTRALIA IN THE 1990 BIRTH COHORT

### 5.1 Stillbirths

There were 118 stillbirths in Western Australia during the 1990 year which were equal to or greater than 500 grams birthweight. The stillbirth rate for the State was 4.5/1000 total births (Table 4).

The stillbirth rate for babies of Aboriginal women (7.7/1000) was high compared to that for babies of Caucasian women (4.5/1000) and for babies of women of other racial groups (2.8/1000).

Stillbirth rates relating to Health Service Management Regions of maternal residence are shown on Table 3. It should be noted, however, that due to small numbers of births in each country division the rates 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 teenage mothers, the rate was 5.4/1000 and for babies of Aboriginal teenage mothers the rate was 9.6/1000 total births. Among women aged 25-29 years, the group with the highest number of births overall, the stillbirth rate was lower at 3.9/1000 total births. Among babies of women aged 35 years and over 14 (5.7/1000) stillbirths occurred (Table 4).

**TABLE 4: STILLBIRTHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1990**

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total	Rate	No.	Total	Rate	No.	Total	Rate	No.	Total	Rate
≤ 15	1	22	45.5	1	46	21.7	-	-	-	2	68	29.4
16	-	94	-	-	61	-	-	1	-	-	156	-
17	2	196	10.2	-	83	-	-	10	-	2	289	6.9
18	-	395	-	1	106	9.4	-	15	-	1	516	1.9
19	2	489	4.1	2	122	16.4	-	25	-	4	636	6.3
≤ 19	5	1196	4.2	4	418	9.6	-	51	-	9	1665	5.4
20-24	18	4669	3.9	6	579	10.4	-	250	-	24	5498	4.4
25-29	35	8503	4.1	1	336	3.0	1	595	1.7	37	9434	3.9
30-34	32	6149	5.2	-	164	-	2	577	3.5	34	6890	4.9
35-39	10	1839	5.4	1	43	23.3	2	255	7.8	13	2137	6.1
40-44	1	261	3.8	-	9	-	-	39	-	1	309	3.2
≥ 45	-	9	-	-	-	-	-	2	-	-	11	-
<b>TOTAL</b>	<b>101</b>	<b>22626</b>	<b>4.5</b>	<b>12</b>	<b>1549</b>	<b>7.7</b>	<b>5</b>	<b>1769</b>	<b>2.8</b>	<b>118</b>	<b>25944</b>	<b>4.5</b>

Excludes births <500 grams birthweight.

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

### 5.1.2 Maternal Race and Parity

Fifty nine (5.8/1000) stillborn babies were to primiparous women compared with 56 (5.6/1000) in the 1989 birth cohort. For babies of women whose parity was three or more, the stillbirth rate fell from 20 (7.6/1000) in 1989 to 9 (3.3/1000) in 1990 (Table 5).

**TABLE 5: STILLBIRTHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1990**

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate
0	49	8989	5.5	9	445	20.2	1	686	1.5	59	10120	5.8
1 - 2	45	11538	3.9	1	675	1.5	4	899	4.4	50	13112	3.8
3 - 4	7	1902	3.7	-	318	-	-	161	-	7	2381	2.9
≥ 5	-	197	-	2	111	18.0	-	23	-	2	331	6.0
<b>TOTAL</b>	<b>101</b>	<b>22626</b>	<b>4.5</b>	<b>12</b>	<b>1549</b>	<b>7.7</b>	<b>5</b>	<b>1769</b>	<b>2.8</b>	<b>118</b>	<b>25944</b>	<b>4.5</b>

Excludes births < 500 grams birthweight.

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

### 5.1.3 Maternal Race, Condition and Plurality

The stillbirth rate for all multiple births (11.4/1000) compares to a 4.4/1000 stillbirth rate for all singleton births. For singleton births the rate of stillbirths among babies of Aboriginal women (7.8/1000) is higher than for total births (4.4/1000) (Table 6).

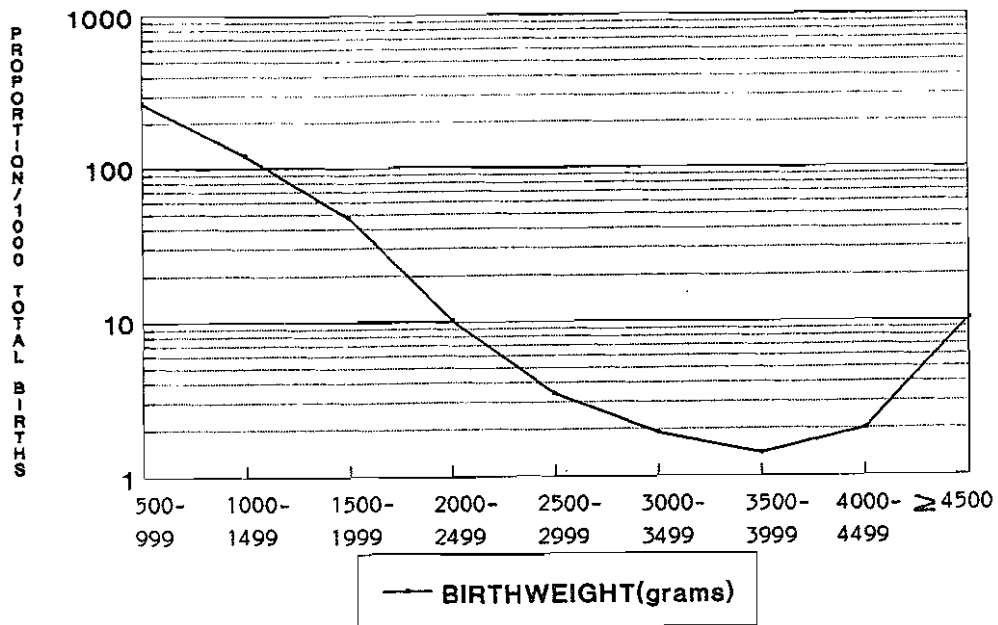
**TABLE 6: CONDITION, PLURALITY AND MATERNAL RACE OF BIRTHS IN WESTERN AUSTRALIA 1990**

Plurality	Maternal Race												Total			
	Caucasian				Aboriginal				Other							
	Total Births	Live Births	Still Births	Rate	Total Births	Live Births	Still Births	Rate	Total Births	Live Births	Still Births	Rate	Total Births	Live Births	Still Births	Rate
Singleton	22054	21960	94	4.3	1529	1517	12	7.8	1747	1742	5	2.9	25330	25219	111	4.4
Multiple	572	565	7	12.2	20	20	-	-	22	22	-	-	614	607	7	11.4
<b>TOTAL</b>	<b>22626</b>	<b>22525</b>	<b>101</b>	<b>4.5</b>	<b>1549</b>	<b>1537</b>	<b>12</b>	<b>7.7</b>	<b>1769</b>	<b>1764</b>	<b>5</b>	<b>2.8</b>	<b>25944</b>	<b>25826</b>	<b>118</b>	<b>4.5</b>

Excludes births <500 grams birthweight.

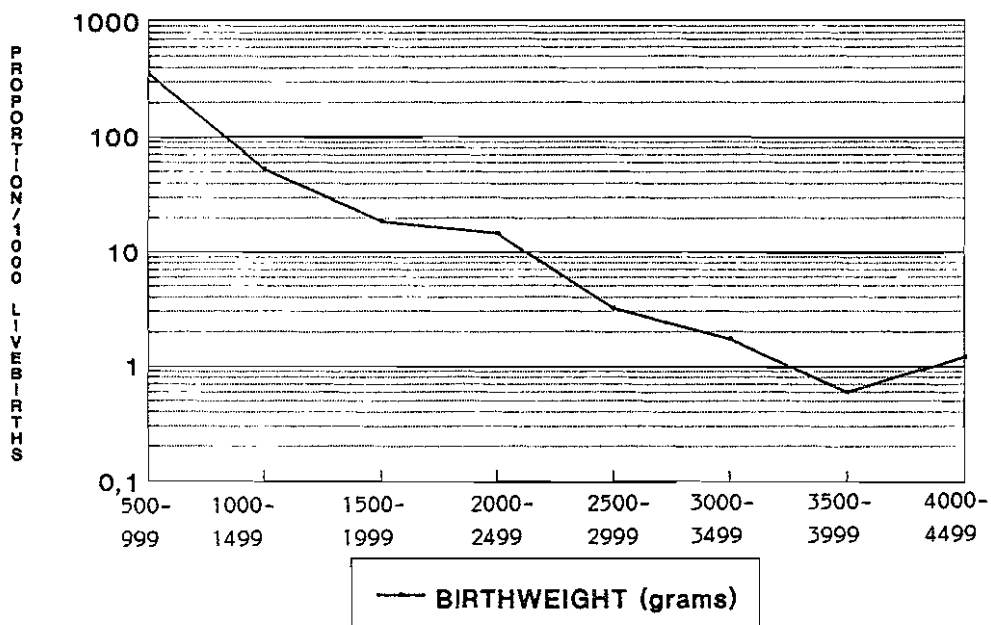
<sup>1</sup> Rate/1000 total births.

**FIGURE III BIRTHWEIGHT DISTRIBUTION OF STILLBIRTHS IN WESTERN AUSTRALIA IN 1990.**



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

**FIGURE IV BIRTHWEIGHT DISTRIBUTION OF NEONATAL DEATHS IN WESTERN AUSTRALIA IN 1990.**



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

#### 5.1.4 Maternal Race and Birthweight

The rate of stillbirths in low birthweight babies was 43.6/1000. The lowest stillbirth rate (1.4/1000) was for babies with birthweight 3500-3999 grams. (Table 7, Figure III).

**TABLE 7: STILLBIRTH RATE BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1990**

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate
500 - 999	23	80	287.5	-	6	-	1	3	(333.3)	24	89	269.7
1000 - 1499	15	121	124.0	3	18	(166.7)	-	11	-	18	150	120.0
1500 - 1999	13	277	46.9	2	32	(62.5)	1	29	(34.5)	16	338	47.3
2000 - 2499	8	803	10.0	1	111	(9.0)	1	68	(14.0)	10	982	10.2
< 2500	59	1281	46.1	6	167	35.9	3	111	(27.0)	68	1559	43.6
2500 - 2999	12	3416	3.5	2	360	(5.6)	-	357	-	14	4133	3.4
3000 - 3499	16	8289	1.9	2	555	(3.6)	-	710	-	18	9554	1.9
3500 - 3999	7	7046	1.0	2	356	(5.6)	-	457	-	9	7859	1.4
4000 - 4499	4	2241	(1.8)	-	89	-	1	117	(8.5)	5	2447	2.0
≥ 4500	3	353	(8.5)	-	22	-	1	17	(58.8)	4	392	(10.2)
TOTAL	101	22626	4.5	12	1549	7.7	5	1769	2.8	118	25944	4.5

Excludes births <500 grams birthweight.

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

( ) Where n<5 rate has been bracketed.

#### 5.1.5 Causes of Stillbirth

There were 47 (39.8%) stillborn babies with cause unknown and 23 (19.5%) stillbirths with extremely low birthweight. Lethal congenital malformations resulted in 15 (12.7%) stillbirths and a further 16 (13.6%) 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 118 stillborn babies, it is known that 80 (67.8%) had autopsies and 16 (13.6%) did not. It is not known whether the remaining 22 (18.6%) stillborn babies underwent autopsy.

Seventy nine (66.9%) stillbirths were recorded as antepartum deaths, 25 (21.2%) were recorded as intrapartum deaths and for 14 (11.9%) the time of death was unknown.

**TABLE 8: CAUSE OF STILLBIRTH BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1990**

Cause of Death	Maternal Race						Total		Total	
	Caucasian		Aboriginal		Other		1990		1989	
	No.	%	No.	%	No.	%	No.	%	No.	%
Lethal Congenital Malformation	14	13.9	1	8.3	-	-	15	12.7	20	14.5
Extremely Low Birth Weight (<1000g)*	21	20.8	-	-	2	40.0	23	19.5	42	30.4
Unknown	37	36.6	8	66.7	-	-	-	-	-	-
Maternal:					2	40.0	47	39.8	48	34.8
Obstetric	2	2.0	-	-	-	-	2	1.7	3	2.2
Medical	1	1.0	2	16.7	-	-	3	2.5	5	3.6
Hypertension	5	5.0	-	-	-	-	5	4.2	1	0.7
Placenta and Cord	14	13.9	1	8.3	1	20.0	16	13.6	16	11.6
Other	7	6.9	-	-	-	-	7	5.9	3	2.2
<b>TOTAL</b>	<b>101</b>	<b>100.0</b>	<b>12</b>	<b>100.0</b>	<b>5</b>	<b>100.0</b>	<b>118</b>	<b>100.0</b>	<b>138</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 87 neonatal deaths among the 25826 livebirths in 1990.<sup>1</sup> The overall neonatal mortality rate was 3.4/1000 livebirths. For babies of Aboriginal women neonatal mortality was 5.9/1000 livebirths which is higher than for babies of Caucasian women (3.2/1000) and the rate for babies of women of other races (4.0/1000) (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 rates do fluctuate markedly.<sup>3</sup>

### 5.2.1 Maternal Race and Maternal Age

Of the 87 liveborn babies who died within the first 28 days of life, 9 (5.4/1000) were born to teenage mothers. In the age group where the highest number of births occurred (25-29 years) the neonatal mortality rate was 3.6/1000. The rate of neonatal deaths (6.5/1000) among babies of Aboriginal mothers is higher than that for babies of Caucasian women (3.2/1000) (Table 9).



**TABLE 9: NEONATAL DEATHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1990**

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
≤ 15	-	21	-	-	45	-	-	-	-	-	66	-
16	-	94	-	-	61	-	-	1	-	-	156	-
17	2	194	10.3	-	83	-	-	10	-	2	287	7.0
18	3	395	7.6	1	105	9.5	-	15	-	4	515	7.8
19	3	487	6.1	-	120	-	-	25	-	3	632	4.7
≤ 19	8	1191	6.7	1	414	2.4	-	51	-	9	1656	5.4
20 - 24	14	4651	3.0	3	573	5.2	2	250	8.0	19	5474	3.5
25 - 29	31	8468	3.7	2	335	6.0	1	594	1.7	34	9397	3.6
30 - 34	12	6117	2.0	2	164	12.2	2	575	3.5	16	6856	2.3
35 - 39	5	1829	2.7	1	42	23.8	2	253	7.9	8	2124	3.8
40 - 44	1	260	3.8	-	9	-	-	39	-	1	308	3.2
≥ 45	-	9	-	-	-	-	-	2	-	-	11	-
<b>TOTAL</b>	<b>71</b>	<b>22525</b>	<b>3.2</b>	<b>9</b>	<b>1537</b>	<b>5.9</b>	<b>7</b>	<b>1764</b>	<b>4.0</b>	<b>87</b>	<b>25826</b>	<b>3.4</b>

Excludes births <500 grams birthweight.

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

### 5.2.2 Maternal Race and Parity

Forty five (3.4/1000) neonatal deaths were to women with a previous parity of one or two. The highest overall rate was for babies of women with parity of three or more (4.1/1000) (Table 10).

**TABLE 10: NEONATAL DEATHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1990**

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
0	28	8940	3.1	2	436	4.6	1	685	1.5	31	10061	3.1
1 - 2	34	11493	3.0	5	674	7.4	5	895	6.7	45	13062	3.4
3 - 4	8	1895	4.2	2	318	6.3	-	161	-	10	2374	4.2
≥ 5	1	197	5.1	-	109	-	-	23	-	1	329	3.0
<b>TOTAL</b>	<b>71</b>	<b>22525</b>	<b>3.2</b>	<b>9</b>	<b>1537</b>	<b>5.9</b>	<b>7</b>	<b>1764</b>	<b>4.0</b>	<b>87</b>	<b>25826</b>	<b>3.4</b>

Excludes births < 500 grams birthweight.

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

### 5.2.3 Maternal Race and Plurality

These data show that a neonatal death rate of 3.1/1000 livebirths for singleton births and 14.8/1000 livebirths for multiple births. There were no 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 1990**

Plurality	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate
Singleton	63	21960	2.9	9	1517	5.9	6	1742	3.4	78	25219	3.1
Twins	8	554	14.4	-	20	-	1	22	45.5	9	596	15.1
Triplets	-	11	-	-	-	-	-	-	-	-	11	-
<b>TOTAL</b>	<b>71</b>	<b>22525</b>	<b>3.2</b>	<b>9</b>	<b>1537</b>	<b>5.9</b>	<b>7</b>	<b>1764</b>	<b>4.0</b>	<b>87</b>	<b>25826</b>	<b>3.4</b>

Excludes births < 500 grams birthweight.

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

### 5.2.4 Maternal Race and Birthweight

In broad terms and as reported for stillbirths, neonatal mortality rates for all races fell as birthweight rose. The rate of low birthweight neonatal deaths among babies born to Aboriginal mothers (18.6/1000) is lower than for low birthweight neonatal deaths of babies born to Caucasian women (34.4/1000) (Table 12, Figure IV).

**TABLE 12: NEONATAL MORTALITY BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1990**

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate
500 - 999	20	57	350.9	2	6	(333.3)	1	2	(500.0)	23	65	353.8
1000 - 1499	7	106	66.0	-	15	-	-	11	-	7	132	53.0
1500 - 1999	6	264	22.3	-	30	-	-	28	-	6	322	18.6
2000 - 2499	9	795	11.3	1	110	(9.1)	4	67	(59.7)	14	972	14.4
< 2500	42	1222	34.4	3	161	(18.6)	5	108	46.3	50	1491	33.5
2500 - 2999	10	3404	2.9	2	358	(5.6)	1	357	(2.8)	13	4119	3.2
3000 - 3499	13	8273	1.6	3	553	(5.4)	-	710	-	16	9536	1.7
3500 - 3999	4	7039	(0.6)	-	354	-	1	457	(2.2)	5	7850	0.6
4000 - 4499	2	2237	(0.9)	1	89	(11.2)	-	116	-	3	2442	(1.2)
≥ 4500	-	350	-	-	22	-	-	16	-	-	388	-
<b>TOTAL</b>	<b>71</b>	<b>22525</b>	<b>3.2</b>	<b>9</b>	<b>1537</b>	<b>5.9</b>	<b>7</b>	<b>1764</b>	<b>4.0</b>	<b>87</b>	<b>25826</b>	<b>3.4</b>

Excludes births <500 grams birthweight.

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

( ) Where n<5 rate has been bracketed.

### 5.2.5 Maternal Race and Age at Neonatal Death

The majority (82.8%) of neonatal deaths occurred in the first week of life, 54.0% occurring within the first 48 hours of life. Among babies of Aboriginal women 55.6% of neonatal deaths occurred in the first seven days of life compared with 87.3% of babies born to Caucasian women (Table 13).

**TABLE 13: AGE AT NEONATAL DEATH BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1990**

Age at Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other		No.	%
	No.	%	No.	%	No.	%		
< day 1	23	32.4	1	11.1	3	42.9	27	31.0
day 1	19	26.8	1	11.1	-	-	20	23.0
day 2	9	12.7	2	22.2	1	14.3	12	13.8
day 3	3	4.2	1	11.1	-	-	4	4.6
day 4	4	5.6	-	-	-	-	4	4.6
day 5	-	-	-	-	-	-	-	-
day 6	4	5.6	-	-	-	-	4	4.6
day 7	-	-	-	-	1	14.3	1	1.2
day ≤ 7	62	87.3	5	55.6	5	71.5	72	82.8
day 8 - 14	3	4.2	3	33.3	1	14.3	7	8.1
day 15 - 21	3	4.2	1	11.1	1	14.3	5	5.8
day 22 - 28	3	4.2	-	-	-	-	3	3.5
<b>TOTAL</b>	<b>71</b>	<b>100.0</b>	<b>9</b>	<b>100.0</b>	<b>7</b>	<b>100.0</b>	<b>87</b>	<b>100.0</b>

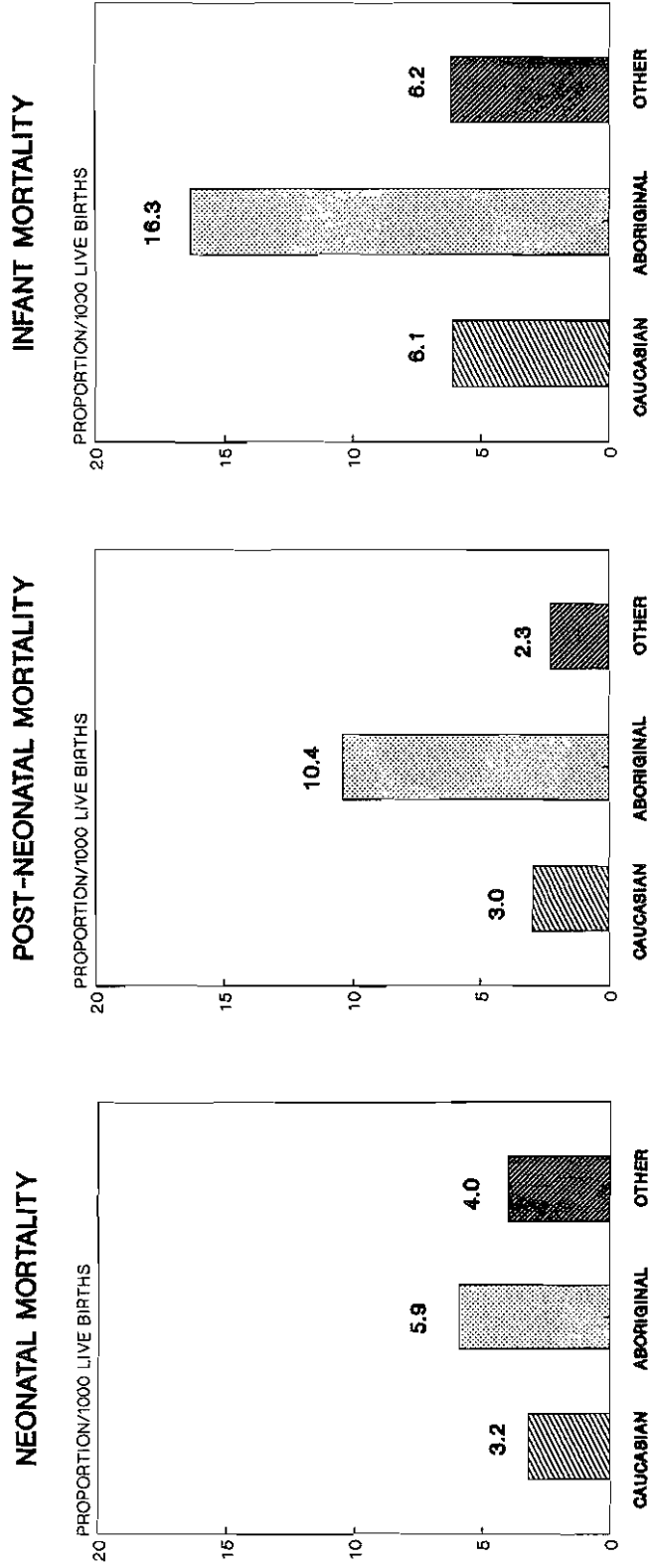
Excludes births <500 grams birthweight

### 5.2.6 Causes of Neonatal Deaths

Lethal congenital malformation for 41 (47.1%) and low birthweight for 32 babies (36.8%) babies were the main causes of neonatal death in the 1990 birth cohort.

**FIGURE V**

**NEONATAL, POST-NEONATAL AND INFANT MORTALITY,  
ABORIGINAL AND NON-ABORIGINAL,  
WESTERN AUSTRALIA, 1990**



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 1990**

Cause of Death	Maternal Race						Total 1990		Total 1989	
	Caucasian		Aboriginal		Other		No.	%	No.	%
	No.	%	No.	%	No.	%				
Lethal Congenital Malformation	33	46.5	5	55.6	3	42.9	41	47.1	49	40.5
Low Birthweight (< 2500grams)	27	38.0	2	22.2	3	42.9	32	36.8	53	43.8
Asphyxia	5	7.1	-	-	-	-	5	5.8	6	5.0
Pregnancy conditions	1	1.4	-	-	-	-	1	1.2	3	2.5
Infections	2	2.8	-	-	-	-	2	2.3	2	1.7
Hydrops fetalis	-	-	-	-	-	-	-	-	-	-
Other	-	-	1	11.1	1	14.3	2	2.3	3	2.5
Sudden Infant Deaths	3	4.3	-	-	-	-	3	3.5	2	1.7
Unknown	-	-	1	11.1	-	-	1	1.2	3	2.5
<b>TOTAL</b>	<b>71</b>	<b>100.0</b>	<b>9</b>	<b>100.0</b>	<b>7</b>	<b>100.0</b>	<b>87</b>	<b>100.0</b>	<b>121</b>	<b>100.0</b>

Excludes births < 500 grams birthweight.

### 5.3 Post Neonatal Deaths

There were 87 post-neonatal deaths identified amongst the 1990 livebirths, a rate of 3.4/1000 livebirths (Table 15 and Table 37).

Post-neonatal mortality for babies of Aboriginal women was 10.4/1000 livebirths which is six times the rate of 3.0/1000 for babies of Caucasian women. For babies born to women of other races the rate was 2.3/1000 (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 rates 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 1990

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.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate		
<u>METROPOLITAN</u>	16	3.2	26	5.3	-	-	2	17.1	1	2.4	4	9.8	17	3.1	32	5.9
North	17	3.5	34	6.9	1	5.8	2	11.6	2	3.7	3	5.6	20	3.6	39	6.9
East	13	2.3	30	5.2	-	-	1	6.2	1	1.9	2	3.8	14	2.2	33	5.1
South	8	3.7	17	7.9	1	15.2	2	30.3	-	-	-	-	9	3.4	19	8.4
<u>NON-METROPOLITAN</u>	4	3.9	9	8.7	1	13.3	3	40.0	-	-	-	-	5	4.4	12	10.5
South West	3	3.6	6	7.1	-	-	1	17.5	-	-	-	-	3	3.3	7	7.6
Great Southern	4	4.0	6	5.9	4	30.8	5	38.5	-	-	2	50.0	8	6.8	13	11.0
Central Wheatbelt	1	1.0	5	5.2	4	20.9	4	20.9	-	-	-	-	5	4.2	9	7.6
Goldfields	1	1.4	2	2.7	1	6.8	1	6.8	-	-	-	-	2	2.0	3	3.0
Mid West Gascoyne	-	-	2	9.2	4	9.5	5	11.9	-	-	-	-	4	6.1	7	10.7
Pilbara	67	3.0	137	6.1	16	10.4	26	16.9	4	2.3	11	6.2	87	3.4	174	6.7
Kimberley																
TOTAL																

Excludes births <500 grams birthweight.

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

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

( ) Where n<5 rate 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 rate of post-neonatal deaths among babies of teenage women was 4.8/1000 livebirths. Among post-neonatal deaths of babies born to Aboriginal women however, a quarter were to teenage mothers with a rate of 9.7/1000 livebirths (Table 16).

**TABLE 16: POST-NEONATAL DEATHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1990**

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
≤ 15	-	21	-	1	45	22.2	-	-	-	1	66	15.2
16	-	94	-	1	61	16.4	-	1	-	1	156	6.4
17	-	194	-	-	83	-	-	10	-	-	287	-
18	2	395	5.1	-	105	-	-	15	-	2	515	3.9
19	2	487	4.1	2	120	16.7	-	25	-	4	632	6.3
≤ 19	4	1191	3.4	4	414	9.7	-	51	-	8	1656	4.8
20 - 24	23	4651	4.9	6	573	10.5	-	250	-	29	5474	5.3
25 - 29	25	8468	3.0	5	335	14.9	3	594	5.1	33	9397	3.5
30 - 34	8	6117	1.3	1	164	6.1	1	575	1.7	10	6856	1.5
35 - 39	5	1829	2.7	-	42	-	-	253	-	5	2124	2.4
40 - 44	2	260	7.7	-	9	-	-	39	-	2	308	6.5
≥ 45	-	9	-	-	-	-	-	2	-	-	11	-
TOTAL	67	22525	3.0	16	1537	10.4	4	1764	2.3	87	25826	3.4

Excludes births <500 grams birthweight.

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

### 5.3.2 Maternal Race and Conjugal State

Higher rates of post-neonatal mortality were recorded for babies of single women (6.2/1000) and babies of separated, divorced or widowed women (14.1/1000), than for women socially supported by a male partner in a marriage or defacto relationship (2.9/1000) (Table 17).

**TABLE 17: POST-NEONATAL DEATHS BY MATERNAL RACE AND CONJUGAL STATE IN WESTERN AUSTRALIA IN 1990**

Conjugal State	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
Single	9	1963	4.6	6	534	11.2	1	82	12.2	16	2579	6.2
Married/defacto	56	20312	2.8	8	984	8.1	3	1667	1.8	67	22963	2.9
Other	2	250	8.0	2	19	105.3	-	15	-	4	284	14.1
TOTAL	67	22525	3.0	16	1537	10.4	4	1764	2.3	87	25826	3.4

Excludes births < 500 grams birthweight.

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

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

### 5.3.3 Maternal Race and Parity

More than one quarter (27.6%) of babies who died in the post-neonatal period were born to primiparous mothers, and a further 50.6% were to women with a parity of 1-2. The rates for these groups were 2.4/1000 for primiparous women, 3.4/1000 for women with parity 1-2, 6.7/1000 for women with parity 3-4 and 9.1/1000 for women with parity of 5 or more (Table 18).

**TABLE 18: POST-NEONATAL DEATHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1990**

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate
0	20	8940	2.2	4	436	9.2	-	685	-	24	10061	2.4
1 - 2	34	11493	3.0	8	674	11.9	2	895	2.2	44	13062	3.4
3 - 4	12	1895	6.3	2	318	6.3	2	161	12.4	16	2374	6.7
≥ 5	1	197	5.1	2	109	18.3	-	23	-	3	329	9.1
<b>TOTAL</b>	<b>67</b>	<b>22525</b>	<b>3.0</b>	<b>16</b>	<b>1537</b>	<b>10.4</b>	<b>4</b>	<b>1764</b>	<b>2.3</b>	<b>87</b>	<b>25826</b>	<b>3.4</b>

Excludes births < 500 grams birthweight.

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

### 5.3.4 Maternal Race and Plurality

Examination of the 87 post-neonatal deaths in 1990 by plurality revealed that for singleton births the rate was 3.2/1000 and for multiple births the rate was 9.9/1000 livebirths. Among twin babies the post-neonatal death rate was 10.1/1000 (Table 19).

**TABLE 19: POST-NEONATAL DEATHS BY MATERNAL RACE AND PLURALITY IN WESTERN AUSTRALIA IN 1990.**

Plurality	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate
Singleton	61	21960	2.8	16	1517	10.5	4	1742	2.3	81	25219	3.2
Twins	6	554	10.8	-	20	-	-	22	-	6	596	10.1
Triplets	-	11	-	-	-	-	-	-	-	-	11	-
<b>TOTAL</b>	<b>67</b>	<b>22525</b>	<b>3.0</b>	<b>16</b>	<b>1537</b>	<b>10.4</b>	<b>4</b>	<b>1764</b>	<b>2.3</b>	<b>87</b>	<b>25826</b>	<b>3.4</b>

Excludes births < 500 grams birthweight.

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



### 5.3.5 Maternal Race and Birthweight

Overall the trend was for post-neonatal mortality rates to increase as birthweight fell. The post-neonatal rate for low birthweight babies of Aboriginal mothers (12.4/1000) was lower than the rate for low birthweight babies of Caucasian women (13.9/1000) (Table 20).

**TABLE 20: POST-NEONATAL MORTALITY BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1990**

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
500 - 999	1	57	(17.5)	-	6	-	-	2	-	1	65	(15.4)
1000 - 1499	4	106	(37.7)	1	15	(66.7)	-	11	-	5	132	37.9
1500 - 1999	5	264	18.9	-	30	-	1	28	(35.7)	6	322	18.6
2000 - 2499	7	795	8.8	1	110	(9.1)	-	67	-	8	972	8.2
< 2500	17	1222	13.9	2	161	(12.4)	1	108	(9.3)	20	1491	13.4
2500 - 2999	10	3403	2.9	8	358	22.3	1	357	(2.8)	19	4119	4.6
3000 - 3499	22	8273	2.7	6	553	10.8	1	710	(1.4)	29	9536	3.0
3500 - 3999	16	7039	2.3	-	354	-	1	457	(2.2)	17	7850	2.2
4000 - 4499	2	2237	(0.9)	-	89	-	-	116	-	2	2442	(0.8)
≥ 4500	-	350	-	-	22	-	-	16	-	-	388	-
TOTAL	67	22525	3.0	16	1537	10.4	4	1764	(2.3)	87	25826	3.4

Excludes births <500 grams birthweight.

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

( ) Where n<5 rate 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 (59.8%) (Table 21). Sudden Infant Death Syndrome is largely responsible for an increase in the rate 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. However, this rate reduced to 5.2/1000 in 1990.

Lethal congenital malformation remained the second highest known cause, to which 15 (17.2%) post-neonatal deaths were attributed. The percentage of post-neonatal deaths due to infection fell from 13.5% in 1988 and 13.0% in 1989 to 9.2 in 1990 (Table 21).

**TABLE 21: CAUSE OF POST-NEONATAL DEATH BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1990**

Cause of Death	Maternal Race						Total 1990		Total 1989	
	Caucasian		Aboriginal		Other		No.	%	No.	%
	No.	%	No.	%	No.	%				
Sudden Infant Death Syndrome	41	61.2	8	50.0	3	75.0	52	59.8	39	50.6
Lethal Congenital Malformation	13	19.4	1	6.3	1	25.0	15	17.2	11	14.3
Infection - Respiratory	2	3.0	2	12.5	-	-	4	4.6	4	5.2
Meningitis	2	3.0	2	12.5	-	-	4	4.6	4	5.2
Other	-	-	-	-	-	-	-	-	2	2.6
Other	7	10.4	1	6.3	-	-	8	9.2	8	10.4
Unknown	2	3.4	2	12.5	-	-	4	4.6	9	11.7
<b>TOTAL</b>	<b>67</b>	<b>100.0</b>	<b>16</b>	<b>100.0</b>	<b>4</b>	<b>100.0</b>	<b>87</b>	<b>100.0</b>	<b>77</b>	<b>100.0</b>

Excludes births <500 grams birthweight.

### 5.3.7 Seasonal Incidence of Post-Neonatal Deaths

The highest percentage of post-neonatal deaths from Sudden Infant Death Syndrome was during the July-September seasonal quarter of the year (Table 22).

**TABLE 22: CAUSE OF POST-NEONATAL DEATH BY SEASONAL INCIDENCE IN WESTERN AUSTRALIA IN 1990**

Cause of Death	Jan - Mar		Apr - Jun		Jul - Sep		Oct - Dec		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Sudden Infant Death Syndrome	6	35.3	13	56.5	25	75.8	8	57.1	52	59.8
Lethal Congenital Malformation	6	35.3	4	17.4	2	6.1	3	21.4	15	17.2
Infection	-	-	4	17.1	3	9.1	1	7.1	8	9.2
Other/Unknown	5	29.4	2	8.7	3	9.1	2	14.3	12	13.8
<b>TOTAL</b>	<b>17</b>	<b>100.0</b>	<b>23</b>	<b>100.0</b>	<b>33</b>	<b>100.0</b>	<b>14</b>	<b>100.0</b>	<b>87</b>	<b>100.0</b>

Excludes births <500 grams birthweight.

SOURCE: MIDWIVES' NOTIFICATION SYSTEM  
REGISTRAR GENERAL'S OFFICE

## 6. PERINATAL MORTALITY IN WESTERN AUSTRALIA IN THE 1990 BIRTH COHORT

### 6.1 Perinatal Mortality

There were 205 perinatal deaths identified in the 1990 birth cohort which gave a perinatal mortality rate of 7.9/1000 total births (Table 3 and Table 23). This compares with rates of 8.8/1000 in 1988, and 10.2/1000 in 1989. Among babies born to Aboriginal women the rate (13.6/1000) was higher than for perinatal deaths of babies of Caucasian women (7.6/1000) and for perinatal deaths of babies born to women of other races (6.8/1000) (Table 23).

**TABLE 23: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY BY MATERNAL RACE IN WESTERN AUSTRALIA IN 1990**

Type of Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other		No.	Rate
	No.	Rate	No.	Rate	No.	Rate		
Stillbirths	101	4.5	12	7.7	5	2.8	118	4.5
Neonatal Mortality	71	3.2	9	5.9	7	4.0	87	3.4
Perinatal Mortality	172	7.6	21	13.6	12	6.8	205	7.9

Excludes births <500 grams birthweight.

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

<sup>2</sup> Neonatal Death rate/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 rates do vary on an annual basis (Table 3).

### 6.2 Maternal Race and Maternal Age

Perinatal mortality is lowest for babies of women aged 25-34 years, (7.4/1000) and the risk increases toward the extremes of the fertile age group.

Eighteen (10.8/1000) perinatal deaths were among babies of women in their teenage years. Another 23 (9.4/1000) 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 1990**

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate
≤ 15	1	22	45.5	1	46	21.7	-	-	-	2	68	29.4
16	-	94	-	-	61	-	-	1	-	-	156	-
17	4	196	20.4	-	83	-	-	10	-	4	289	13.8
18	3	395	7.6	2	106	18.9	-	15	-	5	516	9.7
19	5	489	10.2	2	122	16.4	-	25	-	7	636	11.0
≤ 19	13	1196	10.9	5	418	12.0	-	51	-	18	1665	10.8
20 - 24	32	4669	6.9	9	579	15.5	2	250	8.0	43	5498	7.8
25 - 29	66	8503	7.8	3	336	8.9	2	595	3.4	71	9434	7.5
30 - 34	44	6149	7.2	2	164	12.2	4	577	6.9	50	6890	7.3
35 - 39	15	1839	8.2	2	43	46.5	4	255	15.7	21	2137	9.8
40 - 44	2	261	7.7	-	9	-	-	39	-	2	309	6.5
≥ 45	-	9	-	-	-	-	-	2	-	-	11	-
TOTAL	172	22626	7.6	21	1549	13.6	12	1769	6.8	205	25944	7.9

Excludes births <500 grams birthweight.

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

### 6.3 Maternal Race and Parity

The perinatal mortality rate of babies born to primiparous women was 6.1/1000 and the rate for babies born to women with a parity of 1-2 was 7.2/1000. The highest rate of perinatal deaths (9.1/1000) 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 1990**

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate
0	77	8989	8.6	11	445	24.7	2	686	2.9	62	10120	6.1
1 - 2	79	11538	6.8	6	675	8.9	10	899	11.1	95	13112	7.2
3 - 4	15	1902	7.9	2	318	6.3	-	161	-	17	2381	7.1
≥ 5	1	197	5.1	2	111	18.0	-	23	-	3	331	9.1
TOTAL	172	22626	7.6	21	1549	13.6	12	1769	6.8	205	25944	7.9

Excludes births < 500 grams birthweight.

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

#### 6.4 Maternal Race and Birthweight

More than half (57.6%) of all perinatal deaths (118 75.7/1000) 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. Rates 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 1990**

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate
500 - 999	43	80	537.5	2	6	(333.3)	2	3	(666.7)	47	89	528.1
1000 - 1499	22	121	181.8	3	18	(166.7)	-	11	-	25	150	166.7
1500 - 1999	19	277	68.6	2	32	(62.5)	1	29	(34.5)	22	338	65.1
2000 - 2499	17	803	21.2	2	111	(18.0)	5	68	73.5	24	9820	24.4
< 2500	101	1281	78.8	9	167	53.9	8	111	72.1	118	1559	75.7
2500 - 2999	22	3416	6.4	4	360	(11.1)	1	357	(2.8)	27	4133	6.5
3000 - 3499	29	8289	3.5	5	555	9.0	-	710	-	34	9554	3.6
3500 - 3999	11	7046	1.6	2	356	(5.6)	1	457	(2.2)	14	7859	1.8
4000 - 4499	6	2241	2.7	1	89	(11.2)	1	117	(8.5)	8	2447	3.3
$\geq 4500$	3	353	(8.5)	-	22	-	1	17	(58.8)	4	392	(10.2)
TOTAL	172	22626	7.6	21	1549	13.6	12	1769	6.8	205	25944	7.9

Excludes births <500 grams birthweight.

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

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

#### 6.5 Maternal Race and Babies' Sex

There were 113 (8.4/1000) male and 92 (7.3/1000) female perinatal deaths among those babies born in 1990.

Among babies born to Caucasian women the perinatal death rate for males (8.0/1000) was higher than for the perinatal death rate for females (7.2/1000). The rate of perinatal deaths among male babies of Aboriginal women (15.8/1000) was higher than the perinatal death rate for females (11.0/1000) and among babies of women of other races the rates were 7.7/1000 male and 5.8/1000 female (Table 27).

**TABLE 27: PERINATAL DEATHS BY MATERNAL RACE AND SEX IN WESTERN AUSTRALIA IN 1990**

Sex	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Total Births	Rate
	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate			
Male	93	11650	8.0	13	824	15.8	7	907	7.7	113	13381	8.4
Female	79	10976	7.2	8	725	11.0	5	862	5.8	92	12563	7.3
TOTAL	172	22626	7.6	21	1549	13.6	12	1769	6.8	205	25944	7.9

Excludes births <500 grams birthweight.

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

### 6.6 Maternal Race and Conjugal State

One sixth (9.4/1000) of perinatal deaths were among babies of women reported as socially unsupported by a male partner. This represents a decrease since the 1989 cohort report (15.6/1000). 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 1990**

Conjugal State	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Total Births	Rate
	No.	Total Births	Rate	No.	Total Births	Rate	No.	Total Births	Rate			
Single	17	1974	8.6	8	537	14.9	-	82	-	25	2593	9.6
Married/defacto	153	20402	7.5	13	993	13.1	12	1672	7.2	178	23067	7.7
<sup>2</sup> Other	2	250	8.0	-	19	-	-	15	-	2	284	7.0
TOTAL	172	22626	7.6	21	1549	13.6	12	1769	6.8	205	25944	7.9

Excludes births <500 grams birthweight.

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

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

## 7. INFANT MORTALITY IN WESTERN AUSTRALIA IN THE 1990 BIRTH COHORT

### 7.1 Infant Deaths

There were 174 infant deaths identified amongst the 25826 livebirths in 1990. Of these, 87 were neonatal deaths and 87 were post-neonatal deaths. The infant mortality rate for Western Australia in 1990 was 6.7/1000 livebirths (Tables 15 and 29).

Infant mortality among babies born to Aboriginal women (16.3/1000) was more than three times that for babies born to non-Aboriginal women (Table 41, Figure V). The difference between these groups has reduced from 18.9/1000 in 1985, 12.5/1000 in 1986, 11.7/1000 in 1987, 22.5/1000 in 1988, 15.5/1000 in 1989 to 10.2/1000 in 1990 (Table 41).

### 7.2 Maternal Race and Maternal Age

The infant mortality rate is greatest for babies of teenage women (10.3/1000). The infant mortality rate for babies of Aboriginal teenage mothers (12.1/1000) was higher than that for babies of Caucasian teenage mothers (10.1/1000) (Table 29).

**TABLE 29: INFANT DEATHS BY MATERNAL RACE AND MATERNAL AGE IN WESTERN AUSTRALIA IN 1990**

Maternal Age	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
≤ 15	-	21	-	1	45	22.2	-	-	-	1	66	15.2
16	-	94	-	1	61	16.4	-	1	-	1	156	6.4
17	2	194	10.3	-	83	-	-	10	-	2	287	7.0
18	5	395	12.7	1	105	9.5	-	15	-	6	515	11.7
19	5	487	10.3	2	120	16.7	-	25	-	7	632	11.1
≤ 19	12	1191	10.1	5	414	12.1	-	51	-	17	1656	10.3
20 - 24	37	4651	8.0	9	573	15.7	2	250	8.0	48	5474	8.8
25 - 29	56	8468	6.6	7	335	20.9	4	594	6.7	67	9397	7.1
30 - 34	20	6117	3.3	3	164	18.3	3	575	5.2	26	6856	3.8
35 - 39	10	1829	5.5	1	42	23.8	2	253	7.9	13	2124	6.1
40 - 44	3	260	11.5	-	9	-	-	39	-	3	308	9.7
≥ 45	-	9	-	-	-	-	-	2	-	-	11	-
TOTAL	138	22525	6.1	25	1537	16.3	11	1764	6.2	174	25826	6.7

Excludes births <500 grams birthweight.

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

### 7.3 Maternal Race and Conjugal State

The infant mortality rate (10.5/1000) among babies born to single women is far greater than the rate for babies of women in a marriage or defacto relationship (6.1/1000) (Table 30).

**TABLE 30: INFANT DEATHS BY MATERNAL RACE AND CONJUGAL STATE IN WESTERN AUSTRALIA IN 1990**

Conjugal State	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
Single	15	1963	7.6	11	534	20.6	1	82	12.2	27	2579	10.5
Married/defacto	119	20312	5.9	12	984	12.2	10	1667	6.0	141	22963	6.1
<sup>2</sup> Other	4	250	16.0	2	19	105.3	-	15	-	6	284	21.1
<b>TOTAL</b>	<b>138</b>	<b>22525</b>	<b>6.1</b>	<b>25</b>	<b>1537</b>	<b>16.3</b>	<b>11</b>	<b>1764</b>	<b>6.2</b>	<b>174</b>	<b>25826</b>	<b>6.7</b>

Excludes births <500 grams birthweight.

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

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

#### 7.4 Maternal Race and Parity

The highest rates of infant deaths were among babies of women whose parity was 3 to 4 (11.0/1000) and 5 or more (12.2/1000) (Table 31).

**TABLE 31: INFANT DEATHS BY MATERNAL RACE AND PARITY IN WESTERN AUSTRALIA IN 1990**

Parity	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
0	48	8940	5.4	6	436	13.8	1	685	1.5	55	10061	5.5
1 - 2	68	11493	5.9	13	674	19.3	8	895	8.9	89	13062	6.8
3 - 4	20	1895	10.6	4	318	12.6	2	161	12.4	26	2374	11.0
≥ 5	2	197	10.2	2	109	18.3	-	23	-	4	329	12.2
<b>TOTAL</b>	<b>138</b>	<b>22525</b>	<b>6.1</b>	<b>25</b>	<b>1537</b>	<b>16.3</b>	<b>11</b>	<b>1764</b>	<b>6.2</b>	<b>174</b>	<b>25826</b>	<b>6.9</b>

Excludes births < 500 grams birthweight.

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

#### 7.5 Maternal Race and Plurality

Infant mortality for multiple births (29.6/1000) was four times the rate for singleton births (6.3/1000). The infant death rate (25.3/1000) for twin babies born to Caucasian women in 1990 was far lower than the rate (43.6/1000) in 1989 (Table 32).



**TABLE 32: INFANT DEATHS BY MATERNAL RACE AND PLURALITY IN WESTERN AUSTRALIA IN 1990**

Plurality	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate
Singleton	124	21960	5.6	25	1517	16.5	10	1742	5.7	159	25219	6.3
Twins	14	554	25.3	-	20	-	1	22	45.5	15	596	25.2
Triplets	-	11	-	-	-	-	-	-	-	-	11	-
<b>TOTAL</b>	<b>138</b>	<b>22525</b>	<b>6.1</b>	<b>25</b>	<b>1537</b>	<b>16.3</b>	<b>11</b>	<b>1764</b>	<b>6.2</b>	<b>174</b>	<b>25826</b>	<b>6.7</b>

Excludes births < 500 grams birthweight.

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

### 7.6 Maternal Race and Babies' Sex

The infant death rates were 6.8/1000 male and 6.6/1000 female. Among babies born to Caucasian women the infant death rate for males (6.1/1000) was the same as the infant death rate for females (6.1/1000). For babies of Aboriginal mothers the infant death rate for males (16.0/1000) was lower than the infant death rate for females (16.6/1000) and for infants of women of other races the infant death rate for males (7.7/100) was higher than the infant death rate for females (4.7/1000) (Table 33).

**TABLE 33: INFANT DEATHS BY MATERNAL RACE AND SEX IN WESTERN AUSTRALIA IN 1990**

Sex	Maternal Race									Total		
	Caucasian			Aboriginal			Other					
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate
Male	71	11596	6.1	13	814	16.0	7	904	7.7	91	13314	6.8
Female	67	10929	6.1	12	723	16.6	4	860	4.7	83	12512	6.6
<b>TOTAL</b>	<b>138</b>	<b>22525</b>	<b>6.1</b>	<b>25</b>	<b>1537</b>	<b>16.3</b>	<b>11</b>	<b>1764</b>	<b>6.2</b>	<b>174</b>	<b>25826</b>	<b>6.7</b>

Excludes births <500 grams birthweight.

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

### 7.7 Maternal Race and Birthweight

Low birthweight (less than 2500 grams) babies comprised more than half of all infant deaths. A rate of 46.9/1000 livebirths was recorded for low birthweight babies. Babies with birthweight of 3500 grams or more had the highest chance of survival with an infant mortality rate of 2.5/1000. An infant mortality rate (31.1/1000) for low birth weight babies of Aboriginal women was lower than the rate (48.3/1000) for low birth weight babies of Caucasian women (Table 34).

**TABLE 34: INFANT MORTALITY BY MATERNAL RACE AND BIRTHWEIGHT DISTRIBUTION IN WESTERN AUSTRALIA IN 1990**

Birthweight (grams)	Maternal Race									Total		
	Caucasian			Aboriginal			Other			No.	Live Births	Rate
	No.	Live Births	Rate	No.	Live Births	Rate	No.	Live Births	Rate			
500 - 999	21	57	368.4	2	6	(333.3)	1	2	(500.0)	24	65	369.2
1000 - 1499	11	106	103.8	1	15	(66.7)	-	11	-	12	132	90.9
1500 - 1999	11	264	41.7	-	30	-	1	28	(35.7)	12	322	37.3
2000 - 2499	16	795	20.1	2	110	(18.2)	4	67	(59.7)	22	972	22.6
< 2500	59	1222	48.3	5	161	31.1	6	108	55.6	70	1491	46.9
2500 - 2999	20	3404	5.9	10	358	27.9	2	357	(5.6)	32	4119	7.8
3000 - 3499	35	8273	4.2	9	553	16.3	1	710	(1.4)	45	9536	4.7
3500 - 3999	20	7039	2.8	-	354	-	2	457	(4.4)	22	7850	2.8
4000 - 4499	4	2237	(1.8)	1	89	(11.2)	-	116	-	5	2442	2.0
≥ 4500	-	350	-	-	22	-	-	16	-	-	388	-
TOTAL	138	22525	6.1	25	1537	16.3	11	1764	6.2	174	25825	6.7

Excludes births <500 grams birthweight.

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

( ) Where n<5 rate has been bracketed.

### 7.8 Maternal Race and Age at Infant Death

Over half (50.6%) of the infant deaths occurred in the neonatal period, with most (90.2%) deaths occurring within 24 weeks of birth (Table 35)

**TABLE 35: INFANT DEATHS BY MATERNAL RACE AND AGE AT DEATH IN WESTERN AUSTRALIA IN 1990**

Age at Death in Weeks	Maternal Race						Total	
	Caucasian		Aboriginal		Other		No.	%
	No.	%	No.	%	No.	%		
1 - 4 weeks	72	52.2	9	36.0	7	63.6	88	50.6
5 - 8 weeks	12	8.7	4	16.0	4	36.4	20	11.5
9 - 12 weeks	12	8.7	4	16.0	-	-	16	9.2
13 - 16 weeks	11	8.0	4	16.0	-	-	15	8.6
17 - 20 weeks	13	9.4	-	-	-	-	13	7.5
21 - 24 weeks	5	3.6	-	-	-	-	5	2.9
25 - 52 weeks	13	9.4	4	16.0	-	-	17	9.8
TOTAL	138	100.0	25	100.0	11	100.0	174	100.0

Excludes births <500 grams birthweight.

## 7.9 Causes of Infant Death

The major causes of infant deaths remain lethal congenital malformations for 56 (32.2%) babies, Sudden Infant Death Syndrome for 55 (31.6%) and low birthweight (<2500 grams) for 32 (18.4%) 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 1990**

Cause of Death	Maternal Race						Total		Total	
	Caucasian		Aboriginal		Other		1990		1989	
	No.	%	No.	%	No.	%	No.	%	No.	%
Lethal Congenital Malformation	46	33.3	6	24.0	4	36.4	56	32.2	60	30.3
Low Birthweight (<2500 grams)	27	19.6	2	8.0	3	27.3	32	18.4	53	26.8
Asphyxia	5	3.6	-	-	-	-	5	2.9	6	3.0
Pregnancy conditions	1	0.7	-	-	-	-	1	0.6	3	1.5
Infections	6	4.3	4	16.0	-	-	10	5.7	12	6.1
Hydrops Fetalis	-	-	-	-	-	-	-	-	-	-
Other	7	5.1	2	8.0	1	9.1	10	5.7	11	5.6
Sudden Infant Deaths	44	31.9	8	32.0	3	27.3	55	31.6	41	20.7
Unknown	2	1.4	3	12.0	-	-	5	2.9	12	6.1
<b>TOTAL</b>	<b>138</b>	<b>100.0</b>	<b>25</b>	<b>100.0</b>	<b>11</b>	<b>100.0</b>	<b>174</b>	<b>100.0</b>	<b>198</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 1990**

Type of Death	Maternal Race						Total	
	Caucasian		Aboriginal		Other			
	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Neonatal Mortality	71	3.2	9	5.9	7	4.0	87	3.4
Post-Neonatal Mortality	67	3.0	16	10.4	4	2.3	87	3.4
Infant Mortality	138	6.1	25	16.3	11	6.2	174	6.7

Excludes births <500 grams birthweight.

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

**TABLE 38: PERINATAL AND INFANT MORTALITY BY MATERNAL AGE, PLURALITY AND SEX IN WESTERN AUSTRALIA IN 1990**

Conjugal	Perinatal Mortality						Infant Mortality						
	Aboriginal		Non-Aboriginal		Total		Aboriginal		Non-Aboriginal		Total		
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	
Maternal													
Age ≤15	1	46 (21.7)	1	22 (45.5)	2	68 (29.4)	1	21 (47.6)	-	45	1	66 (15.2)	
16 - 19	4	372 (10.8)	12	1225 9.8	16	1597 10.0	4	369 (10.8)	12	1221 9.8	16	1590 10.1	
20 - 29	12	915 13.1	102	14017 7.3	114	14932 7.6	17	908 18.7	98	13963 7.0	115	14871 7.7	
30 - 39	4	207 (19.3)	67	8820 7.6	71	9027 7.9	4	206 (19.4)	35	8774 4.0	39	8980 4.3	
≥40	-	9 -	2	311 (6.4)	2	320 (6.3)	-	9 -	3	310 (9.7)	3	319 (9.4)	
Plurality													
Singleton	21	1529 13.7	168	23801 7.1	189	25330 7.5	26	1517 17.1	133	23702 5.6	159	25219 6.3	
Multiple	-	20 -	16	587 27.3	16	614 26.1	-	20 -	15	587 25.6	15	607 24.7	
Sex													
Male	13	824 15.8	100	12557 8.0	113	13381 8.4	13	814 16.0	78	12500 6.2	91	13314 6.8	
Female	8	725 11.0	84	11838 7.1	92	12563 7.3	13	723 18.0	70	11789 5.9	83	12512 6.6	

Excludes births <500 grams birthweight.

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

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

( ) Where n<5 rate has been bracketed.

## 8. TRENDS IN BIRTHS, PERINATAL AND INFANT MORTALITY IN WESTERN AUSTRALIA 1980 - 1990

### 8.1 Crude Birth Rates and Total Births 1980 - 1990

The crude birth rate for Western Australia has remained relatively stable from 1980-1990 at between 15.8/1000 and 16.9/1000 person-years of total population.

Consideration of racial groups shows similar stability. The crude birth rate among Aboriginal women (33.1/1000) in 1990 showed little change from 1989 (32.8/1000). Among non-Aboriginal women the crude birth rate ranged between 16.5/1000 in 1980 and 15.3/1000 in 1990 (Table 39, Figure VI).

**TABLE 39: CRUDE BIRTH RATES FOR ABORIGINAL AND NON-ABORIGINAL WESTERN AUSTRALIAN BIRTHS 1980 - 1990**

Year	Aboriginal			Non-Aboriginal			Total		
	Live Births	Pop <sup>n</sup>	Crude Birth Rate	Live Births	Pop <sup>n</sup>	Crude Birth Rate	Live Births	Pop <sup>n</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
1990	1537	46394	33.1	24289	1587431	15.3	25826	1633825	15.8

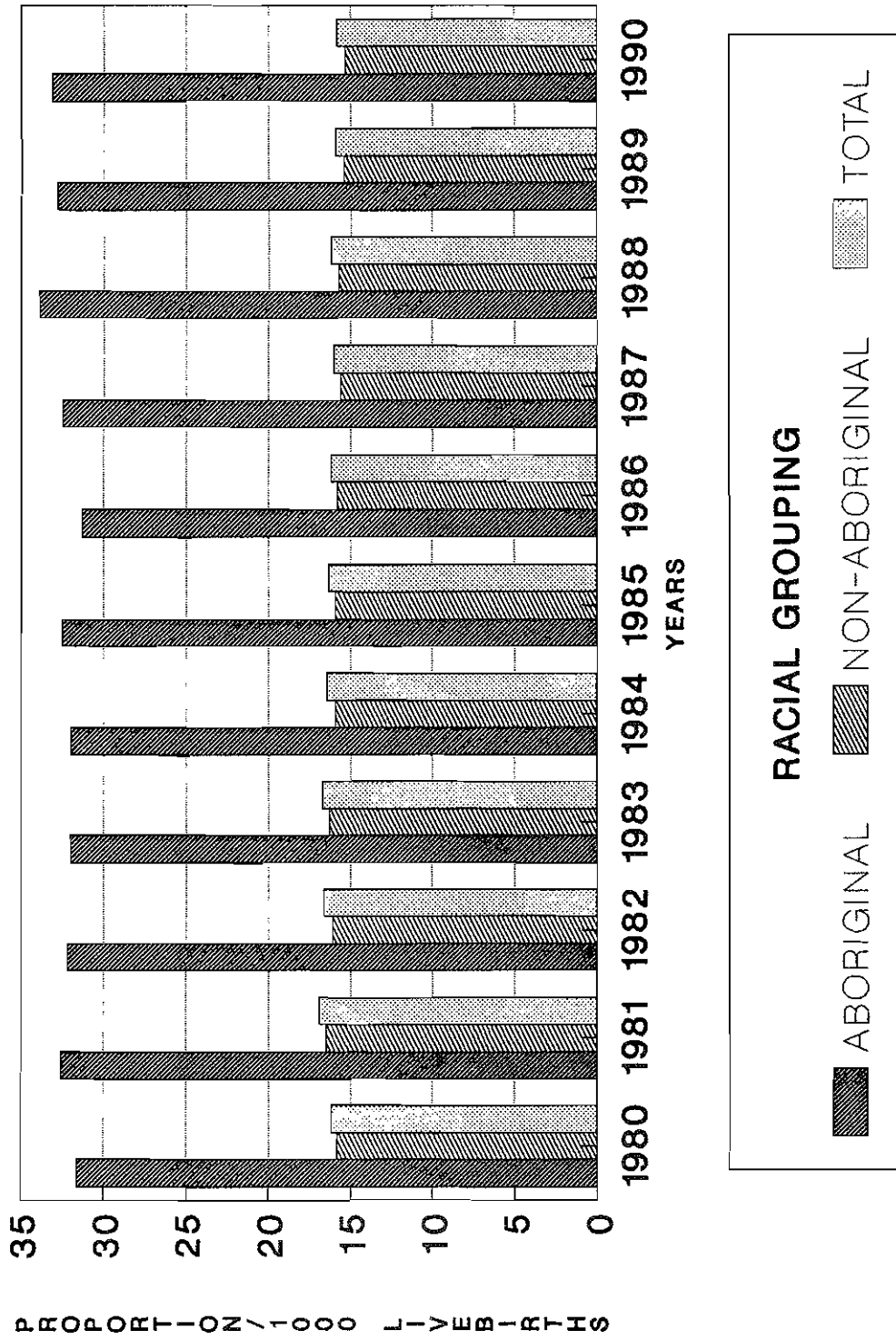
SOURCE: MIDWIVES' NOTIFICATION SYSTEM  
 AUSTRALIAN BUREAU OF STATISTICS - Cat. No. 3201.0.  
 CHILD AND COMMUNITY HEALTH SERVICES - Aboriginal Population Data.

#### 8.2.1 Stillbirths, Neonatal and Perinatal Mortality 1980 - 1990

Western Australian stillbirth rates showed a general downward trend from 7.5/1000 total births in 1980 to 4.5/1000 in 1990 (Table 40).

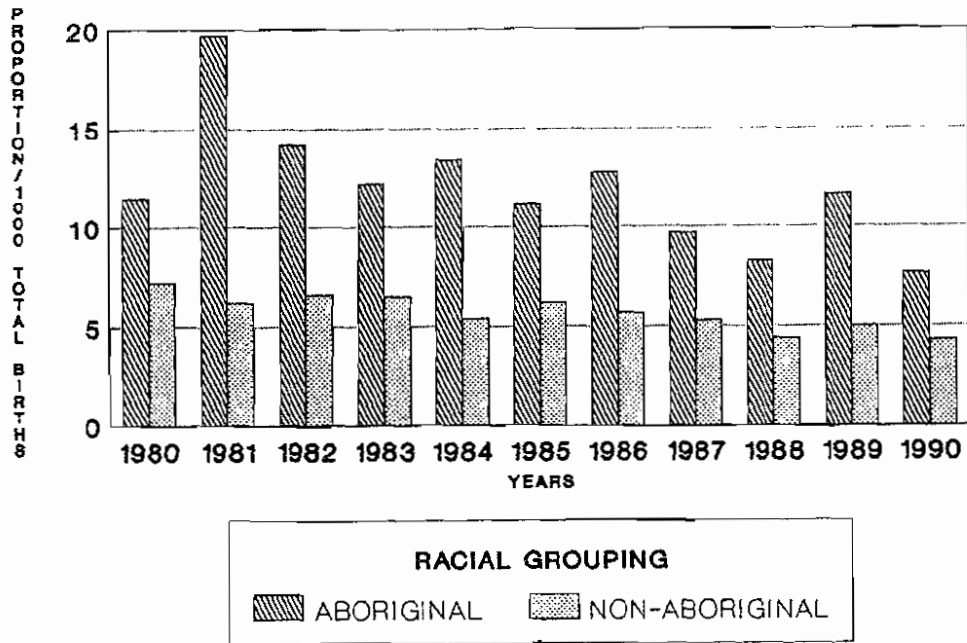
Consideration of stillbirth rates and racial groups showed stillbirths among babies of non-Aboriginal women followed this trend while the rates decreased from 7.2/1000 in 1980 to 4.3/1000 in 1990. Among babies of Aboriginal women, stillbirth rates were less consistent in their decline and remained approximately double the rate for stillbirths among babies of non-Aboriginal women (Table 40).

**FIGURE VI**  
**CRUDE BIRTH RATES AND RACIAL GROUPING**  
**FOR WESTERN AUSTRALIAN BIRTHS, 1980-1990**



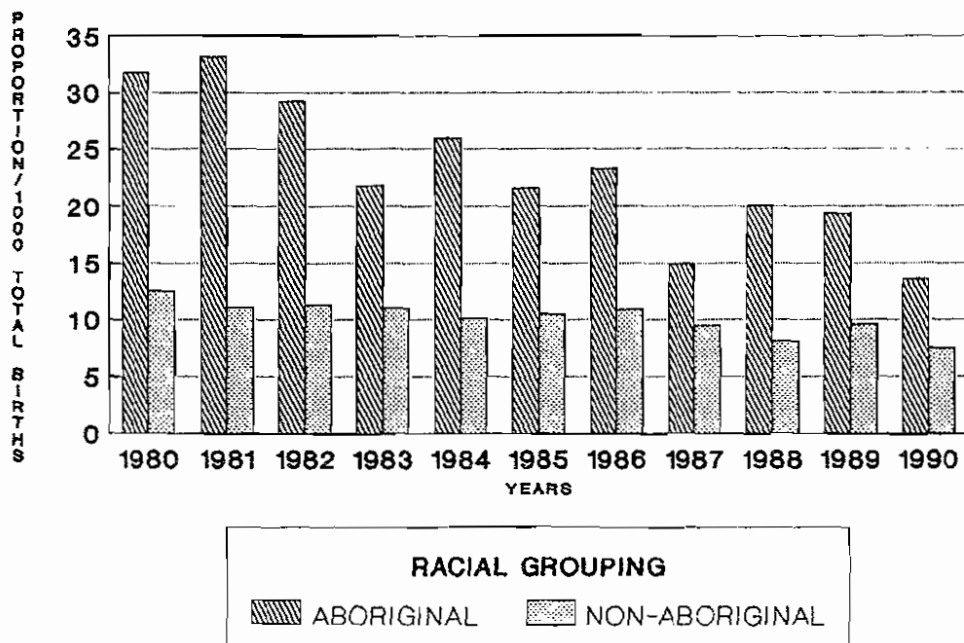
Excludes births < 500 grams birthweight.

**FIGURE VII STILLBIRTH PROPORTIONS AND RACIAL GROUPING OF BIRTHS IN WA. 1980-90.**



Excludes births < 500 grams birthweight.

**FIGURE VIII PERINATAL MORTALITY AND RACIAL GROUPING FOR WESTERN AUSTRALIAN BIRTHS, 1980-90**



Excludes births < 500 grams birthweight.

**TABLE 40: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY FOR ABORIGINAL AND NON-ABORIGINAL BIRTHS IN WESTERN AUSTRALIA 1980 - 1990**

Year	Stillbirths			Neonatal Mortality			Perinatal Mortality											
	Aboriginal		Total	Aboriginal		Total	Aboriginal		Total									
	No.	(1) Non-Aboriginal	No. (1)	No.	(2) Non-Aboriginal	No. (2)	No.	(3) Non-Aboriginal	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	5.7	150	6.4	13	10.5	96	4.4	109	4.7	27	21.6	232	10.6	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	5.5	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	9.4	259	10.2
1990	12	7.7	106	4.3	118	4.5	9	5.9	78	3.2	87	3.4	21	13.6	184	7.5	205	7.9

Excludes births <500 grams birthweight.

1980 - 1983 based on year of death.

1984 - 1990 based on year of birth.

(1) Stillbirth Rates/1000 total births.

(2) Neonatal Mortality Rate/1000 livebirths.

(3) Perinatal Mortality Rate/1000 total births.

SOURCE: MIDWIVES' NOTIFICATION SYSTEM  
REGISTRAR GENERAL'S OFFICE



### 8.2.2 Neonatal Mortality

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

The rate of neonatal mortality among babies of Aboriginal women has reduced during the eleven year period 1980-1990. The rate of 20.4/1000 livebirths in 1980 reduced to 5.9/1000 livebirths in 1990. For babies of non-Aboriginal women, neonatal mortality rates reduced from 5.3/1000 in 1980 to 3.2/1000 in 1990 (Table 40, Figure IX).

### 8.2.3 Perinatal Mortality

Comparison of perinatal mortality for 1984-90, the seven years where the birth cohort method was employed, showed that overall the rate has decreased from 10.9/1000 total births in 1984 to 7.9/1000 in 1990. An overall reduction of 5.6/1000 (13.5/1000 in 1980 to 7.9/1000 in 1990) occurred over eleven years. It was apparent that the reduction in the perinatal mortality among babies of Aboriginal women from 33.2/1000 in 1981 to 13.6/1000 in 1990, 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 - 1990

Over the eleven year period from 1980 to 1990 neonatal and infant mortality rates reduced in Western Australia. Post-neonatal mortality rates showed minimal change over the same period. The neonatal mortality rate reduced from 6.1/1000 in 1980 to 3.4/1000 in 1990. Rates for post-neonatal deaths decreased slightly from 3.2/1000 in 1980 to 3.4/1000 in 1990 and infant mortality rates reduced from 9.3/1000 in 1980 to 6.7/1000 in 1990 (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. The rate increased again to 28.7/1000 in 1988 and 22.4/1000 in 1989 but decreased in 1990 to 16.3/1000 (Table 41).

Infant death rates among babies of Aboriginal women at almost three times the rate 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 rate of deaths of babies born to Aboriginal women during the post-neonatal period was three times the rate 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 - 1990**

Year	Neonatal Mortality			Post-Neonatal Mortality			Infant Mortality							
	Aboriginal		Non-Aboriginal	Aboriginal		Non-Aboriginal	Aboriginal		Non-Aboriginal	Total				
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate				
1980	21	20.4	104	5.3	11	10.7	55	2.8	32	31.1	159	8.1	191	9.3
1981	15	13.7	103	4.9	6	5.5	63	3.0	21	19.2	166	7.9	187	8.5
1982	17	15.3	101	4.8	11	9.9	69	3.3	28	25.2	170	8.1	198	8.9
1983	11	9.7	97	4.5	17	15.0	59	2.7	28	24.7	156	7.2	184	8.0
1984	15	12.8	101	4.7	14	11.9	75	3.5	29	24.7	176	8.1	205	9.0
1985	13	10.5	96	4.4	19	15.4	58	2.6	32	25.9	154	7.0	186	8.0
1986	13	10.6	116	5.2	12	9.8	59	2.6	25	20.3	175	7.8	200	8.4
1987	7	5.3	96	4.2	18	13.6	64	2.8	25	18.8	160	7.1	185	7.7
1988	17	11.9	87	3.7	24	16.8	58	2.5	41	28.7	145	6.2	186	7.5
1989	11	7.7	110	4.6	21	14.7	56	2.3	32	22.4	166	6.9	198	7.8
1990	9	5.9	78	3.2	16	10.4	71	2.9	25	16.3	149	6.1	174	6.7

Excludes births <500 grams birthweight.

1980 - 1983 based on year of death.

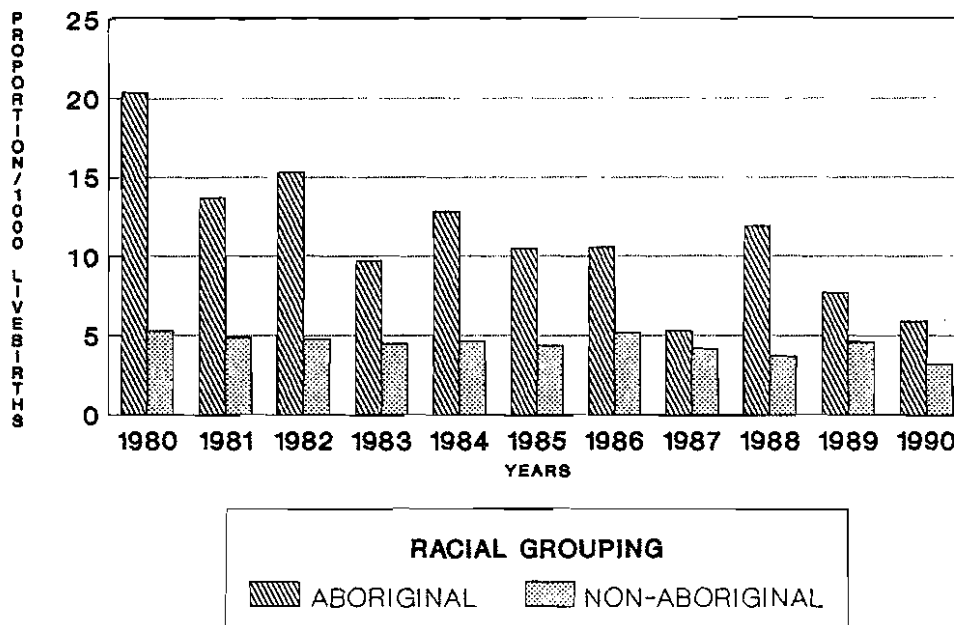
1984 - 1990 based on year of birth.

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

SOURCE : MIDWIVES' NOTIFICATION SYSTEM  
REGISTRAR GENERAL'S OFFICE

FIGURE IX

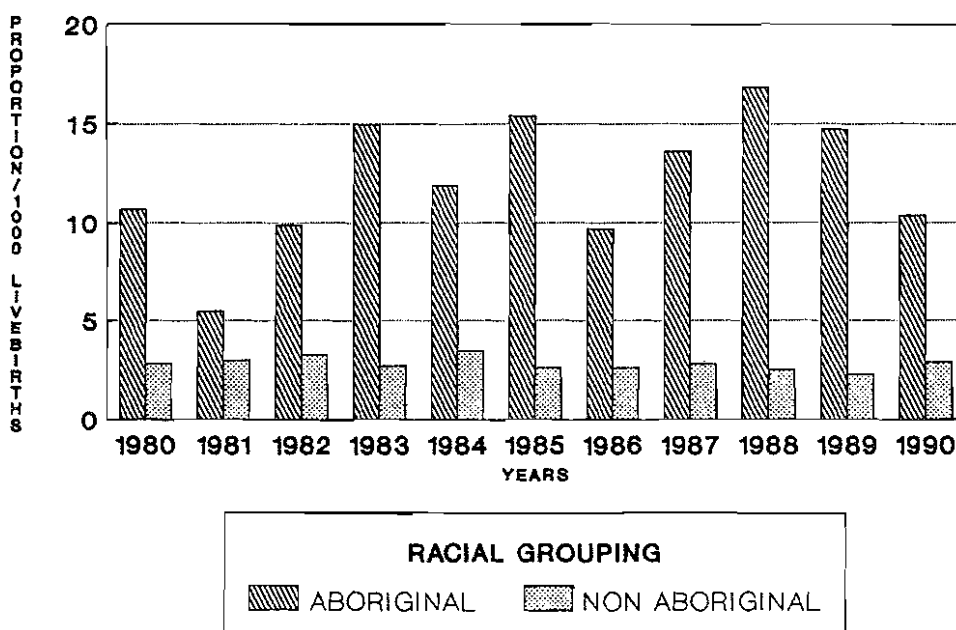
NEONATAL MORTALITY AND RACIAL GROUPING FOR WESTERN AUSTRALIAN BIRTHS, 1980-1990



Excludes births <500 grams birthweight.

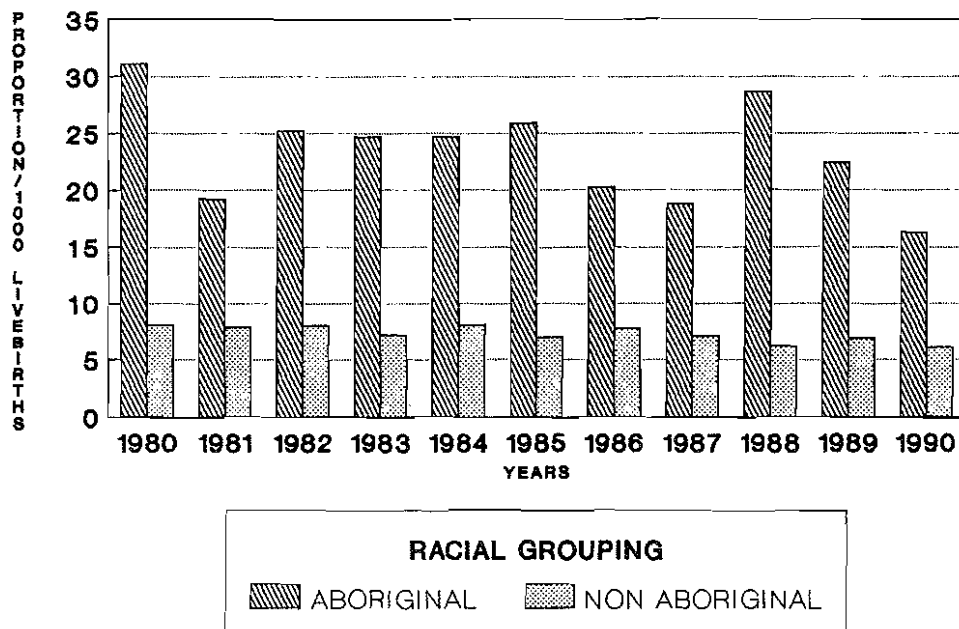
FIGURE X

POSTNEONATAL MORTALITY, RACIAL GROUPING FOR WESTERN AUSTRALIAN BIRTHS, 1980-1990



Excludes births <500 grams birthweight.

**FIGURE XI      INFANT MORTALITY AND RACIAL GROUPING  
FOR WESTERN AUSTRALIAN BIRTHS, 1980-90**



Excludes births < 500 grams birthweight.

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2. Gee, V. Perinatal and Infant Mortality Identified by Maternal Race. The 1989 Western Australian Birth Cohort, Health Department of Western Australia, Perth. 1991.
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

PARTICULARS RELATING TO MOTHER

Hospital .....

PRINT  
IN  
BLOCK  
LETTERS.

SURNAME		UNIT RECORD No.	
FORENAMES		BIRTH DATE	
ADDRESS OF USUAL RESIDENCE		POSTCODE	
MAIDEN NAME		TELEPHONE NUMBER	

Current Conjugal State:

single ( ) 1

married (incl. de facto) ( ) 2

other ..... ( )

Race: (please specify) [ ]

Caucasian ( ) 1

Aboriginal (full or part) ( ) 2

Other ..... ( ) 3

(please specify)

Height (cms) [ ] [ ] [ ]

**PREGNANCY**

PREVIOUS PREGNANCIES (excluding this pregnancy)

Total number of: [ ] [ ]

Previous Pregnancies [ ] [ ]

Previous children now living [ ] [ ]

born alive, now dead [ ] [ ]

stillborn [ ] [ ]

THIS PREGNANCY

Date of LMP [ ] [ ] [ ] [ ] [ ] [ ]

This date - certain ( ) 1

not certain ( ) 2

Expected due date [ ] [ ] [ ] [ ] [ ] [ ]

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

other ..... H

Medical Conditions:

[ ] [ ] [ ] [ ] [ ] [ ]

[ ] [ ] [ ] [ ] [ ] [ ]

**LABOUR AND DELIVERY**

Onset of Labour:

spontaneous ( ) A

induced ( ) B

no labour ( ) 0

Augmentation of Labour no ( ) 1

yes ( ) 2

Presentation:

vertex ( ) 1

breech ( ) 2

other ( ) 3

Type of Delivery:

normal ( ) A

vacuum - successful ( ) B

- failed ( ) C

forceps - successful ( ) D

- failed ( ) E

breech manoeuvre ( ) F

caesarean - elective ( ) G

- emergency ( ) H

Anaesthesia/Analgesia:

none ( ) Z

general ( ) A

epidural/spinal ( ) B

other ( ) C

Hours of established labour: [ ] [ ]

Complications of Labour, Delivery: (Include reason for Caesarean)

precipitate delivery ( ) A

fetal distress ( ) B

prolapsed cord ( ) C

cord tight around neck ( ) D

cephalopelvic disproportion ( ) E

other ..... F

**BABY**

Separate Form for each Baby

Adoption Yes ( ) No ( )

Birth Date: [ ] [ ] [ ] [ ] [ ] [ ]

Time (24 hr. clock) [ ] [ ] [ ] [ ] [ ] [ ]

Plurality:

single birth ( ) 1

first twin ( ) 2

second twin ( ) 3

other multiple birth: ( ) 4

(specify baby number \_\_\_ of \_\_\_)

Sex: male ( ) 1

female ( ) 2

Condition: liveborn ( ) 1

stillborn ( ) 2

Birthweight (grams) [ ] [ ] [ ] [ ] [ ] [ ]

Length (cms) [ ] [ ] [ ] [ ] [ ] [ ]

Head circumference (cms) [ ] [ ] [ ] [ ] [ ] [ ]

Time to establish unassisted regular breathing (mins) [ ] [ ] [ ] [ ] [ ] [ ]

Resuscitation:

none ( ) 0

intubation ( ) 3

oxygen only ( ) 8

other ..... [ ] [ ] [ ] [ ] [ ] [ ]

Apgar Score:

1 min [ ] [ ] [ ] [ ] [ ] [ ]

5 mins [ ] [ ] [ ] [ ] [ ] [ ]

Estimated Gestation (weeks) [ ] [ ] [ ] [ ] [ ] [ ]

Birth Defects .....

Birth Trauma (Eg. cephalhaematoma) .....

COMPLETE SECTION ON SEPARATION

Attach to Mother and Baby's Inpatient Summaries (HA22). Forward to Health Services Statistics and Epidemiology Branch, Health Dept of Western Australia P.O. Box 8172, Stirling Street, PERTH 6849 after discharge of mother and/or baby whichever is later. Guidelines for completion of this form available from above address.

MIDWIFE

Name .....

Signature .....

Reg. No. .... Date: / / .....

**BABY'S SEPARATION DETAILS**

Date of Discharge/Transfer or Death [ ] [ ] [ ] [ ] [ ] [ ]

Type of Separation:

Discharged home ( ) 1

Died ( ) 2

Transferred to [ ] [ ] [ ] [ ] [ ] [ ]

Special Care (whole days only) [ ] [ ] [ ] [ ] [ ] [ ]

Separate HA22 for baby: yes, attached ( ) 2

HEALTH DEPARTMENT COPY

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

For Office Use Only

Registration Number

Registration Number grid with boxes for digits 1-14.

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 [ ] .....

due to [ ] .....

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 .....

I hereby certify that the particulars shown above are true to the best of my knowledge.

Signature ..... Date .....

Name ..... Address .....

(Block Letters)

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

\* 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.

29737/11/83—2M BKS—MAG 14A

