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PERINATAL STATISTICS IN WESTERN AUSTRALIA

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VIVIEN GEE
BAppSc. (Nursing.Curtin), RN, RM, CHN
Epidemiology Branch

including

Special Article Contribution
by

SANDRA M. WEBB
B.SC. (Hons), M.Sc

and

C. D'ARCY J. HOLMAN
MBBS, MPH, PhD.

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MATERNAL AND CHILD HEALTH STUDIES UNIT
EPIDEMIOLOGY BRANCH
HEALTH DEPARTMENT OF WESTERN AUSTRALIA
189 ROYAL STREET, EAST PERTH, WA, 6004

CLERICAL STAFF: Mrs Colleen Kontor
Miss Lucy Gericevich
Mr Robert Willday

CO-ORDINATOR: Mrs Vivien Gee

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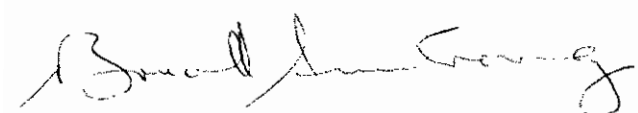
1. INTRODUCTION

The value of routinely collected statistics increases the longer they are collected. The passage of time brings with it the possibility of informative trends.

The Perinatal Statistics derived from the Western Australian Midwives Notification System are no exception. Collected since 1974, and now subject to regular annual reporting, the trends in these data show increasingly the pattern of the past and what might be expected in the future.

There are a number of interesting trends to be seen in this Report. The proportion of births to single mothers appears to be increasing; the proportion of homebirths has increased; there is a steady shift towards increasing age of primagravidas; there is a steady trend towards an increasing rate of intervention in labour, most marked for caesarean sections; there has been an increase in the rate of triplet births (attributable, presumably, to that modern day wonder, IVF); overall, however, the birth rate is declining, as is perinatal mortality and its components, stillbirth and neonatal death. Most dramatic of all, perhaps, has been the fall in perinatal mortality in infants of Aboriginal mothers which, in 1976 was nearly 40 per thousand, and, in 1987, was reported for the first time to be under 20 per thousand (a gratifying 15.7 per thousand total births). For the first time perinatal mortality in infants of Aboriginal mothers has reached the level enjoyed by infants of caucasian mothers in the late '70s.

The mere collection of these data, and observation of the trends, is not enough. The data throw out challenges. Can we continue to narrow the gap in perinatal mortality between infants of Aboriginal and non-Aboriginal mothers? Is perinatal mortality falling because of, or in spite of, increased obstetric intervention rates? What will be the social consequences of an increase in proportion of births to single mothers and older mothers? These are but a few of the challenges and questions that this report lays before us. If we fail to respond to them, and simply continue to collect and report the statistics, we might just as well have never started their collection in 1974.



Bruce K Armstrong
COMMISSIONER OF HEALTH

2. SUMMARY

Midwives' forms received by this department indicate that 24,138 babies were born during 1987 in Western Australia.

Although this represents an increase of 1.2% in total birth numbers from the previous twelve months, the crude birth rate of 15.5 per 1000 population has decreased by 1.1% from the 1986 statistic.

This report includes statistics only on those babies whose birthweight is equal to or greater than 500 grams.

Of the 23,836 women confined, 23,538 (98.7%) were singleton pregnancies with the remaining 298 (1.3%) being multiple births. Multiple births included 288 twin and 3 triplet pregnancies. (Tree Diagram 1)

The average age of women confined was 27 years.

Two maternal deaths during 1987 gave a maternal mortality proportion of 0.08/1000 livebirths.¹²

Most confinements (99.1%) occurred in hospital. Babies born before arrival for planned hospital confinements occurred in 63 cases representing 0.3% of overall births. There were 144 (0.6%) planned home confinements during 1987. (Tree Diagram 3)

The overall fertility rate for women of aboriginal race was more than double that of non-aboriginal women. The fertility rate of teenage aboriginal women was more than eight times greater than that of non-aboriginal women of the same age. (Table 12)

More than two thirds of the total women confined had no complication of pregnancy recorded. Pre-eclampsia was recorded for 1666 (7.0%) of women which indicates a significant level of morbidity. (Table 13)

Induction of labour occurred in 26.2% of women confined while 10.6% were confined without establishing labour. (Table 14)

Of those women whose pregnancy was of breech presentation prior to delivery, 72% were confined by caesarean section.

Caesarean sections in Western Australia continued to increase with 16.9% of all women being delivered by this method. (Table 17) Of these women 1,302 or 32.3% had a previous history of caesarean section. Additional factors influencing the 1.2% increase in caesarean section proportion are corresponding reductions in forcep deliveries of 1.2% and vaginal breech deliveries of 0.1%. The incidence of spontaneous vaginal delivery shows a decrease of 0.5% during the last twelve months being 63.3% of total 1987 maternal deliveries. (Figure VII)

Six percent of all babies weighed less than 2500grams at birth. When examined by maternal race 10.5% of babies born to aboriginal women were of low birthweight. (Table 30) More than two thirds of stillbirths were of low birthweight. (Table 31)

Preterm birth (less than 37 weeks gestation) occurred in 1573 (6.5%) of the total births. (Table 34.1). When examined by plurality, 44.7% of the multiple births were preterm. (Table 34.2)

Special neonatal care was required for 15.6% of total births during 1987. This represents more than twice the number in previous years. Of those admitted 67% stayed one day or less in special care. (Table 37)

The majority of babies stayed in hospital between two to seven days after birth and another 18.4% stayed longer than eight days. (Table 38.1)

Amongst the 24,138 births, 134 were stillborn and 103 of the livebirths died within the first twenty eight days of life. (Table 38.2) Almost two thirds of the neonatal deaths occurred within the first day of life. (Table 47)

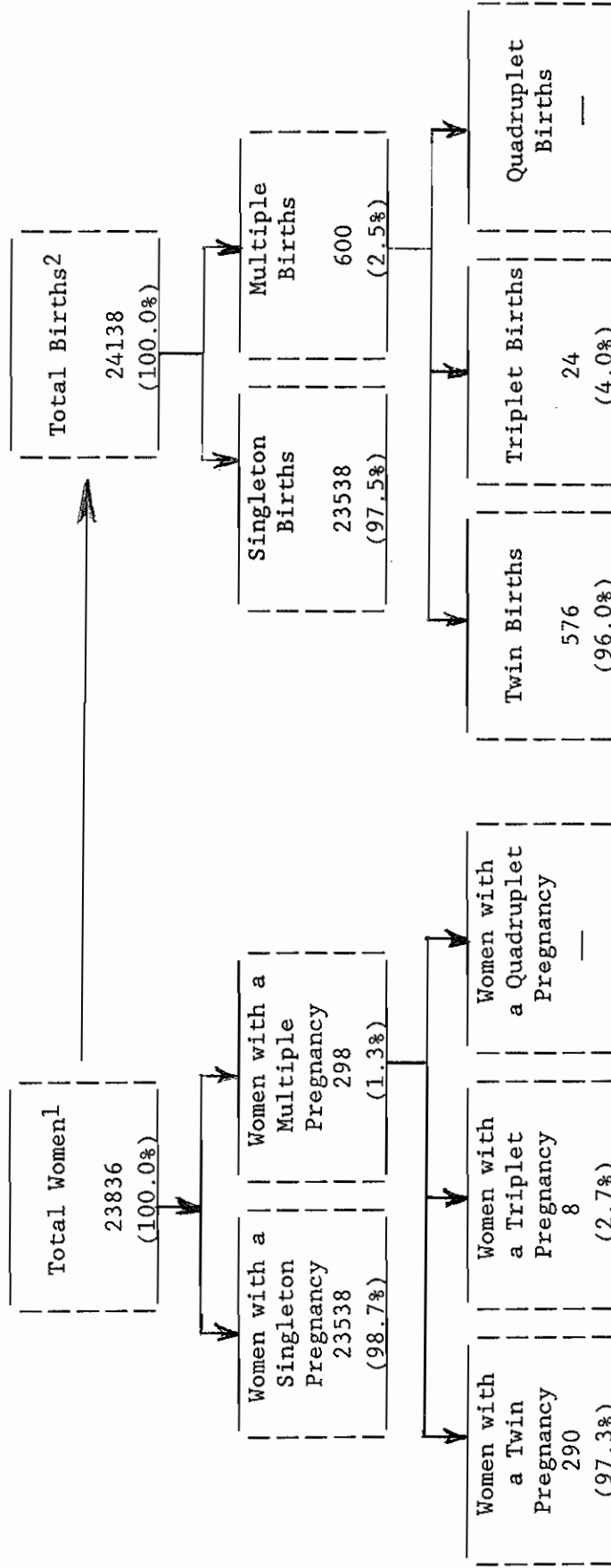
Causes of stillbirth included low birthweight and lethal congenital malformations. Stillbirths of unknown cause represented 35.8% of the total. For neonatal deaths, the major causes of death were low birthweight (less than 2500 grams) and lethal congenital malformations. (Table 48)

Autopsies were requested for 56% of stillbirths and 48.6% of neonatal deaths. (Table 49)

Mortality proportions were identified by plurality for the 1987 birth cohort. The overall perinatal mortality for multiple births was almost five times greater than for singleton births. The stillbirth proportion for multiple births was 25.0/1000 compared with 5.5/1000 for singleton births. The neonatal death proportion for multiple births was almost eight times greater than for singleton births. (Tree Diagram 2)

TREE DIAGRAM 1

PREGNANCIES AND BIRTHS IN WESTERN AUSTRALIA, 1987



Excludes births less than 500 grams birthweight.

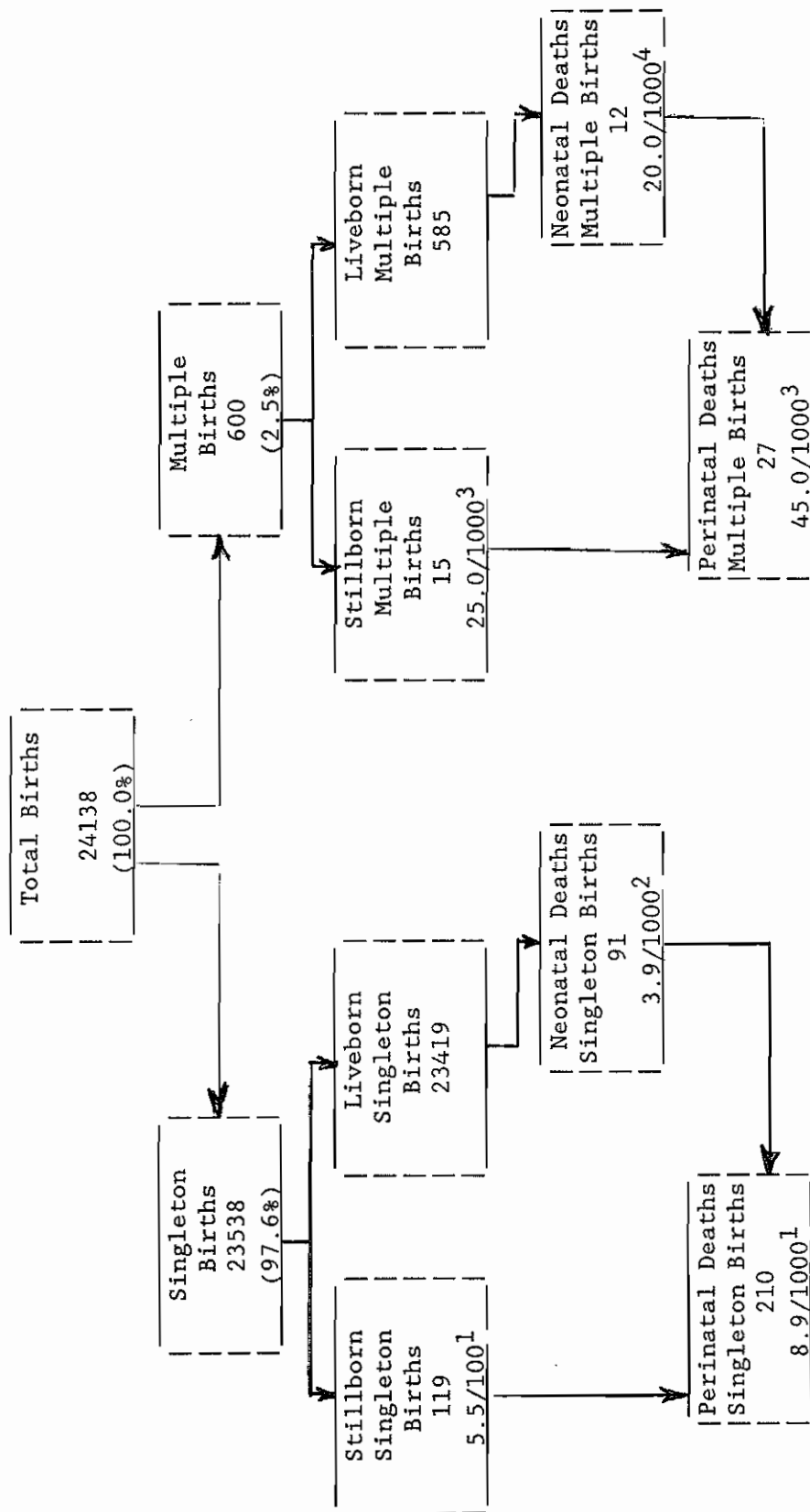
¹ Includes 2 women with a twin pregnancy where one twin weighed less than 500 grams birthweight.

² Includes 2 single twin births whose birthweight was 500 grams or more.

SOURCE: MIDWIVES' NOTIFICATION SYSTEM

TREE DIAGRAM 2

PLURALITY OF BIRTHS AND PERINATAL DEATHS IN WESTERN AUSTRALIA, 1987



Excludes births less than 500 grams birthweight.

1 /1000 total singleton births.
3 /1000 total multiple births.

2 /1000 singleton livebirths.
4 /1000 multiple livebirths.

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
REGISTRAR GENERAL'S OFFICE

HOSPITAL MORBIDITY SYSTEM
COMMUNITY AND CHILD HEALTH SERVICES

3. DEFINITIONS

Apgar Score

A numerical scoring system applied after birth to evaluate the condition of the baby. It is based on the heart rate, respiration, muscle tone, reflexes and colour. Low scores indicate poor condition. The five minute score only is recorded on the Midwives' Form 2.

Birthweight

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

Low Birthweight - A birthweight of less than 2500 grams.

Very Low Birthweight - A birthweight less than 1500 grams.

Caesarean Section

A delivery of the fetus through an incision in the abdominal wall.

Elective Caesarean Section - Is a planned procedure prior to onset of labour and before spontaneous rupture of membranes or without any induction procedure.

Emergency Caesarean Section - The decision to perform a caesarean section, for a complication either before the onset of labour or during labour, whether the onset of labour was spontaneous or following induction.

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 confinements per 1000 women-years to women aged between 15-44 years.

Length of Stay

The total number of patient days in hospital at time of discharge. A stay of less than 1 day (patient admission/birth and discharge on the same day) is counted as one day, in the total days of care. For patients admitted and discharged on different days, the number of days is computed by subtracting the date of admission from the day of separation. For planned homebirths it is routinely coded as 10 days, from date of birth.

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

Maternal Mortality - is the number of maternal deaths per 1000 livebirths in a year.

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.

Neonatal Death

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

Nulliparous - is never having completed a pregnancy beyond viable age.

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.

Plurality

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

Race - refers to mother's racial group

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

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

Other - includes Asian, Indian, Polynesian, etc.

Stillbirth

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

6. MATERNAL DEMOGRAPHIC INFORMATION

6.1 Age

Of the 23,836 women confined in Western Australia during 1987, 86.3% were aged between 20 and 34 years. Young women aged 19 years or less represented 6.2% of total women confined with the 35 year and older group increasing to 7.5% from 7.3% in 1986. Of the women with multiple pregnancies, 11 were less than 20 years of age and 40 women were 35 years or older. (Table 1)

The ages of younger women have been recorded in individual years due to interest in teenage confinements.

TABLE 1: AGE AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Maternal Age	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
< 13	3	0.0	0	0.0	3	0.0
14	16	0.0	0	0.0	16	0.1
15	59	0.3	0	0.0	59	0.2
16	141	0.6	0	0.0	141	0.6
17	256	1.1	1	0.3	257	1.1
18	410	1.7	4	1.3	414	1.7
19	596	2.5	6	2.0	602	2.5
20 - 24	5605	23.8	60	20.1	5665	23.8
25 - 29	9213	39.1	107	35.9	9320	39.2
30 - 34	5483	23.3	80	26.8	5563	23.3
35 - 39	1531	6.5	36	12.1	1567	6.6
40 - 44	215	1.0	4	1.3	219	0.9
> 45	10	0.0	0	0.0	10	0.0
Total	23538	100.0	298	100.0	23836	100.0

Excludes births less than 500 grams birthweight.

6.2 Race

Ethnic grouping of women identified the majority (89.0%) of women confined as caucasian. The remaining eleven percent is composed of Aboriginal women (5.6%) and "other" race women (5.4%).

Multiple birth proportions of total births show 273 (1.1%) caucasian women, 12 (0.1%) aboriginal women and 13 (0.1%) of women of "Other" racial classification. (Table 2)

TABLE 2: RACE AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Maternal Race	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
Caucasian	20943	87.9	273	1.1	21216	89.0
Aboriginal	1317	5.5	12	0.1	1329	5.6
Other	1278	5.3	13	0.1	1291	5.4
Total	23538	98.7	298	1.3	23836	100.0

Excludes births less than 500 grams birthweight.

Other races include Indian, Asian, Polynesian, etc.

¹ Proportion/100 women confined.

6.3 Conjugal State

Over twelve percent of all women confined in Western Australia during 1987 were reported to be unsupported, being either single, widowed or separated. Single women represented the largest group being 10.6%. Eight percent of all women with multiple pregnancy were unsupported. (Table 3, Figure I)

TABLE 3: CONJUGAL STATE AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

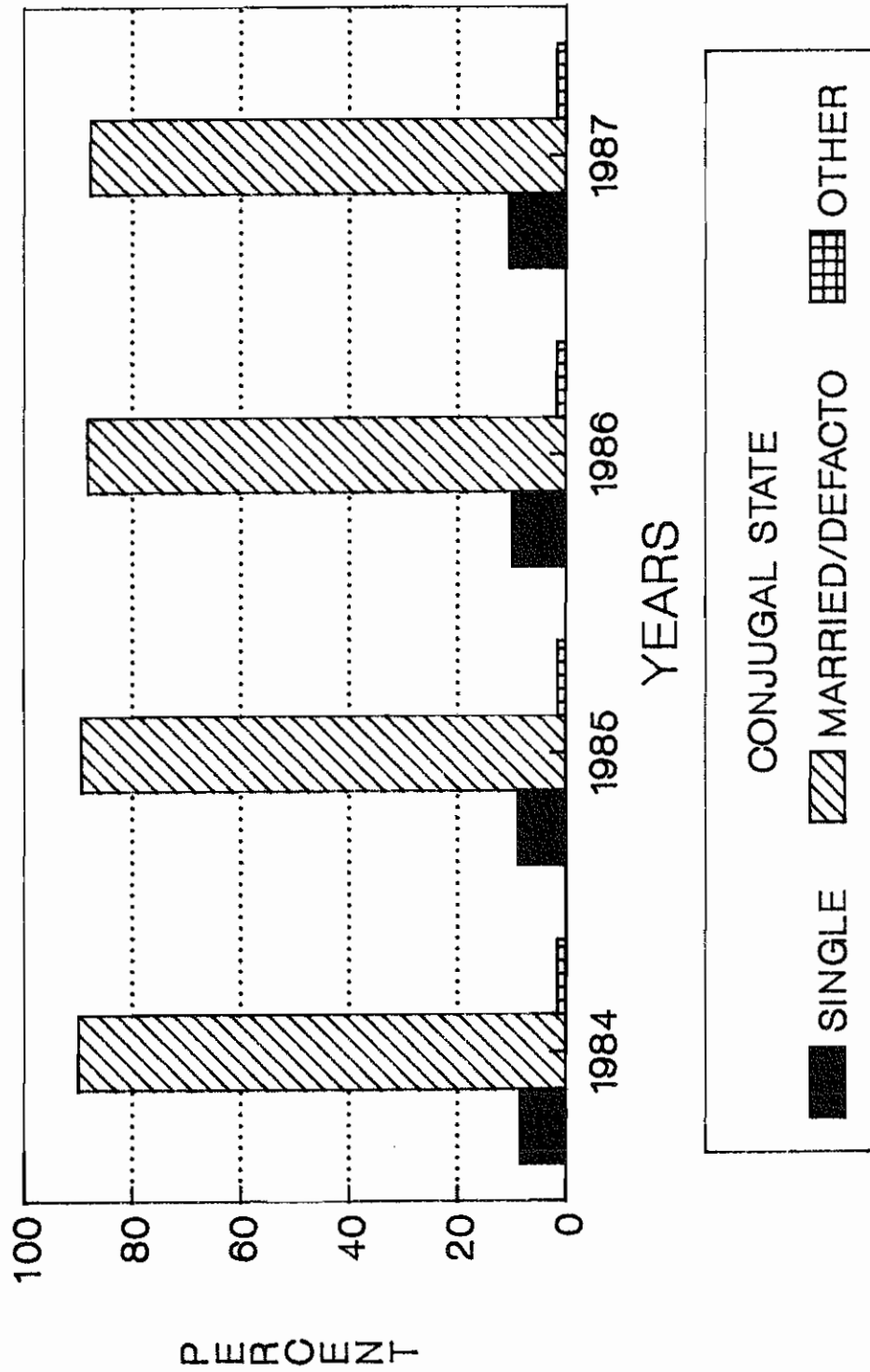
Conjugal State	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
Single	2516	10.7	20	6.7	2536	10.6
Married/defacto	20631	87.6	274	92.0	20905	87.7
Other ¹	391	1.7	4	1.3	395	1.7
Total	23538	100.0	298	100.0	23836	100.0

Excludes births less than 500 grams birthweight.

¹ Other includes separated, divorced and widowed.

CONJUGAL STATE OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1984-87

FIGURE 1:



6.4 Statistical Division of Residence

More than two thirds of all women confined in 1987 lived in the Perth Statistical Division. The numbers of women living in rural areas are given in Table 4. Of those women who had a multiple pregnancy, 71.8% lived in the Perth Statistical Division, 4.0% in the Pilbara, 9.4% in the South West and 4.0% in South Eastern Division. (Table 4, Figure II)

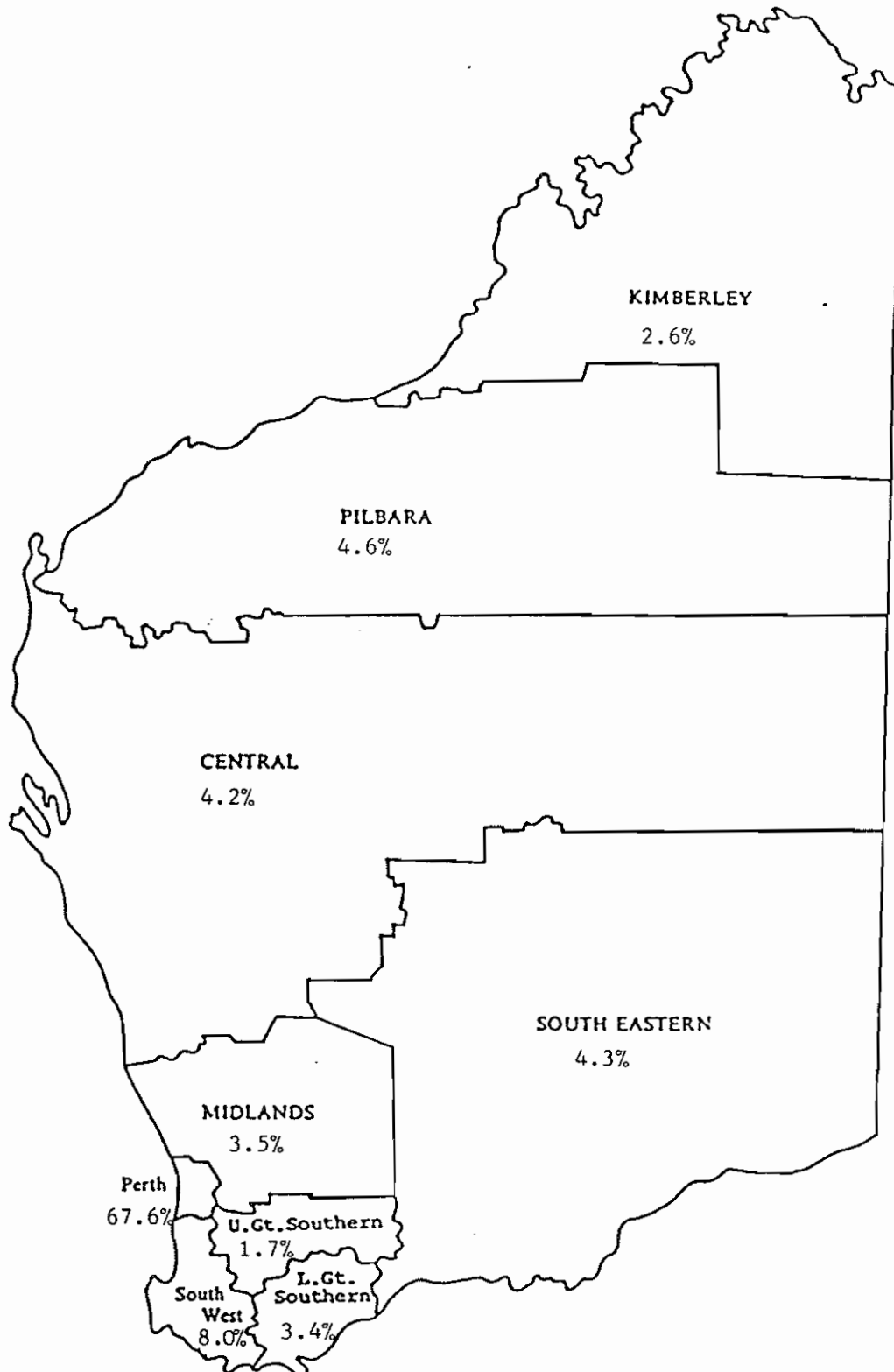
Information on Western Australian women confined during 1987 in other States outside Australia is not included in this report. Confinements in 1987 of twenty three women whose usual place of residence was given as outside Western Australia have been included.

TABLE 4: STATISTICAL DIVISION OF RESIDENCE AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Statistical Division of Residence	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
Perth	15899	67.5	214	71.8	16113	67.6
South West	1886	8.0	28	9.4	1914	8.0
Lower Great Southern	808	3.4	6	2.1	814	3.4
Upper Great Southern	387	1.6	5	1.7	392	1.7
Midlands	833	3.5	9	3.0	842	3.5
South Eastern	1003	4.3	12	4.0	1015	4.3
Central	1000	4.2	7	2.3	1007	4.2
Pilbara	1085	4.6	12	4.0	1097	4.6
Kimberley	616	2.6	5	1.7	621	2.6
Outside W.A.	23	0.1	0	0.0	23	0.1
Total	23538	100.0	298	100.0	23836	100.0

Excludes births less than 500 grams birthweight.

STATISTICAL DIVISION OF RESIDENCE OF WOMEN CONFINED
IN WESTERN AUSTRALIA, 1987



Excludes births less than 500 grams birthweight and those 23 mothers resident outside Western Australia
Source: Midwives' Notification System.

6.5 Place of Confinement

During 1987 there were 24,138 total births in Western Australia. Of these, 99.1% occurred in metropolitan or country hospitals. Non-hospital births included 63 babies born before arrival at hospital (BBA) and 144 babies born at home as planned.

Seventy three percent of total births were in metropolitan hospitals. This included 19.6% occurring in a metropolitan obstetric teaching hospital, 26.8% in metropolitan departmental (Government) hospitals and 27.2% in private metropolitan hospitals. The majority (87.7%) of the multiple births in 1987 occurred in metropolitan hospitals, with 48.5% being delivered in a teaching hospital. (Table 5, Figure III)

TABLE 5: PLACE OF CONFINEMENT AND PLURALITY OF BIRTHS IN WESTERN AUSTRALIA, 1987

Place of Birth	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
<u>Metropolitan</u>						
¹ Teaching	4437	19.0	291	48.5	4728	19.6
Department	6384	27.1	91	15.2	6475	26.8
Private	6435	27.3	144	24.0	6579	27.2
<u>Country</u>						
² Regional	2907	12.3	51	8.5	2958	12.2
Private	538	2.3	8	1.3	546	2.3
³ Other	2631	11.2	14	2.3	2645	11.0
<u>Non-Hospital</u>						
Home Births	144	0.6	-	-	144	0.6
⁴ BBA	62	0.3	1	0.2	63	0.3
Total	23538	100.0	600	100.0	24138	100.0

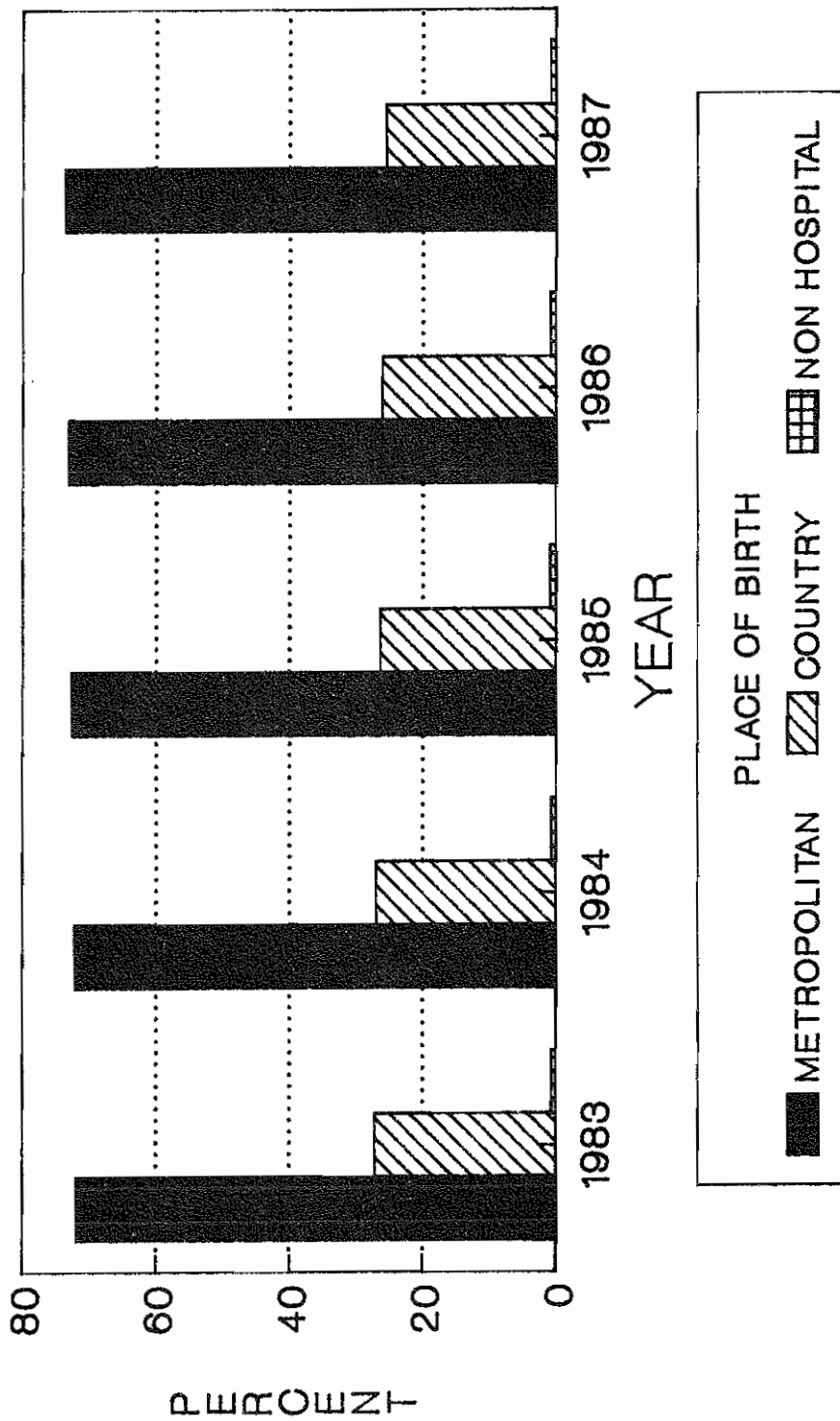
Excludes births less than 500 grams birthweight.

- 1 Teaching Hospital - University Medical School (Teaching Hospital Act 1955).
- 2 Country Regional Hospital - Government Hospital with private and public beds.
- 3 Other Country Hospital - includes Government and Board Hospitals.
- 4 BBA (born before arrival at hospital)

Homebirths decreased by 17% from the previous twelve months and represented 0.6% of the total births. (Table 6, Figure IV)

PLACE OF CONFINEMENT BIRTHS IN W.A. 1983-1987

FIGURE III



HOME BIRTHS IN WESTERN AUSTRALIA 1980-1987

FIGURE IV

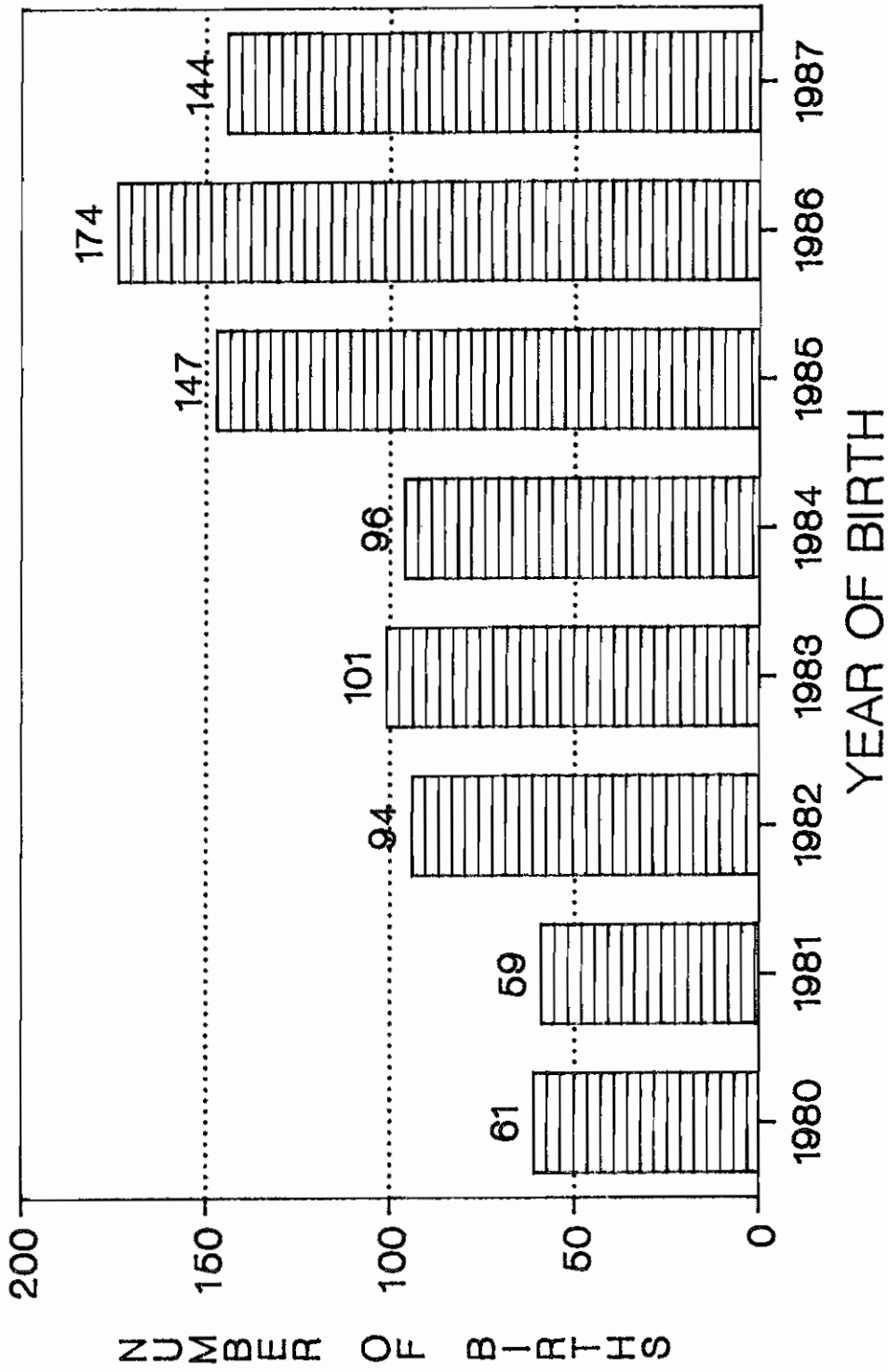


TABLE 6: HOMEBIRTHS IN WESTERN AUSTRALIA 1980-1987

Year	No. ¹	% of Total Births in W.A.
1980	61	0.3
1981	59	0.3
1982	94	0.4
1983	101	0.4
1984	96	0.4
1985	147	0.6
1986	174	0.7
1987	144	0.6

¹ Excludes planned homebirths transferred either antepartum or intrapartum to hospital.

In 1987 there were 29 women who had planned a homebirth but because of complications were either referred or transferred during pregnancy (24.1%) or labour, (75.9%). (Table 7) These women and their babies are included in hospital birth statistics. (Table 7)

TABLE 7: REFERRAL/TRANSFER OF WOMEN WHO PLANNED A HOMEBIRTH IN WESTERN AUSTRALIA IN 1987

Time of Referral/Transfer	No.	%
Antepartum	7	24.1
Intrapartum	22	75.9
Total	29	100.0

Postpartum medical assistance was provided to four other women who had retained placenta and/or perineal lacerations. The babies of two other women were admitted to hospital following homebirth with respiratory disorders.

An epidemiological comparison of home and hospital births in Western Australia is presently being conducted.

7. PREGNANCY PROFILE

7.1 Previous Pregnancies

More than a third of the total women confined in 1987 were confined for the first time. Of those women with a multiple pregnancy, 40.3% were identified as nulliparous. Only 9.8% had a parity of three or more. (Table 8) Mean parity = 1.04 (range 0-11).

TABLE 8: PARITY AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Parity	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
0	9142	38.8	120	40.3	9262	38.9
1 - 2	12089	51.4	148	49.7	12237	51.3
3 - 4	1992	8.5	26	8.7	2018	8.5
> 5	315	1.3	4	1.3	319	1.3
Total	23538	100.0	298	100.0	23836	100.0

Excludes births less than 500 grams birthweight.

Of the 9262 nulliparous women, 1492 (16.1%) were identified as teenagers (19 years or less), 82.7% were aged 20 to 34 years. Amongst the 219 women aged forty or more, 36 were having their first baby. There were three teenagers who had a parity of five or more. (Table 9)

Teenage mothers were 80% nulliparous and 20% with a parity of 1-2. Women aged 40 years or more were 16.4% nulliparous, 44.7% with parity of 1-2, 21.9% with parity 3-4 and 40% with parity of 5 or more.

TABLE 9: PARITY AND AGE OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Maternal Age	Parity								Total	
	0		1 - 2		3 - 4		> 5		No.	%
	No.	%	No.	%	No.	%	No.	%		
< 14	19	-	-	-	-	-	-	-	19	0.1
15 - 19	1171	4.9	299	1.2	3	-	-	-	1473	100.0
20 - 24	3002	12.6	2495	10.5	158	0.7	10	-	5665	23.8
25 - 29	3445	14.5	5144	21.6	673	2.8	58	0.2	9320	39.1
30 - 34	1286	5.4	3366	14.1	789	3.3	122	0.5	5563	23.3
35 - 39	303	1.3	833	3.5	343	1.4	88	0.4	1567	6.6
40 - 44	36	0.1	98	0.4	48	0.2	37	0.2	219	0.9
> 45	-	-	2	-	-	40.0	-	-	10	-
Total	9262	38.8	12237	51.3	2018	8.5	319	1.3	23836	100.0

Excludes births less than 500 grams birthweight.

When maternal age was examined for primigravid women confined during 1983-1987, no obvious change in age of women having their first pregnancies was discernible. (Table 10, Figure V)

Aboriginal women had a much higher parity than non-aboriginal women. (Table 11) Almost 40% of caucasian women and those of "other" races were experiencing their first baby compared with only 30% for aboriginal women.

TABLE 11: PARITY AND RACE OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Parity	Race						Total	
	Caucasian		Aboriginal		Other		No.	%
	No.	%	No.	%	No.	%		
0	8352	39.4	398	29.9	512	39.7	9262	38.9
1 - 2	11012	51.9	545	41.0	680	52.6	12237	51.3
3 - 4	1662	7.8	276	20.8	80	6.2	2018	8.5
> 5	190	0.9	110	8.3	19	1.5	319	1.3
Total	21216	100.0	1329	100.0	1291	100.0	23836	100.0

Excludes births less than 500 grams birthweight.

MATERNAL AGE OF PRIMIGRAVID WOMEN CONFINED IN WESTERN AUSTRALIA 1980-1987

FIGURE V

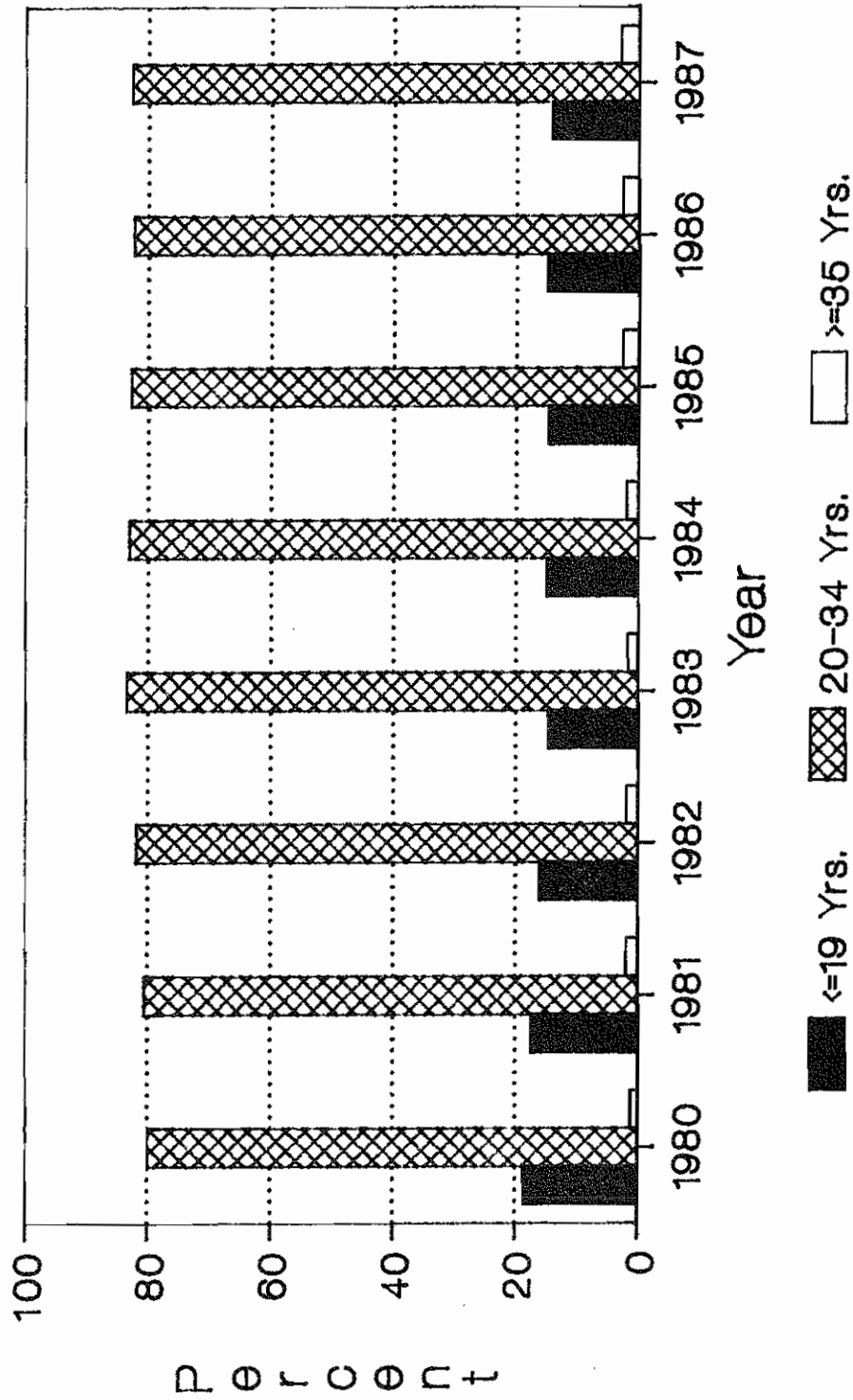


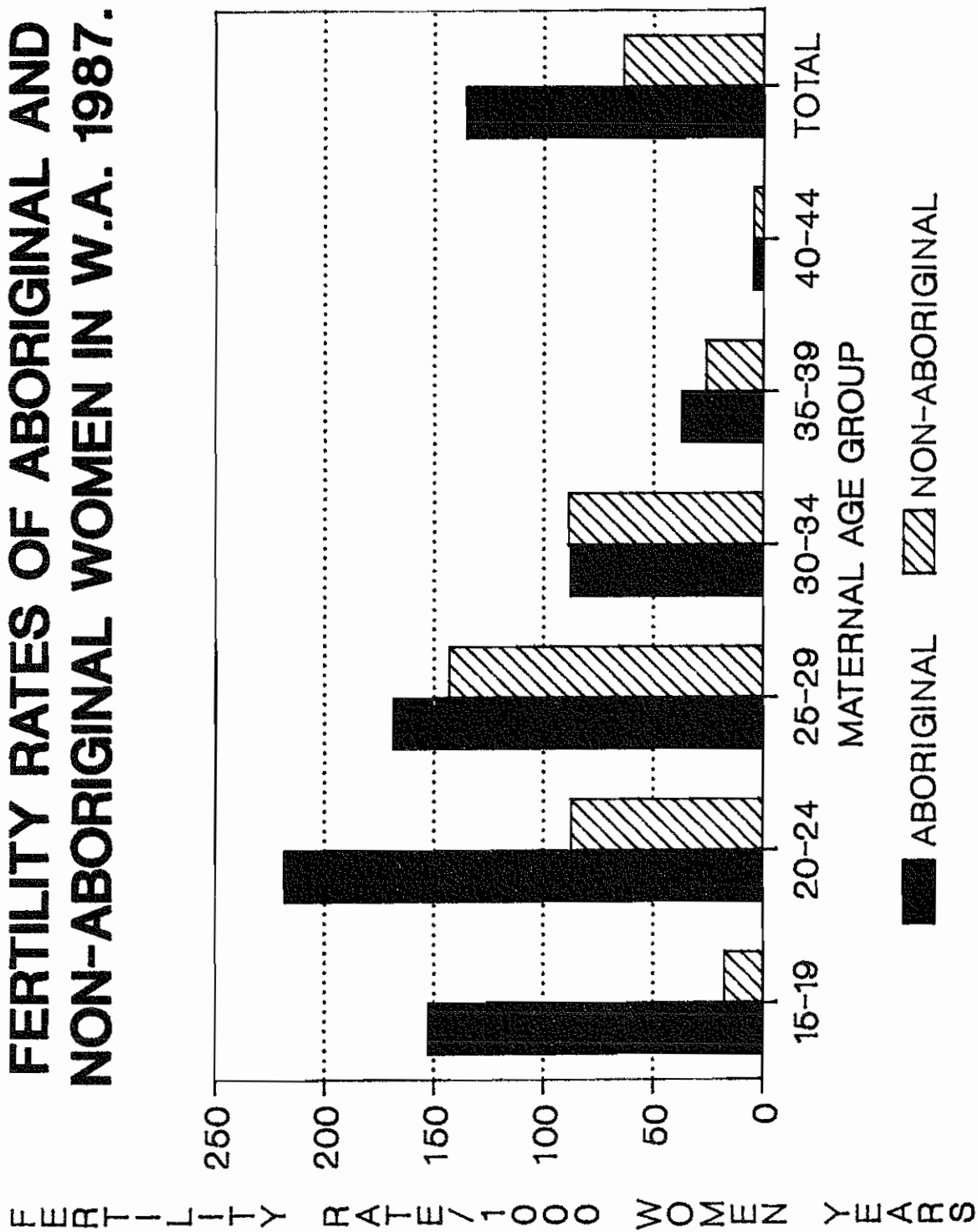
TABLE 10: AGE OF PRIMIGRAVID WOMEN CONFINED IN WESTERN AUSTRALIA 1983 - 1987

Maternal Age	Year of Confinement									
	1983		1984		1985		1986		1987	
	No.	%	No.	%	No.	%	No.	%	No.	%
< 15	22	0.3	12	0.2	24	0.4	21	0.3	19	0.3
15	44	0.6	41	0.6	45	0.7	54	0.8	54	0.8
16	129	1.8	138	2.0	131	1.9	143	2.0	115	1.6
17	239	3.4	227	3.3	210	3.1	232	3.3	206	3.0
18	267	3.8	279	4.1	248	3.7	261	3.7	283	4.0
19	349	4.9	327	4.8	331	4.9	339	4.8	319	4.5
20	413	5.8	374	5.5	366	5.4	363	5.2	351	5.0
21	561	7.9	475	7.0	465	6.9	407	5.8	395	5.6
22	632	8.9	549	8.1	526	7.8	508	7.2	437	6.2
23	598	8.4	576	8.5	567	8.4	547	7.8	562	8.0
24	651	9.2	601	8.9	544	8.0	577	8.2	564	8.1
25	663	9.3	577	8.5	592	8.7	604	8.6	611	8.7
26	551	7.8	587	8.7	549	8.1	584	8.3	588	8.4
27	453	6.4	473	7.0	510	7.5	560	8.0	526	7.5
28	410	5.8	404	6.0	398	5.9	438	6.2	440	6.3
29	339	4.8	336	5.0	334	4.9	370	5.3	411	6.0
30	219	3.1	222	3.3	253	3.7	255	3.6	319	4.5
31	178	2.5	158	2.3	210	3.1	222	3.2	232	3.3
32	113	1.6	138	2.0	134	2.0	144	2.0	153	2.2
33	90	1.3	89	1.3	92	1.4	115	1.6	119	1.7
34	61	0.9	68	1.0	71	1.0	88	1.3	84	1.2
35	48	0.7	53	0.8	75	1.1	72	1.0	54	0.8
36	30	0.4	23	0.3	50	0.7	52	0.7	59	0.9
37	18	0.3	17	0.3	24	0.4	26	0.4	43	0.6
38	12	0.2	15	0.2	10	0.1	20	0.3	23	0.3
39	11	0.2	11	0.2	6	0.1	14	0.2	15	0.2
40	1	0.0	6	0.1	7	0.1	3	0.0	15	0.2
> 40	6	0.1	7	0.1	6	0.1	8	0.1	6	0.1
Total	7108	100.0	6783	100.0	6778	100.0	7027	100.0	7003	100.0

Excludes births less than 500 grams birthweight.

FIGURE VI

FERTILITY RATES OF ABORIGINAL AND NON-ABORIGINAL WOMEN IN W.A. 1987.



7.2 Fertility Rates

Age-specific fertility rates in the Aboriginal and non-Aboriginal sub-populations and the total population are shown in Table 12. The population estimates used for non-Aboriginals were projections from the 1986 census data and for Aboriginals were calculated according to the method of Hicks³.

Overall, the fertility rate amongst Aboriginals is more than double that of non-Aboriginals. Amongst the 15 to 19 year age group, Aboriginals fertility is eight times greater, but for the 20 to 34 year group it is one and one half times greater. The rates of Aboriginals in the 35 to 44 year age group are more equitable. (Figure VI)

TABLE 12: FERTILITY RATES¹ OF ABORIGINAL, NON-ABORIGINAL AND TOTAL WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Maternal Age	Aboriginal			Non-Aboriginal			Total		
	Births	Population	Fertility Rate ¹	Births	Population	Fertility Rate ¹	Births	Population	Fertility Rate ¹
15 - 19	399	2592	153.9	1085	60817	17.8	1484	63409	23.4
20 - 24	473	2153	219.7	5251	59378	88.4	5724	61531	93.0
25 - 29	295	1732	170.3	9135	63072	144.8	9430	64804	145.5
30 - 34	120	1343	89.3	5525	61357	90.0	5645	62700	90.0
35 - 39	38	1020	37.2	1566	58493	26.8	1604	59513	26.9
40 - 44	4	890	4.5	218	47970	4.5	222	48860	4.5
Total	1329	9730	136.6	22780	351087	64.9	24109	360817	66.8

Excludes births less than 500 grams birthweight

¹ Fertility Rate: Total births/1000 women-years

7.3 Complications of Pregnancy

More than two thirds of all women confined during 1987 were recorded as having no complications of pregnancy.

Pre-eclampsia was reported in 1666 (7.0%) of women. For the 38 (12.7%) women with multiple pregnancy the incidence of complications was almost double that of singleton pregnancies (6.9%). Also there were 580 (2.4%) women recorded as having unspecified hypertension, 181 (0.8%) with anaemia of pregnancy, 439 (1.8%) women had an unspecified genito-urinary tract infection, 211 (0.9%) had retarded fetal growth and 139 (0.6%) showed abnormal glucose tolerance tests. (Table 13)

TABLE 13: SELECTED COMPLICATIONS OF PREGNANCY AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	% 1	No.	% 2		
No Complications	16253	69.0	111	37.2	16364	68.7
<u>Complications</u>						
Threatened Abortion	929	3.9	18	6.0	947	4.0
Urinary Tract Infection	929	3.9	13	4.4	942	4.0
Pre-eclampsia	1628	6.9	38	12.7	1666	7.0
A.P.H. - placenta praevia	167	0.7	3	1.0	170	0.7
- abruptio	192	0.8	3	1.0	195	0.8
- other	599	2.5	11	3.7	610	2.5
Premature Rupture of Membranes	791	3.4	45	15.1	836	3.5
Other	3370	14.3	121	40.6	3491	14.6

Excludes births less than 500 grams birthweight.

1 Percentage of women with a singleton pregnancy.

2 Percentage of women with a multiple pregnancy.

Although it was thought that complications of pregnancy may be under reported by midwives, the validation study undertaken in 1987 showed that they were well reported, except for premature rupture of the membranes (less than 95% accurate). This was due to confusion between definitions of premature and preterm rupture of membranes.⁴

7.4 Medical Conditions

Amongst the 23,836 women confined during 1987, there were 2558 reported instances of pre-existing medical complication. Of these 497 (2.1%) of women confined were reported as asthmatic, 105 (0.4%) as epileptic, 46 (0.2%) as having pre-existing diabetes and 64 (0.3%) with thyroid disorders.

The 1987 Validation Study of the Midwives' Notification System recommended that examples of medical conditions should be listed on the Notification of Case Attended Form 2, to improve ascertainment.⁴ This was also recommended by the recent committee to review the Midwifery Regulations.⁵ This amendment to the form will be considered in the near future.

8. LABOUR AND DELIVERY

8.1 Onset of Labour

The majority (63.2%) of total women confined during 1987 established labour spontaneously. Only 43.3% of women with multiple pregnancy had a spontaneous onset of labour. Augmentation of labour either by oxytocin or artificial rupture of membranes or both occurred in 22.6% of those women who had a spontaneous onset of labour.

Induction of labour occurred for 26% of total women confined. Ninety Three (31.2%) women with multiple pregnancy underwent induction of labour. Of those women who did not establish labour, 10.4% had singleton and 25.5% had multiple pregnancies. (Table 14)

TABLE 14: ONSET OF LABOUR AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Onset of Labour	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
Spontaneous	14933	63.4	129	43.3	15062	63.2
Induced	6156	26.2	93	31.2	6249	26.2
No labour	2449	10.4	76	25.5	2525	10.6
Total	23538	100.0	298	100.0	23836	100.0
Spontaneous/ Augmented	3365	14.3 (22.6) ¹	36	12.1 (27.9) ¹	3401	14.3 (22.6) ¹

Excludes births less than 500 grams birthweight.

¹ Percentage in parentheses is the proportion of women who had augmentation following spontaneous onset of labour.

There were 60 (0.2%) women identified as having had a failed induction of labour during 1987.

From 1981 to 1987 the number of women in Western Australia having an induction of labour has remained around 25-27% of the total confinements. (Table 15)

TABLE 15: INTERVENTION IN LABOUR OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1981-1987

Year	Obstetric Intervention	
	Induction % of women	Spontaneous onset Augmentation % of women
1981	25.7	13.5
1982	24.8	14.3
1983	25.7	14.2
1984	24.6	15.6
1985	25.8	16.6
1986	26.9	18.0
1987	26.2	14.3

Excludes births less than 500 grams birthweight.

Due to the difficulty with definition of induction and augmentation amongst midwives, these data may have been inaccurately recorded over the past few years. The option of augmentation has been removed from the question on onset of labour on the midwives' form from January 1988, and will possibly be included as a separate question with a future review of the form.

8.2 Presentation (singleton births only)

The presentation for the 23,538 singleton births was identified as 22,455 vertex, 924 breech, and 159 "other" presentations. (Table 16)

Cephalic presentations were delivered vaginally in 86% of cases during 1987.

Almost three quarters (72.5%) of total births presenting by the breech were delivered by caesarean section (43.9% elective and 28.6% emergency caesarean section) (Table 16)

TABLE 16: PRESENTATION AND TYPE OF DELIVERY FOR SINGLETON BIRTHS IN WESTERN AUSTRALIA, 1987

Type of Delivery	Presentation						Total	
	Cephalic		Breech		Other		No.	%
	No.	%	No.	%	No.	%		
Normal	14966	66.7	9	1.0	27	17.0	15002	63.8
Vacuum	2010	8.9	-	-	2	1.3	2012	8.5
Forceps	2354	10.5	4	0.4	7	4.4	2365	10.0
Breech Manoeuvre	-	-	243	26.1	-	-	243	1.0
Elective Caesarean	1564	7.0	405	43.9	42	26.4	2011	8.6
Emergency Caesarean	1561	6.9	263	28.6	81	5.9	1905	8.1
Total	22455	100.0	924	100.0	159	100.0	23538	100.0

Excludes births less than 500 grams birthweight.

8.3 Type of Delivery

Less than two thirds of the total woman confined in 1987 had a spontaneous vaginal delivery. Vaginal instrumental deliveries occurred in approximately one in five of the total confinements with 8.5% of women having a vacuum extraction and 10.0% a forcep delivery.

Vaginal forcep deliveries are reduced by 1.2% from 11.4% to 10.2% over the past twelve months.

For those women with a multiple pregnancy, 113 (37.9%) were delivered by caesarean section. Spontaneous vaginal deliveries occurred in 86 (28.8%) multiple pregnancies. (Table 17 Figure VII)

Of the women who were delivered by caesarean section during 1987, 32.3% had had a previous caesarean section delivery.

FIGURE VII

TYPE OF DELIVERY AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987.

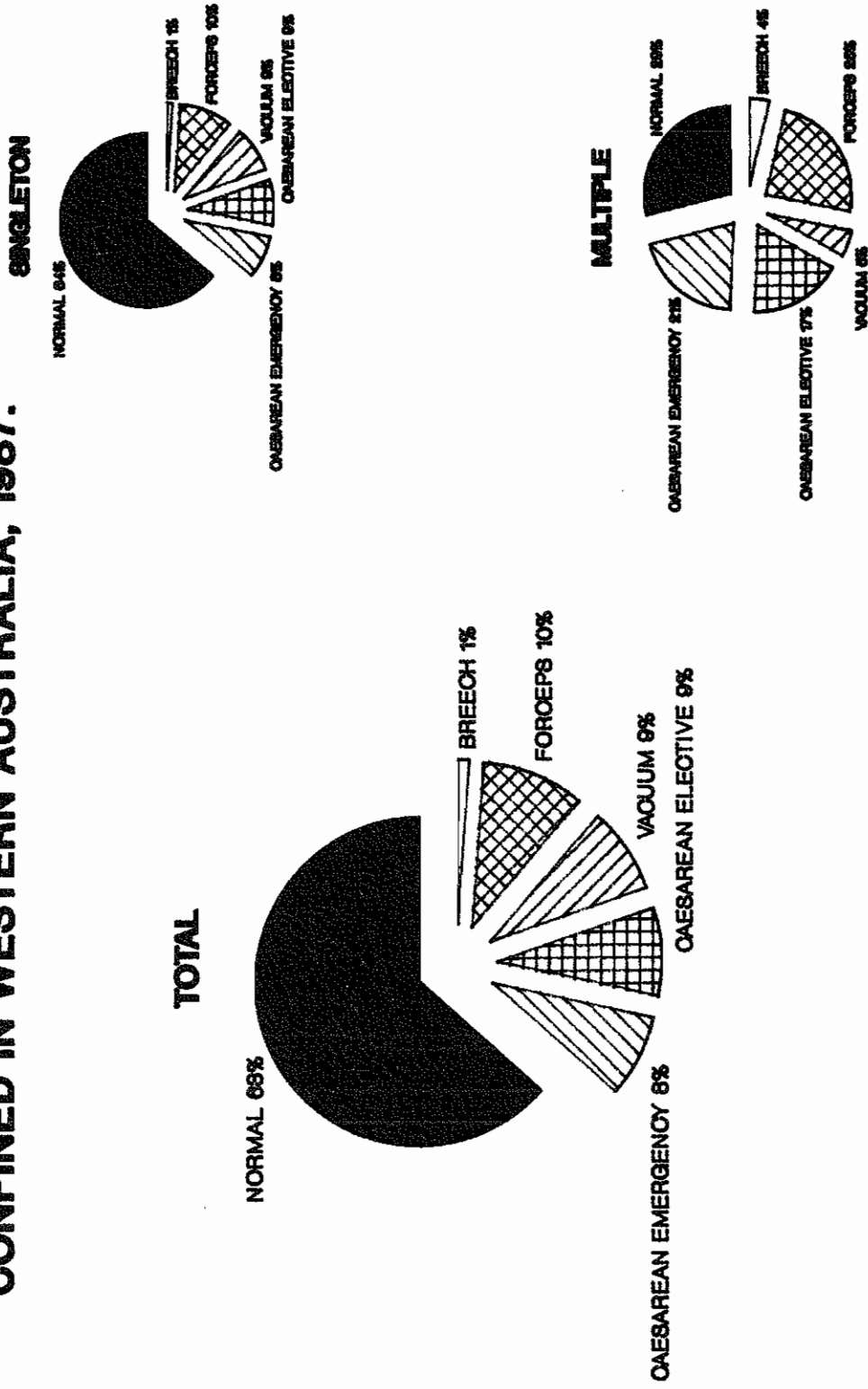


TABLE 17: TYPE OF DELIVERY AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Type of Delivery	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
Normal	15002	63.7	86	28.8	15088	63.3
Vacuum	2012	8.5	15	5.0	2027	8.5
Forceps	2365	10.1	73	24.5	2438	10.2
Breech Manoeuvre	242	1.0	11	3.7	253	1.1
Elective Caesarean	2011	8.5	52	17.4	2063	8.7
Emergency Caesarean	1905	8.1	61	20.5	1966	8.2
*Combined	1	-	-	-	1	-
Total	23538	100.0	298	100.0	23836	100.0

Excludes births less than 500 grams birthweight.

* Singleton delivery, breech presentation, vacuum to breech, breech manoeuvre and forceps to aftercoming head.

The incidence of caesarean section in Western Australia has continued to increase. In 1987, 16.9% of women were delivered by this method. (Table 18, Figure VIII). This increase reflects both national and international trends. Data from South Australia in 1986 reported caesarean section proportions of 19.3%, Victoria in 1986, 16.4%^{7,8} NSW in 1986 15.3% and Tasmania 12.0% in 1986.

TABLE 18: CAESAREAN SECTION IN WOMEN CONFINED IN WESTERN AUSTRALIA, 1975-1987

Year of Delivery	% of all Women
1975	4.8
1976	5.8
1977	6.3
1978	7.1
1979	10.0
1980	11.1
1981	11.7
1982	12.4
1983	13.2
1984	13.9
1985	15.1
1986	15.7
1987	16.9

Excludes births less than 500 grams birthweight.

Of those women confined by caesarean section in Western Australia during 1987, the highest proportion was at metropolitan obstetric teaching and private hospitals. Overall, elective caesarean sections numbered 8.6% births and emergency caesarean sections were 8.2% births. (Table 19)

TABLE 19: PLACE OF CONFINEMENT AND CAESAREAN SECTION CONFINEMENTS IN WESTERN AUSTRALIA, 1987

Place of Birth	Caesarean Section						Total		
	Elective			Emergency			No.	Total	%
	No.	Total Births	%	No.	Total Births	%			
Metropolitan									
Teaching	438	4728	9.3	617	4728	13.0	1055	4728	22.3
Departmental	480	6475	7.4	425	6475	6.6	905	6475	14.0
Private	761	6579	11.6	543	6579	8.2	1304	6579	19.9
Country									
Regional	236	2958	7.8	264	2958	8.9	500	2958	16.9
Private	45	546	8.2	38	546	6.9	83	546	15.2
Other	103	2645	3.9	79	2645	3.0	182	2645	6.9
Total	2063	23931	8.6	1966	23931	8.2	4029	23931	16.9

Excludes births less than 500 grams birthweight.
Excludes 144 homebirths and 63 B.A.A.'s.

Table 20 demonstrates that overall, caesarean section confinements increased proportionately with maternal age. This trend was found in nearly all categories of hospitals.

8.4 Hours of Established Labour

The recorded length of labour varied amongst those women who had a spontaneous onset and those who were induced. Almost half the women who had an induction experienced between one to four hours of labour whereas slightly more than half the women with a spontaneous onset had between five to 12 hours of labour. There were 65 women or 0.3% of the total whose labour was recorded as more than 24 hours duration. (Table 21)

TABLE 20: CAESAREAN SECTION CONFINEMENTS, MATERNAL AGE AND PLACE OF CONFINEMENT IN WESTERN AUSTRALIA, 1987

Maternal Age	Metropolitan				Country				Total												
	Teaching		Private		Regional		Private				Other										
	No. Women	%	No. Women	%	No. Women	%	No. Women	%	No. Women	%	No. Women	%									
< 19	62	404	15.3	43	467	9.2	5	31	16.1	58	365	15.9	4	8	50.0	9	202	4.4	181	1477	12.2
20-34	826	3640	22.7	799	5573	14.3	1155	5937	19.4	405	2403	16.8	74	506	14.6	156	2319	6.7	3415	20378	16.7
> 35	167	536	31.2	63	389	16.2	144	539	26.7	37	165	22.4	5	28	17.8	17	117	14.5	433	1774	24.4
	1055	4580	23.0	905	6429	14.1	1304	6507	20.0	500	2933	17.0	83	542	15.3	182	2638	6.9	4029	23629	17.0

Excludes births less than 500 grams birthweight.
Excludes 144 homebirths and 63 B.A.A.'s.

CAESAREAN SECTIONS IN WESTERN AUSTRALIA 1975-1987

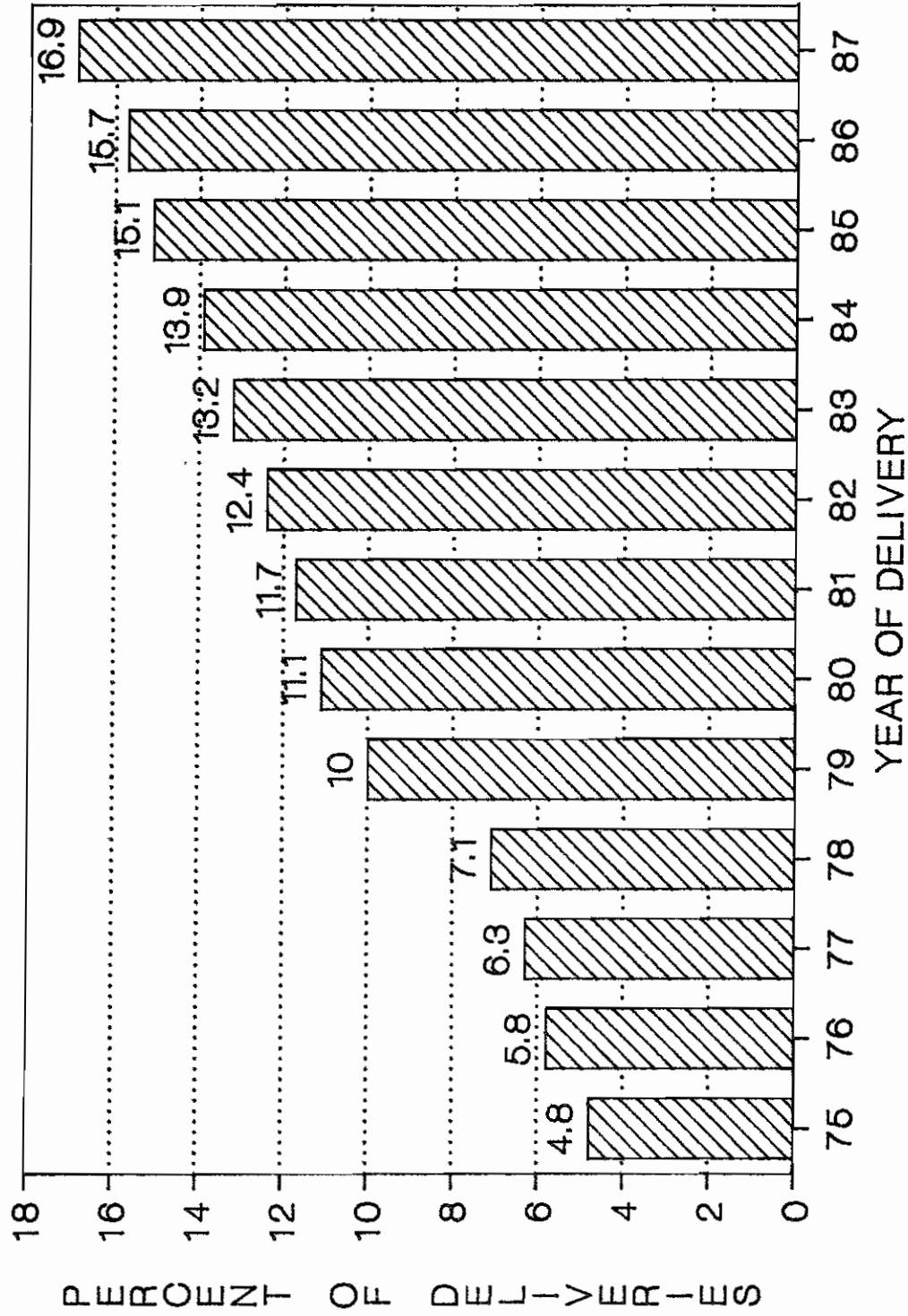


FIGURE VIII

TABLE 21: HOURS OF ESTABLISHED LABOUR BY ONSET OF LABOUR OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

Hours of Labour	Onset of Labour			
	Spontaneous		Induction	
	No.	%	No.	%
1 - 4	5825	38.7	3012	48.3
5 - 12	8009	53.2	3001	48.0
13 - 18	968	6.4	194	3.1
19 - 24	187	1.2	36	0.6
> 24	59	0.4	6	-
Unknown	14	0.1	-	-
Total	15062	100.0	6249	100.0

Excludes births less than 500 grams birthweight, and 2,525 (10.6%) women who did not experience labour.

8.5 Complications of Labour and Delivery

There were no complications of labour or delivery recorded for over half the women confined in 1987. However, only 41.3% of those women with a multiple pregnancy were reported to have no complications.

Of those women identified with a complication, fetal distress was recorded for 13.5% of singleton pregnancies and 8.0% of multiple pregnancies. Cephalopelvic disproportion was identified for 6% of all women confined. (Table 22)

Other complications included; 366 (1.5%) women with hypertension; 46 (0.2%) women with severe pre-eclampsia and three women were recorded as having had an eclamptic fit.

Prolonged first stage of labour was identified in 24 cases, prolonged second stage in 309 (1.3%) women and unspecified prolonged labour occurred in 144 (0.6%) women. Perineal tears were identified as first degree in 93 (0.4%) cases, second degree in 97 (0.4%) cases and 83 (0.3%) women had a third degree tear.

Primary postpartum haemorrhage was recorded for 356 (1.5%) women and retained placenta in 239 (1.0%) women.

These data suggest significant morbidity in child bearing women. Furthermore, the validation study of the midwives data indicated that complications tend to be under-reported.

Attempts to improve the completeness of this information continue with the follow-up system for missing or incomplete information and with the provision of the Guidelines, and ongoing education and feedback to midwives.

TABLE 22: SELECTED COMPLICATIONS OF LABOUR AND DELIVERY AND PLURALITY OF WOMEN CONFINED IN WESTERN AUSTRALIA, 1987

	Plurality				Total	
	Singleton		Multiple		No.	% ³
	No.	% ¹	No.	% ²		
<u>No Complication</u>	12199	51.8	123	41.3	12322	51.7
<u>Complication</u>						
Precipitate Delivery	1309	5.6	13	4.4	1322	5.6
Fetal Distress	3178	13.5	24	8.0	3202	13.4
Prolapsed Cord	72	0.3	5	1.7	77	0.3
Cord Tightly Around Neck	1509	6.4	3	1.0	1512	6.3
Cephalopelvic Disproportion	1414	6.0	9	3.0	1423	6.0
Other	6360	27.0	151	50.7	6511	27.3

Excludes births less than 500 grams birthweight.

1 Percentage of women with a singleton pregnancy.

2 Percentage of women with a multiple pregnancy.

3 Percentage of total women.

9. BABY CHARACTERISTICS

9.1 Births

Notification of Case Attended Form 2 (Appendix 1) were received for 24,138 births of 500 grams birthweight or more.

Singleton births numbered 23,538 (97.5%) and multiple births 600 (2.5%). Multiple births comprised 576 (288 sets) twins and 24 (8 sets) triplets. (Tree Diagram 1).

Since 1980, the proportion of triplet births has increased from 1/1000 to 10/1000 total births. The proportion of twin births has also risen from 19.2/1000 to 23.8/1000 total births.¹⁰ (Table 23)

TABLE 23: PLURALITY OF BIRTHS IN WESTERN AUSTRALIA, 1980 - 1987

Year of Birth	Plurality				Total
	Singleton	Twin	Triplet	Quadruplet	
1980	20380	399	2 ¹	-	20781
1981	21714	464	9	-	22187
1982	21869	458	12	-	22339
1983	22546	464 ²	15	-	23025
1984	22412	487 ³	18	-	22917
1985	22749	515 ⁴	24	-	23288
1986	23290	522	23 ¹	4	23839
1987	23538	576 ⁵	24	-	24138

Excludes births less than 500 grams birthweight

¹ Excludes one triplet less than 500 grams birthweight

² Includes four single twins whose birthweight was 500 grams or more

³ Includes three single twins whose birthweight was 500 grams or more

⁴ Includes one single twin whose birthweight was 500 grams or more.

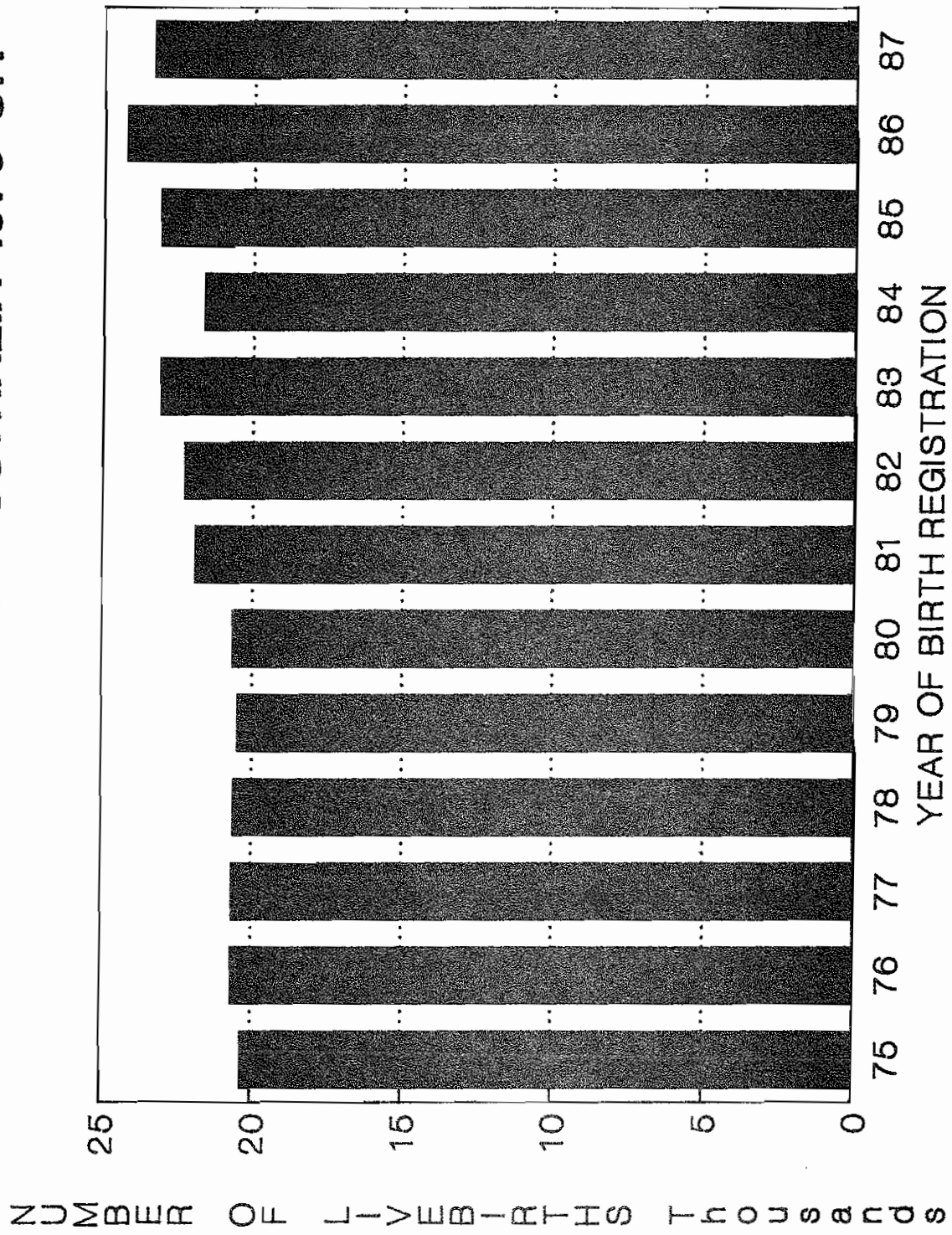
⁵ Includes two single twins whose birthweight was 500 grams or more.

9.2 Livebirths

The Australian Bureau of Statistics records increasing numbers of live births in Western Australia over the past twelve years (Table 24, Figure IX). The crude birthrate has decreased by 12% since 1975. Thus increases in Western Australian population account for rise in birth numbers rather than individual women bearing more children.

FIGURE IX

LIVEBIRTHS IN WESTERN AUSTRALIA 1975-87.



9.3 Crude Birth Rate

The crude birth rate was 15.5/1000 population in 1987. This is based on birth registrations from the Australian Bureau of Statistics and Registrar Generals' Office. (Table 24, Figure X)

TABLE 24: LIVEBIRTHS AND CRUDE BIRTH RATES IN WESTERN AUSTRALIA, 1975-1987

	Livebirths	Population ¹	Birth Rate ² / 1000
1975	20338	1155499	17.6
1976	20670	1178928	17.5
1977	20651	1204454	17.1
1978	20611	1227903	16.8
1979	20469	1246800	16.4
1980	20652	1269270	16.3
1981	21900	1301238	16.8
1982	22261	1336588	16.7
1983	23087	1363890	16.9
1984	21625	1384224	15.6
1985	23109	1407817	16.4
1986	24236	1457992	16.6
1987	23332	1500007	15.5

¹ Mean resident population.

² Livebirths per 1000 total population.

SOURCE: AUSTRALIAN BUREAU OF STATISTICS

9.4 Sex

There were 12,441 male births and 11,694 female births and three babies of indeterminate sex born during 1987. Males represented 51.4% of the total births. The sex ratio was 1.06 males per 1.0 female. (Table 25)

TABLE 25: CONDITION AT BIRTH AND SEX OF BIRTHS IN WESTERN AUSTRALIA, 1987

Sex	Condition at Birth				Total	
	Stillbirth		Livebirth		No.	%
	No.	%	No.	%		
Male	71	52.9	12370	51.5	12441	51.5
Female	60	44.9	11634	48.5	11694	48.5
Indeterminate	3	2.2	-	-	3	-
Total	134	100.0	24004	100.0	24138	100.0

Excludes births less than 500 grams birthweight.

CRUDE BIRTH RATE IN WESTERN AUSTRALIA 1975-1987

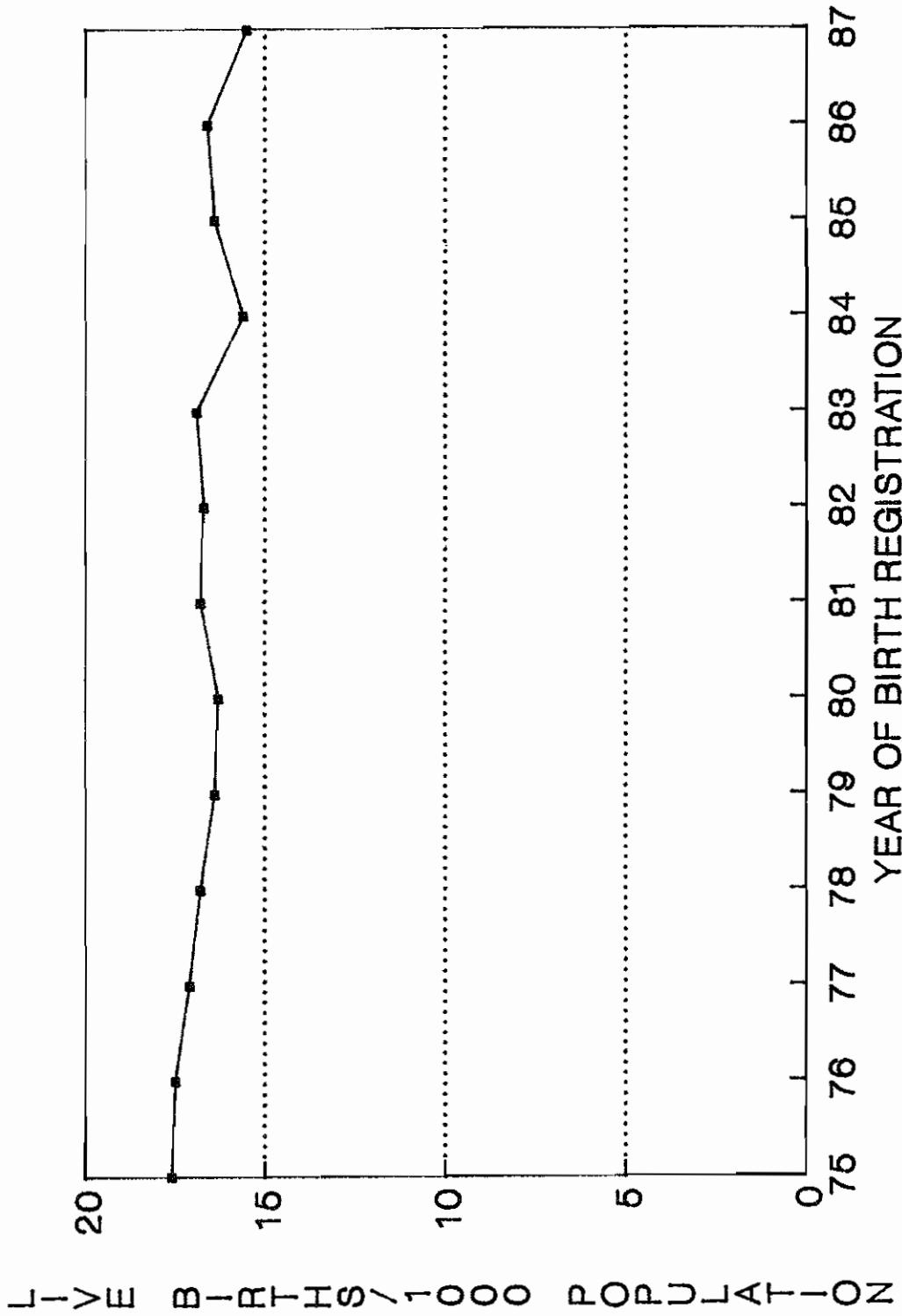


FIGURE X

TABLE 28: APGAR SCORE AT FIVE MINUTES AND TIME TO SPONTANEOUS RESPIRATION OF LIVEBIRTHS IN WESTERN AUSTRALIA, 1987

Apgar Score	Time to Spontaneous Respiration										Intubation ¹		Unknown		Total	
	< 1		2 - 3		4 - 6		7 - 10		> 10							
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1 - 3	7	0.0	2	0.1	2	0.9	8	24.2	1	33.3	63	6.3	0	0.0	83	0.3
4 - 7	244	1.0	153	11.2	83	38.1	22	66.7	2	66.7	396	39.9	0	0.0	900	3.7
8 - 10	21099	99.0	1216	88.7	133	61.0	3	9.1	0	0.0	534	53.8	0	0.0	22985	95.8
Unknown	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	36	100.0	36	0.1
Total	21350	100.0	1371	100.0	218	100.0	33	100.0	3	100.0	993	100.0	36	100.0	24004	100.0

Excludes births less than 500 grams birthweight and also stillbirths.

¹ These babies were intubated at birth and time to spontaneous respiration was not recorded.

9.7 Time to Spontaneous Respiration

Eighty nine percent of all livebirths were recorded as having established spontaneous respiration within the first minute of life. Seven percent of livebirths required two to six minutes to establish respirations and 36 babies (0.1%) took seven minutes or more. There were 993 (4.1%) livebirths who were intubated immediately following delivery. (Table 28)

9.8 Resuscitation

Less than one third (31.5%) of the 24004 liveborn babies in 1987 received some form of resuscitation at birth. Those babies who received no resuscitation numbered 16389 (68.3%). Resuscitation procedures such as intubation or bag and mask were used for 2153 (8.9%) of births and another 5441 (22.5%) babies were given oxygen only.

When resuscitation and Apgar Scores were examined it was found that 77.8% of the babies with an Apgar Score of 1-3 and 44% of those with an Apgar Score of 4-7 were intubated. (Table 29)

TABLE 29: RESUSCITATION METHODS AND APGAR SCORE AT FIVE MINUTES OF LIVEBIRTHS IN WESTERN AUSTRALIA, 1987

Resuscitation	Apgar Score at 5 Minutes								Unknown		Total	
	0		1 - 3		4 - 7		8 - 10		No.	%	No.	%
	No.	%	No.	%	No.	%	No.	%				
None	-	-	4	4.0	54	6.0	16331	71.0	0	0.0	16389	18.3
Oxygen Only	-	-	1	1.2	249	27.7	5191	22.6	0	0.0	5441	22.7
Intubation	13	100.0	63	77.8	396	44.0	534	2.3	0	0.0	1006	4.2
Bag and Mask	0	0.0	6	7.4	113	12.5	322	1.4	0	0.0	441	1.8
Other	0	0.0	7	8.6	88	9.8	607	2.6	0	0.0	702	2.9
Unknown	0	0.0	0	0.0	0	0.0	0	0.0	25	100.0	25	0.1
Total	13	100.0	81	100.0	900	100.0	22985	100.0	25	100.0	24004	100.0

Excludes births less than 500 grams birthweight and 134 stillbirths.

9.9 Birthweight

Over two thirds (67.6%) of all babies born weighed between 3000 and 3999 grams at birth. The percentage of low birthweight babies (less than 2500 grams) was 6.1% of the total births and 1.1% of very low birthweight (less than 1500 grams).

Low birthweight among Aboriginal births was 10.5%, almost twice that of Caucasian births where only 5.8% were of low birthweight. (Table 30)

TABLE 30: BIRTHWEIGHT DISTRIBUTION AND MATERNAL RACE OF BIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Maternal Race						Total	
	Caucasian		Aboriginal		Other		No.	%
	No.	%	No.	%	No.	%		
500 - 999	118	0.5	12	0.9	4	0.3	134	0.5
1000 - 1499	119	0.5	12	0.9	10	0.8	141	0.6
1500 - 1999	246	1.2	23	1.7	10	0.8	279	1.1
2000 - 2499	773	3.6(5.8)	94	7.0(10.5)	65	5.0(6.9)	932	3.9(6.1)
2500 - 2999	3193	14.9	317	23.6	244	18.7	3754	15.6
3000 - 3499	8025	37.3	482	35.9	557	42.6	9064	37.6
3500 - 3999	6605	30.7	299	22.3	331	25.4	7235	30.0
4000 - 4499	2094	9.7	82	6.1	74	5.7	2250	9.3
> 4500	320	1.5	20	1.5	9	0.7	349	1.4
Total	21493	100.0	1341	100.0	1304	100.0	24138	100.0

Excludes births less than 500 grams birthweight.

¹ Low birthweight percentage

Consideration of condition at birth, birthweight and plurality showed that overall, the livebirth proportion was 99.4% and stillbirth proportion 0.6%. With reference to the 932 (6.1%) low birthweight babies (less than 2500 grams birthweight), the proportions were 823 (93.4%) livebirths and 98 (6.6%) stillbirths. (Table 31.1)

Singleton births showed similar proportions to total births. The low birthweight liveborn babies numbered 1087 (92.7%). (Table 31.2)

For multiple births, there were 585 (97.5%) livebirths and 15 (2.5%) stillbirths. The proportion of liveborn low birthweight babies is less for multiple births (95.8%). (Table 31.3)

When the categories of low birthweight were examined from 1980 to 1987 it was apparent that during this time births less than 1000 grams represented 0.5-0.6% of the total births. For those babies whose birthweight was less than 1500 grams the percentage varied from 1.0% to 1.6% of the total births. Those babies who weighed less than 2500 grams accounted for 5.8% to 6.3% of the total births. (Table 32, Figure XI)

TABLE 31.1: BIRTHWEIGHT DISTRIBUTION AND CONDITION AT BIRTH OF TOTAL BIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Condition at Birth				Total	
	Livebirths		Stillbirths		No.	%
	No.	%	No.	%		
500 - 999	82	0.3	52	0.2	134	0.5
1000 - 1499	127	0.5	14	0.1	141	0.6
1500 - 1999	265	1.0	14	0.1	279	1.1
2000 - 2499	914	3.8	18	0.1	932	3.9 (6.1)
2500 - 2999	3740	15.5	14	0.1	3754	15.6
3000 - 3499	9053	37.6	11	-	9064	37.6
3500 - 3999	7227	30.0	8	-	7235	30.0
4000 - 4499	2248	9.3	2	-	2250	9.3
> 4500	348	1.4	1	-	349	1.4
Total	24004	99.4	134	0.6	24138	100.0

Excludes births less than 500 grams birthweight

TABLE 31.2: SINGLETON BIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Condition at Birth				Total	
	Livebirths		Stillbirths		No.	%
	No.	%	No.	%		
500 - 999	60	0.3	45	0.2	105	0.5
1000 - 1499	98	0.4	14	0.1	112	0.5
1500 - 1999	197	0.8	12	-	209	0.8
2000 - 2499	732	3.1	14	-	746	3.2 (5.0)
2500 - 2999	3535	15.0	12	-	3547	15.0
3000 - 3499	8982	38.2	11	-	8993	38.2
3500 - 3999	7219	30.7	8	-	7227	30.7
4000 - 4499	2248	9.6	2	-	2250	9.6
> 4500	348	1.5	1	-	349	1.5
Total	23419	99.5	119	0.5	23538	100.0

Excludes births less than 500 grams birthweight

TABLE 31.3: MULTIPLE BIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Condition at Birth				Total	
	Livebirths		Stillbirths		No.	%
	No.	%	No.	%		
500 - 999	22	3.7	7	1.2	29	4.9
1000 - 1499	29	4.8	-	-	29	4.8
1500 - 1999	68	11.3	2	0.3	70	11.6
2000 - 2499	182	30.3	4	0.7	186	31.0 (52.7)
2500 - 2999	205	34.2	2	0.3	207	34.5
3000 - 3499	71	11.8	-	-	71	11.8
3500 - 3999	8	1.3	-	-	8	1.3
4000 - 4499	-	-	-	-	-	-
> 4500	-	-	-	-	-	-
Total	585	97.5	15	2.5	600	100.0

Excludes births less than 500 grams birthweight

LOW BIRTHWEIGHT IDENTIFIED FOR TOTAL BIRTHS IN W.A. 1980-1987.

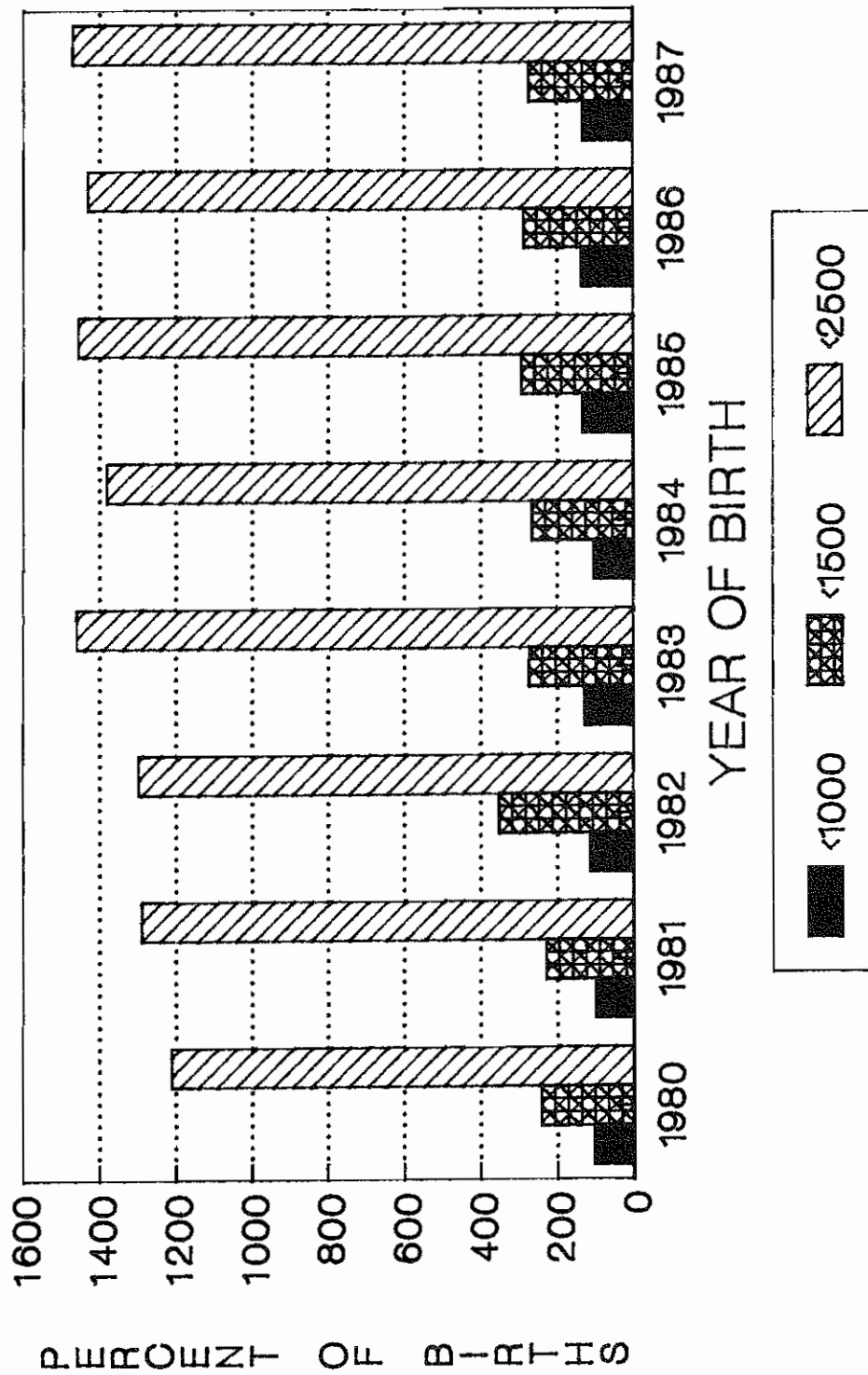


FIGURE XI

TABLE 32: LOW BIRTHWEIGHT¹ CATEGORIES IDENTIFIED AMONGST THE TOTAL BIRTHS IN WESTERN AUSTRALIA, 1980-1987

Year of Birth	Low Birthweight ¹ Categories (grams)						Total
	<1000		<1500		<2500		
	No.	% ²	No.	% ²	No.	% ²	
1980	105	0.5	242	1.2	1212	5.8	20770
1981	101	0.5	230	1.0	1289	5.8	22191
1982	115	0.5	353	1.6	1299	5.8	22343
1983	129	0.6	274	1.2	1461	6.3	23029
1984	105	0.5	266	1.2	1382	6.0	22917
1985	134	0.6	294	1.3	1457	6.3	23288
1986	137	0.6	288	1.2	1431	6.0	23839
1987	134	0.5	274	1.1	1471	6.1	24138

Excludes births less than 500 grams birthweight.

¹ Low birthweight - births less than 2500 grams birthweight.

² Percentages of the total births.

Low birthweight was identified for aboriginal and non-aboriginal births from 1980 to 1987. Although the percentages have been reasonably stable, the aboriginal low birthweight continues to be almost double that of the non-aboriginal babies. (Table 33, Figure XII)

TABLE 33: LOW BIRTHWEIGHT¹ AMONGST ABORIGINAL AND NON-ABORIGINAL BIRTHS IN WESTERN AUSTRALIA, 1980-1987

Year of Birth	Aboriginal			Non-Aboriginal		
	Total Births	LBW ¹ No.	%	Total Births	LBW ¹ No.	%
	1980	1036	130	12.5	19734	1082
1981	1118	146	13.1	21073	1143	5.4
1982	1129	146	12.9	21214	1153	5.4
1983	1149	151	13.1	21880	1310	6.0
1984	1192	157	13.2	21725	1225	5.6
1985	1249	170	13.6	22039	1287	5.8
1986	1246	146	11.7	22593	1285	5.7
1987	1341	141	10.5	22797	1344	5.9

Excludes births less than 500 grams birthweight.

¹ Low birthweight - less than 2500 grams birthweight.

LOW BIRTHWEIGHT IDENTIFIED BY RACE WESTERN AUSTRALIA, 1980-1987.

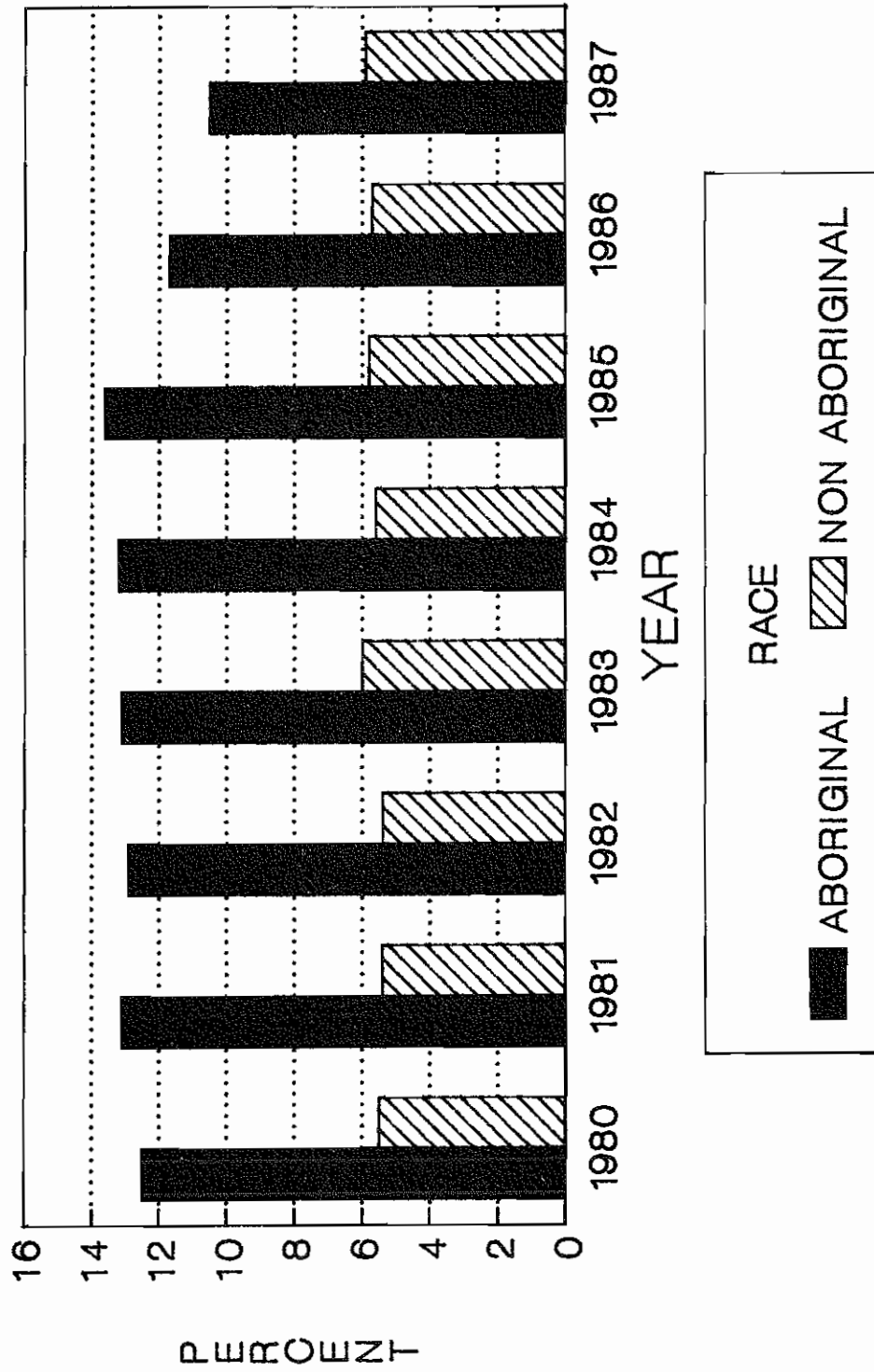


FIGURE XII

9.10 Gestation

Preterm birth (less than 37 weeks gestation) occurred in 1,573 (6.5%) of the total births. (Table 34.1) When examined for singleton births only, 1,305 (5.5%) babies were preterm. (Table 34.2) Of the 600 multiple births, 268 (44.7%) were also preterm. (Table 34.3)

Gestational age was estimated by clinical assessment of each newborn infant by the midwife attending.

9.11 Congenital Malformations

Data on selected congenital malformations included in this report are made available by the Western Australian Congenital Malformations Registry.¹¹ (Table 35)

When a congenital malformation is recorded on the Notification of Case Attended (Midwives') Form 2, it provides the basic data source for the Congenital Malformations Registry.

Reports and further details on congenital malformations in Western Australia are available upon request to the Registry.

TABLE 34.1: GESTATION AND BIRTHWEIGHT OF TOTAL BIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Gestation Weeks										TOTAL			
	< 22		22 - 27		28 - 32		33 - 36		37 - 42		< 43		NO.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
500 - 999	1	100.0	96	86.5	34	14.0	2	0.2	-	-	-	-	133	0.5
1000 - 1499	-	-	13	11.7	94	38.7	30	2.5	4	-	-	-	141	0.6
1500 - 1999	-	-	-	-	83	34.2	164	13.5	32	0.1	-	-	279	1.1
2000 - 2499	-	-	2	1.8	24	9.9	447	36.7	459	2.0	-	-	932	3.9
2500 - 2999	-	-	-	-	3	1.2	427	35.0	3321	14.7	1	5.5	3752	15.5
3000 - 3499	-	-	-	-	3	1.2	118	9.7	8940	39.9	2	11.1	9063	37.6
3500 - 3999	-	-	-	-	1	0.4	21	1.7	7206	32.0	6	33.3	7234	30.0
4000 - 4499	-	-	-	-	1	0.4	7	0.6	2236	9.9	6	33.3	2250	9.3
> 4500	-	-	-	-	-	-	2	0.2	344	1.5	3	16.7	349	1.4
Total	1	100.0	111	100.0	243	100.0	1218	100.0	22542	100.0	18	100.0	24133	100.0

Excludes 5 singleton births of unknown gestation

TABLE 34.2: GESTATION AND BIRTHWEIGHT OF SINGLETON BIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Gestation Weeks										TOTAL			
	< 22		22 - 27		28 - 32		33 - 36		37 - 42		< 43		NO.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
500 - 999	1	100.0	74	85.0	27	13.6	2	0.2	-	-	-	-	104	0.4
1000 - 1499	-	-	13	14.9	77	38.9	19	1.9	3	-	-	-	112	0.5
1500 - 1999	-	-	-	-	67	33.8	118	11.6	24	0.1	-	-	209	0.9
2000 - 2499	-	-	-	-	19	9.6	359	35.2	368	1.6	-	-	746	3.1
2500 - 2999	-	-	-	-	3	1.5	381	37.4	3160	14.3	1	5.5	3545	15.0
3000 - 3499	-	-	-	-	3	1.5	112	11.0	8875	39.9	2	11.1	8992	38.2
3500 - 3999	-	-	-	-	1	0.5	19	1.9	7200	32.5	6	33.3	7226	30.7
4000 - 4499	-	-	-	-	1	0.5	7	0.7	2236	10.0	6	33.3	2250	9.6
> 4500	-	-	-	-	-	-	2	0.2	344	1.5	3	16.7	349	1.4
Total	1	100.0	87	100.0	198	100.0	1019	100.0	22210	100.0	18	100.0	23533	100.0

Excludes 5 singleton births of unknown gestation

TABLE 34.3: GESTATION AND BIRTHWEIGHT OF MULTIPLE BIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Gestation Weeks										TOTAL			
	< 22		22 - 27		28 - 32		33 - 36		37 - 42		< 43		NO.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
500 - 999	-	-	22	91.7	7	15.5	-	-	-	-	-	-	29	4.8
1000 - 1499	-	-	-	-	17	37.8	11	5.5	1	0.3	-	-	29	4.8
1500 - 1999	-	-	-	-	16	35.5	46	23.1	8	2.4	-	-	70	11.7
2000 - 2499	-	-	2	8.3	5	11.1	88	44.2	91	27.4	-	-	186	31.0
2500 - 2999	-	-	-	-	-	-	46	23.1	161	48.5	-	-	207	34.5
3000 - 3499	-	-	-	-	-	-	6	3.0	65	19.6	-	-	71	11.7
3500 - 3999	-	-	-	-	-	-	2	1.0	6	1.8	-	-	8	1.3
4000 - 4499	-	-	-	-	-	-	-	-	-	-	-	-	-	-
> 4500	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	-	-	24	100.0	45	100.0	199	100.0	332	100.0	-	-	600	100.0

9.12 Birth Trauma

There were very few babies reported with major birth trauma. The most common birth trauma identified was injuries to the scalp (5.8% of all livebirths) and this included cephalhaematoma and chignon from vacuum extraction. "Other" injuries were identified in 53 babies. (Table 36)

TABLE 35: BIRTHS IDENTIFIED WITH CONGENITAL MALFORMATIONS IN WESTERN AUSTRALIA, 1987

Diagnostic Category (and B.P.A. Code)	1985		1986		1987	
	No.	¹ Rate	No.	¹ Rate	No.	¹ Rate
NERVOUS SYSTEM DEFECTS (74000 - 74299)	87	3.1	75	3.1	68	2.8
Neural Tube Defects (74000 - 74209)	53	2.3	44	1.8	45	1.9
Microcephaly (74210)	50	0.5	6		4	
Congenital Hydrocephalus (74230 - 74239) (excludes hydrocephalus associated with N.T.D.)	18	0.7	10		11	
CARDIOVASCULAR DEFECTS (74500 - 74799)	146	6.3	162	6.8	122	5.1
Transposition of Great Vessels (74510 - 74519)	10		14		11	
Tetralogy of Fallot (74520)	7		10		1	
Ventricular Septal Defect (74540 - 74549)	78	3.3	75	3.7	71	2.9
Atrial Septal Defect (74550 - 74559)	30	1.3	30	1.3	14	
Hypoplastic Left Heart Syndrome (74670)	3		5		1	
Patent Ductus Arteriosus (74700)	30	1.3	29	1.2	21	0.9
Coarctation of Aorta (74710 - 74719)	20	0.8	14		10	
RESPIRATORY SYSTEM DEFECTS (74800 - 74899)	26	1.1	32	1.3	21	0.9
Hypoplasia/Dysplasia of Lung (74850 - 74858)	17	0.7	20	0.8	16	0.7
GASTRO-INTESTINAL DEFECTS (74900 - 75199)	142	6.1	133	5.6	123	5.1
Cleft Palate Only (74900 - 74909)	16	0.7	15	0.6	10	
Cleft Lip Only (74910 - 74919)	9)	1.5	12)	1.4	9)	1.1
Cleft Lip and Palate (74920 - 74929)	25)		22)		26)	
Tracheo-Oesophageal Fistula, Oesophageal Atresia, Oesophageal Stenosis (75030 - 75038)	4		6		16	0.7
Pyloric Stenosis (75050-75058)	44	1.9	42	1.8	44	1.8
Stenosis/Atresia Anus (75123 - 75124)	9		7		7	
URO-GENITAL DEFECTS (75200 - 75399)	194	8.3	178	7.5	130	5.4
Undescended Testis (treated) (75250 - 75253)	65	2.8	48	2.0	18	0.7
Hypospadias (75260)	73	5.1	72	3.0	75	3.1
Renal Agenesis or Dysgenesis (75300 - 75301)	11		9		6	
Ureteric Reflux (75348)	16		12		8	
MUSCULO-SKELETAL DEFECTS (7540 - 75699)	311	13.3	282	11.8	290	12.0
Congenital Dislocation of Hip (75430 - 75431)	142	6.1	140	5.9	124	5.1
Talipes (75450 - 75473)	50	2.1	52	2.2	47	1.9
Polydactyly (75500 - 75509)	28	1.2	23	1.0	31	1.3
Syndactyly (75510 - 75519)	14		8		17	0.7
Reduction Deformities Upper and/or Lower Limbs (75520 - 75549)	16	0.7	9		14	
Diaphragmatic Hernia (75661)	5		6		10	
Exomphalos (75670)	9		8		7	
Gastroschisis (75671)	4		6		5	
Achondroplasia (75643)	1		0		2	
Osteogenesis Imperfecta (75650)	3		2		1	
CHROMOSOME DEFECTS (75800 - 75899)	47	2.0	46	1.9	48	2.0
Down Syndrome (75800 - 75809)	31	1.3	34	1.4	31	1.3
Trisomy 13 (75810 - 75819)	1		3		5	
Trisomy 18 (75820 - 75829)	3		2		4	
Turner's Syndrome (75860 - 75861, 75869)	1		1		1	
OTHER						
Congenital Rubella (77100)	2		1		1	
Cystic Fibrosis (27700)	8		3		4	
Phenylketonuria (27010)	2		1		1	

¹ Rate per 1000 total births.

Rates have not been calculated where number of cases with defect is less than 15.

SOURCE: CONGENITAL MALFORMATIONS REGISTRY

TABLE 36: BIRTH TRAUMA AMONGST LIVEBIRTHS IN WESTERN AUSTRALIA, 1987

Birth Trauma	No.	% of Livebirths
Subdural and Cerebral Haemorrhage	2	-
Injuries to Scalp	1383	5.8
Fracture of Clavicle	15	0.1
Other Injuries to Skeleton	9	-
Facial Nerve Injury	13	-
Injury to Brachial Plexus	20	0.1
Other	53	0.2

Excludes births less than 500 grams birthweight.

9.13 Special Care

Although there are difficulties relating to the definition and location of special care units in Western Australia, data from the Midwives' system indicating special care have been included to identify the need of services for newborn babies. It is not possible from the current data to differentiate those babies who received neonatal intensive care.

Amongst the 24,004 livebirths, a total of 3,737 (15.6%) babies were reported to have had some special care. Singleton births numbered 3551 and multiple births 186.

More than two thirds of the babies admitted to special care units were there for one day or less. Only 4.1% stayed more than 28 days. Multiple births stayed longer in special care units, with 54.3% staying 8 days or more. (Table 37)

TABLE 37: PLURALITY AND LENGTH OF STAY IN SPECIAL CARE OF LIVEBIRTHS IN WESTERN AUSTRALIA, 1987

Length of Stay (days)	Plurality				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%		
< 1	1987	56.0	19	10.2	2006	53.7
1	476	13.4	20	10.7	496	13.3
2	253	7.1	5	2.7	258	6.9
3	153	4.3	8	4.3	161	4.3
4	142	4.0	18	9.7	160	4.3
5	82	2.3	7	3.8	89	2.4
6	75	2.1	4	2.1	79	2.1
7	47	1.3	4	2.1	51	1.4
8 - 14	106	3.0	33	17.8	139	3.7
15 - 20	63	1.8	8	4.3	71	1.9
21 - 28	48	1.3	24	12.9	72	1.9
> 28	119	3.3	36	19.3	155	4.1
Total	3551	100.0	186	100.0	3737	100.0

Excludes births less than 500 grams birthweight.

9.14 Neonatal Transfers

These data include emergency inter-hospital transfers to special care units immediately following birth and those babies who were transferred to another hospital prior to being discharged home.

Of the 24,004 livebirths, 955 (4.0%) babies were transferred to another hospital after birth.

9.15 Length of Stay

The majority of babies (78.6%) stayed in their hospital of birth from two to seven days and another 4,421 (18.4%) stayed eight or more days. One hundred and seventy three babies stayed more than 28 days. (Table 38.1)

TABLE 38.1: LENGTH OF STAY BY BIRTHWEIGHT DISTRIBUTION OF LIVEBIRTHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Length of Stay (Days)										Total			
	< 1		2 - 7		8 - 14		15 - 20		21 - 28		> 28		No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
500 - 999	33	4.6	4	0.0	2	0.0	0	0.0	1	0.9	42	24.3	82	0.3
1000 - 1499	19	2.6	4	0.0	5	0.1	3	1.6	17	16.7	79	45.7	127	0.5
1500 - 1999	26	3.6	21	0.1	79	2.0	51	28.2	55	54.0	33	19.0	265	1.1
2000 - 2499	49	6.8	431	2.3	357	9.0	53	29.3	17	16.7	7	4.0	914	3.8
2500 - 2999	133	18.4	2815	14.9	757	19.1	30	16.6	3	2.9	2	1.1	3740	15.6
3000 - 3499	237	33.0	7456	39.5	1331	33.6	20	11.0	3	2.9	6	3.5	9053	37.7
3500 - 3999	160	22.2	6075	32.2	969	24.4	17	9.4	4	3.9	2	1.1	7227	30.1
4000 - 4499	54	7.5	1787	9.5	398	10.0	6	3.3	2	2.0	1	0.6	2248	9.4
> 4500	9	1.2	270	1.4	67	1.7	1	0.5	0	0.0	1	0.6	348	1.4
Total	720	100.0	18863	100.00	3965	100.00	181	100.00	102	100.00	173	100.00	24004	100.00

Excludes births less than 500 grams birthweight
Includes 144 homebirths in midwives' care

There were 955 inter-hospital transfers and 75 neonatal deaths in the hospital of birth. Table 38.2 shows the length of stay of babies who were neither transferred nor died in the hospital of birth. The overall length of hospital stay following a baby's transfer from the hospital of birth is not recorded on midwives data.

TABLE 38.2: LENGTH OF STAY BY BIRTHWEIGHT DISTRIBUTION OF SURVIVING LIVEBIRTHS¹ IN W.A. 1987

Birthweight (Grams)	Length of Stay (Days)										Total			
	< 1		2 - 7		8 - 14		15 - 20		21 - 28		> 28		No.	%
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
500 - 999	-	-	-	-	1	-	-	-	-	-	25	19.7	26	0.1
1000 - 1499	-	-	-	-	2	-	-	-	8	11.1	58	45.7	68	0.3
1500 - 1999	-	-	10	-	55	1.4	34	22.5	41	56.9	30	23.6	170	1.7
2000 - 2499	2	0.7	394	2.1	337	8.7	50	33.1	15	20.8	5	3.9	803	3.5
2500 - 2999	42	15.2	2731	14.8	742	19.1	27	17.9	2	2.8	2	1.6	3546	15.4
3000 - 3499	113	40.8	7319	39.6	1320	34.0	18	11.9	2	2.8	4	3.1	8776	38.3
3500 - 3999	93	33.6	5982	32.5	964	24.8	16	10.6	3	4.2	1	0.8	7059	30.7
4000 - 4499	26	9.4	1762	9.5	396	10.2	5	3.3	1	1.4	1	0.8	2191	9.5
> 4500	1	0.3	265	1.4	67	1.7	1	0.7	-	-	1	0.8	335	1.4
Total	277	100.0	18463	100.0	3884	100.0	151	100.0	72	100.0	127	100.0	22974	100.0

Excludes births less than 500 grams birthweight
Includes 144 home births in midwives' care
¹ Excludes 955 babies requiring interhospital transfer

9.16 Perinatal Mortality

There were 134 stillbirths and 103 neonatal deaths during 1987. The perinatal mortality proportion for Western Australia was 9.8/1000 total births.

Perinatal mortality calculations in this report are based on the year of birth cohort, whereas prior to 1984 they were based on the year of death. (Table 39, Figure XIII)

TABLE 39: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY PROPORTIONS IN WESTERN AUSTRALIA, 1980-1987

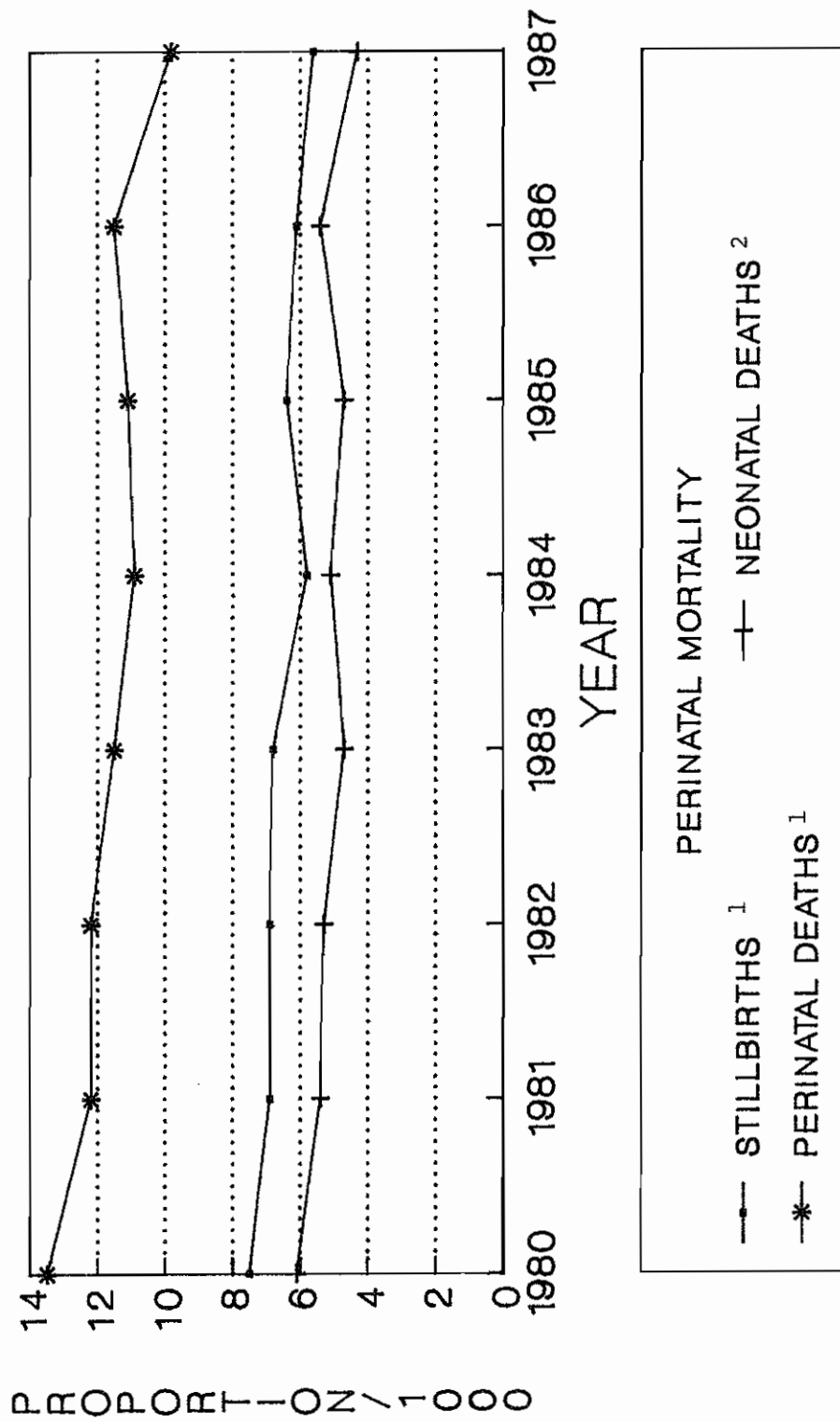
Year	Perinatal Mortality					
	Stillbirths		Neonatal Deaths		Total	
	No.	Proportion/ 1000 Total Births	No.	Proportion/ 1000 Live Births	No.	Proportion/ 1000 Total Births
1980	155	7.5	125	6.1	280	13.5
1981	153	6.9	118	5.4	271	12.2
1982	155	6.9	118	5.3	273	12.2
1983	157	6.8	108	4.7	265	11.5
1984 ¹	134	5.8	116	5.1	250	10.9
1985 ¹	150	6.4	109	4.7	259	11.1
1986 ¹	146	6.1	129	5.4	275	11.5
1987 ¹	134	5.6	103	4.3	237	9.8

Excludes births less than 500 grams birthweight.

¹ Data based on year of birth.

Tables 40 and 41 give perinatal mortality proportions of birthweight and gestation criteria using World Health Organization definitions. Aboriginal stillbirth, neonatal and perinatal mortality proportions are double those of non-aboriginal births. (Table 43, Figure XIV)

PERINATAL MORTALITY PROPORTIONS IN WESTERN AUSTRALIA 1980-1987.



¹ Stillbirths and Perinatal Deaths/1000 Total Births
² Neonatal Deaths/1000 Livebirths
 Note: 1980-1983 data based on year of death.
 1984-1986 data based on year of birth.

FIGURE XIV

PERINATAL MORTALITY IN WESTERN AUSTRALIA ETHNIC GROUPING OF BIRTHS 1976-1987.

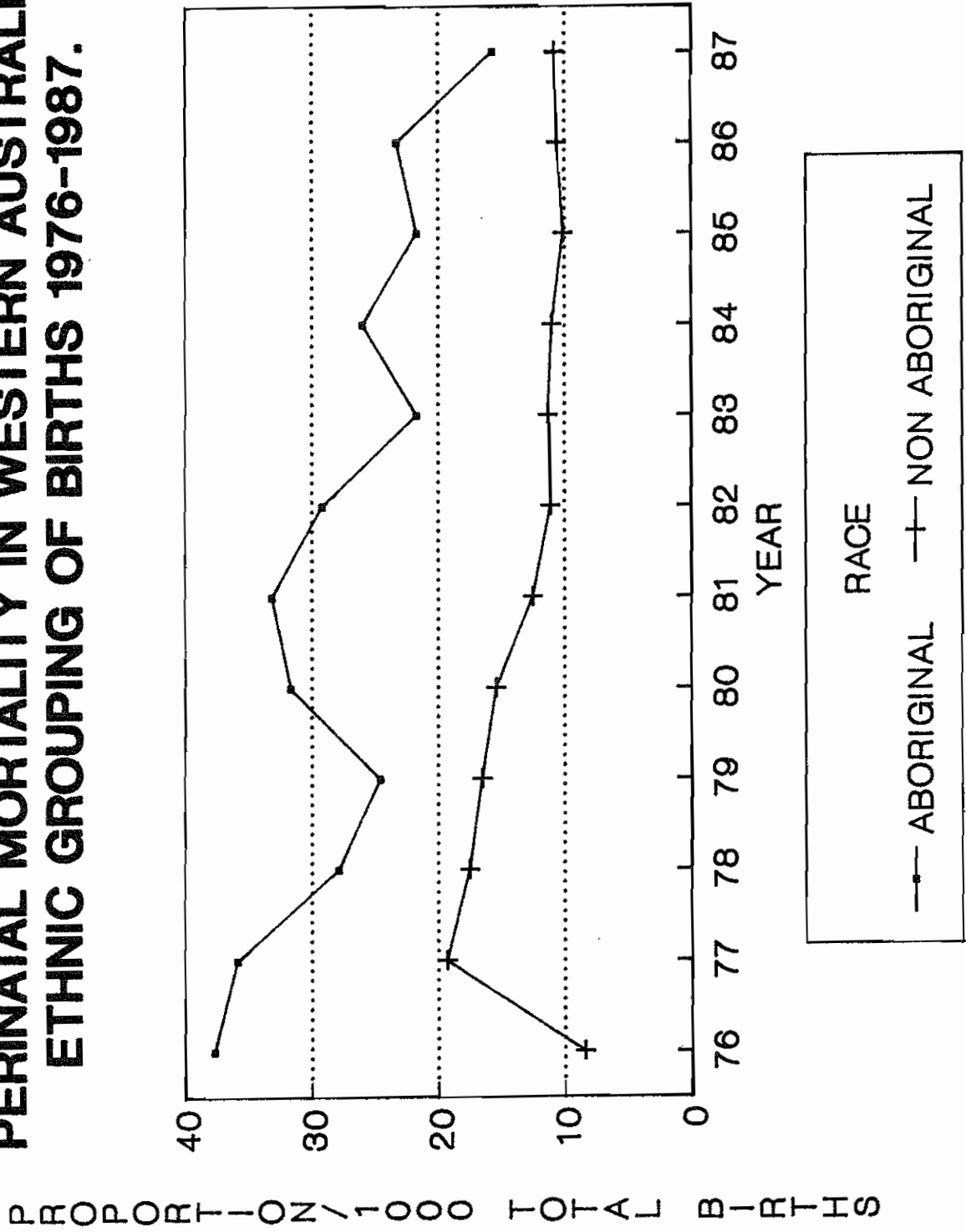


TABLE 40: WESTERN AUSTRALIAN PERINATAL MORTALITY USING BIRTHWEIGHT CRITERIA, 1987

Birthweight	Stillbirth Proportion/ 1000 Total Births	Neonatal Death Proportion/ 1000 Livebirths	Perinatal Death Proportion/ 1000 Total Births
> 400 grams	6.6	4.9	11.1
> 500 grams International Definition of World Health Organisation	5.5	4.3	9.8

TABLE 41: WESTERN AUSTRALIAN PERINATAL MORTALITY USING GESTATION CRITERIA, 1987

Gestation	Stillbirth Proportion/ 1000 Total Births	Neonatal Death Proportion/ 1000 Livebirths	Perinatal Death Proportion/ 1000 Total Births
> 20 weeks	8.8	4.7	12.5
> 22 weeks National Definition of World Health Organisation	6.8	4.5	11.3

SOURCE: MIDWIVES' NOTIFICATION SYSTEM
HOSPITAL MORBIDITY SYSTEM
COMMUNITY AND CHILD HEALTH SYSTEM
REGISTRAR GENERAL'S OFFICE
AUSTRALIAN BUREAU OF STATISTICS

TABLE 42: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY PROPORTIONS BY MATERNAL RACE IN WESTERN AUSTRALIA, 1987

Type of Death	Maternal Race			Total
	Caucasian	Aboriginal	Other	
Stillbirth/ 1000 total births	5.3	9.7	4.6	5.5
Neonatal/ 1000 livebirths	4.1	6.0	4.6	4.3
Perinatal/ 1000 total births	9.5	15.6	9.2	9.8

Excludes births less than 500 grams birthweight.

Data from 1976 to 1987 on stillbirth, neonatal and perinatal mortality proportions in Western Australia shows there has been an overall decline during this decade. Table 42 gives the mortality proportions by race. Aboriginal proportions have declined but remain double the non-aboriginal figures.

TABLE 43: STILLBIRTHS, NEONATAL AND PERINATAL MORTALITY PROPORTIONS BY ABORIGINAL AND NON-ABORIGINAL BIRTHS IN WESTERN AUSTRALIA, 1976-1987

Year	Stillbirth ¹ Proportion		Neonatal Mortality ² Proportion		Perinatal Mortality ¹ Proportion	
	Non- Aboriginal	Aboriginal	Non- Aboriginal	Aboriginal	Non- Aboriginal	Aboriginal
1976	19.3	11.0	18.7	8.4	37.7	19.3
1977	18.0	9.2	18.3	8.4	35.9	17.5
1978	10.2	9.3	17.8	7.3	27.9	16.5
1979	14.2	8.3	10.4	7.1	24.6	15.4
1980	11.5	7.2	20.4	5.3	31.7	12.5
1981	19.7	6.2	13.7	4.9	33.2	11.1
1982	14.2	6.6	15.3	4.8	29.2	11.3
1983	12.2	6.5	9.7	4.4	21.7	11.0
1984	13.4	5.4	11.9	3.5	26.0	10.1
1985	11.2	5.7	10.5	4.4	21.7	10.6
1986	12.8	5.7	10.6	5.2	23.3	10.8
1987	9.7	5.3	6.0	4.2	15.7	9.5

Excludes births less than 500 grams birthweight.

¹ Stillbirth and perinatal mortality proportions/1000 total births.

² Neonatal mortality proportions/1000 livebirths.

More than a third of stillbirths and neonatal deaths had a birthweight less than 1000 grams. Overall, 73% of stillbirths and 69.8% of neonatal deaths weighed less than 2500 grams at birth. (Table 44)

TABLE 44: BIRTHWEIGHT DISTRIBUTION OF STILLBIRTHS, NEONATAL AND PERINATAL DEATHS IN WESTERN AUSTRALIA, 1987

Birthweight (Grams)	Perinatal Deaths				Total	
	Stillbirths		Neonatal Deaths		No.	%
	No.	%	No.	%		
500 - 999	52	30.8	38	36.9	90	38.0
1000 - 1499	14	10.4	10	9.7	24	10.1
1500 - 1999	14	10.4	12	11.6	26	10.8
2000 - 2499	18	13.4	12	11.6	30	12.6
2500 - 2999	14	10.4	13	12.6	27	11.4
3000 - 3499	11	8.2	10	9.7	21	8.9
3500 - 3999	8	6.0	4	3.9	12	5.1
> 4000	3	2.2	4	3.9	7	2.3
Unknown	0	0.0	0	0.0	0	0.0
Total	134	100.0	103	100.0	237	100.0

Excludes births less than 500 grams birthweight.

Amongst the 600 multiple births, there were 27 perinatal deaths. Of these, 15 were stillborn and 12 were neonatal deaths. (Table 45)

The stillbirth proportion for multiple births (25.6%) was five times greater than for singleton births.

The neonatal mortality proportion for multiple births was almost eight times greater than for singleton births.

TABLE 45: PLURALITY OF STILLBIRTHS, NEONATAL AND PERINATAL DEATHS AMONGST BIRTHS IN WESTERN AUSTRALIA, 1987

Plurality	Perinatal Mortality				Total	
	Stillbirths		Neonatal Deaths		No.	1
	No.	1	No.	2		
Singleton	119	5.0	91	3.9	210	8.9
Multiple	15	25.6	12	20.5	27	46.1
Total	134	5.5	103	4.3	237	9.8

Excludes births less than 500 grams birthweight.

1 Stillbirth/Perinatal mortality proportions:

- singleton births /1000 singleton births
- multiple births /1000 multiple births.

2 Neonatal mortality proportions:

- singleton births /1000 singleton livebirths
- multiple births /1000 multiple livebirths.

When stillbirths were examined by timing of death, 62.7% occurred antepartum, 23.9% were intrapartum and timing of stillbirth was unknown in 18 cases. (Table 46)

TABLE 46: TIME OF DEATH OF STILLBIRTHS IN WESTERN AUSTRALIA, 1987

Time of Death	No.	%
Antepartum	84	62.7
Intrapartum	32	23.9
Unknown	18	13.4
Total	134	100.0

Excludes births less than 500 grams birthweight.

Almost two thirds of the neonatal deaths occurred within the first day of life. (Table 47)

TABLE 47: AGE AT NEONATAL DEATH AMONGST LIVEBIRTHS IN WESTERN AUSTRALIA, 1987

Age At Neonatal Death	No.	% of Neonatal Deaths
< Day 1	57	55.3
Day 1	9	8.7
Day 2	10	9.7
Day 3	3	2.9
Day 4	3	2.9
Day 5	3	2.9
Day 6	2	1.9
Day 7	-	-
Day 8-14	9	8.8
Day 15-21	4	3.9
Day 22-28	3	2.9
Total	103	100.0

Excludes births less than 500 grams birthweight.

The causes of death of stillborn babies are largely unknown (35.8%). Extremely low birthweight (less than 1000 grams birthweight) contributed in 31.4% of cases and 16.4% resulted from lethal congenital malformations.

The principal causes of death of neonates are reported to be low birthweight 46.7% and lethal congenital malformations 36.9%. (Table 48)

TABLE 48: CAUSES OF STILLBIRTHS AND NEONATAL DEATHS IN WESTERN AUSTRALIA, 1987

Cause of Death	1 Stillbirths		2 Neonatal Deaths	
	No.	%	No.	%
Lethal Congenital Malformations	22	16.4	38	36.9
Extremely low birthweight (<1000grams)	42	31.4	-	-
Low birthweight (<2500grams)	-	-	48	46.7
Asphyxia	-	-	8	7.8
Maternal	-	-	-	1.6
Obstetric	-	1.4	-	-
Medical	-	-	-	-
Hypertension	3	2.2	-	-
Placenta & Cord	15	1.1	-	-
Hydrops fetalis	-	-	-	0.3
Infection	-	-	2	1.9
S.I.D.S.	-	-	2	1.9
Other	4	3.0	4	3.9
Unknown	48	35.8	1	0.9
Total	134	100.0	103	100.0

Excludes births less than 500 grams birthweight.

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

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

SOURCE: MIDWIVES' NOTIFICATION SYSTEM

Autopsies were requested for 56% of stillbirths and 48.6% of neonatal deaths. For 44 (18.6%) perinatal deaths, it was unknown whether an autopsy was requested. (Table 49)

TABLE 49: AUTOPSY REQUESTS FOR STILLBIRTHS AND NEONATAL DEATHS IN WESTERN AUSTRALIA, 1987

	Perinatal Deaths				Total	
	Stillbirths		Neonatal Death		No.	%
	No.	%	No.	%		
Yes	75	56.0	50	48.6	125	52.7
No	31	23.1	37	35.9	68	28.7
Unknown	28	20.9	16	15.5	44	18.6
Total	134	100.0	103	100.0	237	100.0

Excludes births less than 500 grams birthweight.

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NOTIFICATION OF CASE ATTENDED 1 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 () 1
 married (incl. de facto) () 2
 other ()

10 Race:

Caucasian () 1
 Aboriginal (full or part) () 2
 Other () 3

11 Height (cms)

PREGNANCY

PREVIOUS PREGNANCIES (excluding this pregnancy)

Total number of

12 Previous Pregnancies

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
 other () H

21 Medical Conditions:

LABOUR AND DELIVERY

23 Onset of Labour:

spontaneous [] A
 induced [] B
 no labour [] D

24 Presentation:

vertex () 1
 breech () 2
 other () 3

25 Type of Delivery:

normal [] A
 vacuum - successful [] B
 - failed [] C
 forceps - successful [] D
 - failed [] E
 breech 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 () 1
 first twin () 2
 second twin () 3
 other multiple birth: () 4

36 (specify baby number ___ of ___)

37 Sex: male () 1
 female () 2

38 Condition: liveborn () 1
 stillborn () 2

39 Birthweight (grams)

40 Length (cms)

41 Time to establish unassisted regular breathing (mins)

42 Resuscitation:

none [] 0
 intubation [] 3
 oxygen only [] 8
 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 Reg. 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 (wholedays only)

32 Separate HA22 for baby:
 yes, attached () 2

WESTERN AUSTRALIAN IVF/GIFT PREGNANCIES AND CONFINEMENTS 1983-1987:

COMPARISONS WITH OTHER WESTERN AUSTRALIAN PREGNANCIES AND CONFINEMENTS

Sandra M. Webb and C. D'Arcy J. Holman

INTRODUCTION

During a comprehensive three-year study of In Vitro Fertilization (IVF) and related practices in Western Australia (WA) data were collected on demographic, clinical and economic aspects of the treatments. All 1,240 couples who began treatment in WA's two IVF clinics between January 1, 1983 and December 31, 1986 were studied. All of their 2,982 treatment cycles up to June 30 1987, and all of their 202 confinements and 273 births up to November 30, 1987 were monitored. There were 144 confinements after In Vitro Fertilization [including 11 Pronuclear Stage Transfer (PROST) confinements] and 58 confinements after Gamete Intra Fallopian Transfer (GIFT). Manual linkage to the WA Midwives' Notification System provided data on IVF/GIFT pregnancies and confinements. These births were compared with all 1985 non-aboriginal pregnancies and confinements on the same system.

This comprehensive study was unique in providing complete data on success rates over the studied years, in which treatments and outcomes were individually matched. The study also provided a number of unique demographic details and estimates of costs, including obstetric and neonatal care.

METHODS

Treatment cycle data were all obtained from records held at the IVF clinics. Details of pregnancies and confinements were available from pregnancy registers, specialist's records or from manual checking of the Midwives' Notification System.

A population for comparison with IVF pregnancies and confinements was obtained from the 1985 Midwives' Notification System. Aboriginal pregnancies and confinements were excluded from the comparison group because it was felt that aboriginality would be a confounding factor in comparisons. The comparison group consisted of 21774 confinements.

The adequacy of fetal growth was determined from graphs derived from the WA population.⁽¹⁾ In order to assess adequacy of fetal growth for gestational age of both the IVF/GIFT babies and the midwives' comparison group, the mothers were first sorted on parity and height, and the babies sorted on sex. Then cross tabulations were made of weight and gestational age as computed from birthdate and date of the last menstrual period. Small growth for age babies fell below the 10th percentile and large growth for age babies fell above the 90th percentile on the relevant graphs.

Preliminary analysis showed that, during this study period, there were no significant differences between IVF and GIFT confinements with respect to plurality, or age or nulliparity of the mothers. Both groups were therefore considered together. The IVF confinements included mainly standard Embryo Transfer (ET) cases, but also some cases (11) after PROST.

Direct costs associated with IVF/GIFT treatment cycles were obtained in a 10% sample of all treatment cycles. Additional costs associated with obstetric and neonatal care were assigned later, and with data available from the study probabilities were assigned to each possible outcome after treatment. Outcomes analysed included cancellation, failed fertilization, ectopic pregnancy, spontaneous abortion, early admission for confinement, type of delivery, stillbirth and neonatal special care. This enabled average costs, both retrospective and prospective to be calculated, both for IVF/GIFT and natural conceptions.

Management and analysis of data were performed in the Epidemiology Branch of the Health Department of Western Australia. All data were processed and edited using the Statistical Package for the Social Sciences. Confidence intervals around prevalence ratio estimates were obtained using a natural logarithm transformation and precision-based weighting.(2)

RESULTS

Overall there were 6.9 livebirth confinements per 100 IVF/ET cycles begun (1983-1986), 14.4 livebirth confinements per 100 GIFT cycles begun (1985-1986) and 14.3 livebirth confinements per 100 PROST cycles begun (1986). Each IVF/GIFT confinement provided, on average, 1.35 babies compared with 1.01 in the comparison group, due to the very high prevalence of multiple confinements in the IVF/GIFT group (PR 27.0, 95% CI 21.1 - 35.1). For IVF/ET 7.7% of all pregnancies were ectopic and 5.7% of clinically diagnosed pregnancies (heart-beat on ultra-sound at 6-7 weeks gestation) ended in spontaneous abortion. For GIFT there were 9.3% ectopics and 9.5% spontaneous abortions. Numbers of PROST confinements were too small for meaningful analysis.

IVF/GIFT Mothers

The IVF/GIFT mothers represented a high risk group for reasons of nulliparity, advanced age and the high prevalence of multiple confinements.

Table 1 shows that 74.8% of IVF/GIFT mothers were nulliparous and this represented twice the prevalence of nulliparity in the other mothers. (PR 1.9, 95% CI 1.8 - 2.1). The IVF/GIFT mothers were also five times as likely to be over 35 years of age (PR 4.9, 95% CI 4.0 - 6.0) and twelve times as likely to be over 40 years of age (PR 12.1, 95% CI 10.3 - 14.3). Overall 7.9% of them were over 40 years of age. It can be seen in Table 2 that a total of 6.9% of all IVF/GIFT confinements were for triplet births and 20.3% were for twin births. Multiple births were far more likely to result from IVF/GIFT than in naturally conceived pregnancies (PR 27.0, 95% CI 21.1 - 35.1). All these features confirmed that the IVF/GIFT pregnancies and confinements were high-risk. There were no significant trends, such as towards declining triplet prevalence after IVF/GIFT. Of all IVF/GIFT mothers 49.2% had reported complications of pregnancy and 58.5% had complications of labour, compared with 30% and just under 50% respectively in the comparison group. Early admission for confinement (taken as more than one day before confinement) occurred for 31.7% of IVF/GIFT mothers, and their mean stay was 21.4 days. This compared with a 9.5% early admission fraction and a mean stay of 7.2 days for other women, and probably related to the larger proportion of high-risk pregnancies in the IVF/GIFT group.

Table 3 shows the hospitals of confinement of IVF/GIFT women. It was seen that although the majority (66.3%) were confined at the Metropolitan Obstetric Teaching Hospital, this proportion was declining. In all 26.8% delivered at suburban hospitals, 2.9% in country hospitals and 4.0% interstate or overseas.

Analysis of onset of labour showed that 25.4% of IVF/GIFT singletons and 15.0% of twins were induced. However, if confinements of women aged 30-34 years were compared, the prevalence of induction of labour was similar (PR 0.9, 95% CI 0.2 - 3.3), but the prevalence of no labour was higher for IVF/GIFT confinements (PR 2.0, 95% CI 1.4 - 3.0). There were 21.8% normal deliveries of IVF/GIFT babies compared with 62% of others. The elective caesarean fraction was 23.8% and the emergency caesarean fraction was 21.8%, giving a total caesarean fraction of 45.6% compared with 15.0% of others. The caesarean fractions in IVF/GIFT confinements were higher in both singleton (PR 2.3, 95% CI 1.8 - 2.9) and multiple deliveries (PR 2.5, 95% CI 2.0 - 3.2). The overall IVF/GIFT caesarean fractions were 34.3% for singletons, 66.6% for twins and 100.0% for triplets.

Reasons for the high proportions of caesarean section in IVF/GIFT confinements were sought, and if confinements of nulliparous women aged 30-34 years were compared it was found, as shown in Table 4, that there was only one significant difference. The prevalence of elective caesarean sections of singletons was 19.7% in the IVF/GIFT group, compared with 8.5% in the others (PR 2.3, 95% CI 1.4 - 4.0). There were no significant differences for multiple confinements or emergency caesareans. It was also found that the prevalence of caesarean sections for singleton confinements with cephalic presentation was more than double that in the other group (PR 2.5, 95% CI 1.9 - 3.2).

Further analysis showed (Table 5) there was a declining trend in the prevalence of caesarean section which was significant for singleton confinements.

IVF/GIFT Babies

The IVF/GIFT babies were also, as is well known, a high risk group, but this was not all due to the high prevalence of multiple births.

Table 6 shows the distributions of birthweight and plurality of IVF/GIFT babies. For IVF/GIFT babies 4.7% of singletons and 29.4% of multiples were of very low birthweight (<1500g). Compared with the non-aboriginal Midwives' group these figures were significantly elevated, with a PR of 5.2, 95% CI 2.6 - 10.6 for singletons, and PR 2.5, 95% CI 1.7 - 3.6 for multiples. Similarly, low birthweight (<2500g) confinements were more prevalent in IVF/GIFT, with a PR of 2.7, 95% CI 1.8 - 4.1 for singletons, and 1.4, 95% CI 1.2 - 1.6 for multiples.

These low birthweights were accompanied by early gestational ages at confinement of IVF/GIFT babies, and Table 6 also shows that 12.2% of singletons and 68.6% of multiples were associated with preterm birth (<37 weeks). Compared with the midwives' group the figures for early gestation were significantly elevated, when singletons (PR 1.7, CI 1.1 - 2.6) or multiples (PR 1.5, 95% CI 1.3 - 1.7) were compared separately. Therefore, the early gestations and low birthweights of IVF/GIFT babies were not solely due to the high numbers of multiple confinements. A causative factor may have been the increased numbers of older and primigravid mothers in the IVF/GIFT group. However, the increase in elective caesarean sections must also have been a factor.

To examine further these tendencies, a comparison of the adequacy of the fetal growth of singletons was made between the IVF/GIFT group and the midwives' group. No significant difference was found in the prevalences of small growth for gestational age (<10% percentile) or large growth for gestational age (>90% percentile) between the two groups.

When stillbirths and infant deaths were related to plurality as in Table 6, it was found that for IVF/GIFT babies the proportions of total deaths were 2.8% for singletons and 9.1% for multiples. Only one of seven infant deaths occurred in the post-neonatal period. The total IVF/GIFT stillbirth proportion was five times and infant mortality was four times greater than in the comparison group, but only for singletons was the difference significant

(PR 4.7, 95% CI 1.7 - 7.4). There were 12.5% total deaths in IVF/GIFT twins and only 2.5% in triplets, but the difference was not significant. IVF/GIFT triplets had a higher caesarean section fraction, but were also more often affected by low birthweight and early gestation than twins and singletons.

Analysis of special care was carried out on data available on the Midwives' System. These data were obtained from the birthing hospital and gave no indication of level of care. In all 30.2% of the IVF/GIFT babies had some special care and their mean stay was 37.9 days. Only 18.7% of them stayed less than eight days. By comparison, of other babies, 11.4% were admitted to special care for mean stays of 9.4 days, and 76.8% of them stayed less than eight days. IVF/GIFT triplets had ten times, and twins five times the admission proportions of singletons, but the mean stays of both groups were similar at 41.7 and 40.2 days respectively.

It was found that 10.7% of IVF/GIFT babies were transferred from the birthing hospital to another institution. This was double the transfer of other babies (PR 2.1, 95% CI 1.6 - 3.0).

National data available from the National Perinatal Statistics Unit on all Australian IVF/GIFT pregnancies and confinements⁽³⁾ now show a small but significant increase in several types of congenital malformation. Numbers in the Western Australian study were too small to add meaningfully to discussion on this issue, however.

IVF/GIFT Costs

In 1986 the average cost of a basic IVF/ET treatment cycle was \$3,893, for GIFT it was \$3,607 and for PROST \$4,616.

To calculate the excess total direct costs of IVF and GIFT newborns and confinements, costs associated with both IVF/GIFT and naturally conceived conceptions were calculated. Each IVF/GIFT confinement resulted in 1.35 babies while each natural conception resulted in 1.01 babies. The cost per day of neonatal special care in 1986 was estimated to average \$340. As the Midwives' Notification System had no indication of the level of special care given, this average cost had to be used, with the assumption that it was also relevant for the IVF/GIFT babies. Included in this estimate were all special

care nursery salaries and special goods and services, as well as overhead costs estimated from the total hospital overhead costs in proportion to special care bed days (0.21 of all bed days). Excluded were estimations of depreciation on special care nursery equipment (personal communication, Deputy Superintendent, Metropolitan Obstetric Teaching Hospital). The weighted mean cost of special care for each IVF/GIFT newborn was \$3,750, however, if an IVF/GIFT baby did require special care this actually averaged \$12,886.

Table 7 shows the excess total direct cost for each IVF confinement was \$57,002 and of each IVF liveborn was \$41,986, with direct government contributions of \$30,244 and \$22,223. For births which followed GIFT treatment, with almost double the success rate of IVF, the cost per confinement was \$29,527 and per baby was \$21,635 with direct government contributions of \$18,215 and \$13,312 respectively. Total direct costs for PROST confinements were between those for IVF and GIFT.

DISCUSSION

The data available from the WA study of IVF and related technologies was unique in its broad range and in the way the IVF/GIFT data could be directly compared with other relevant data bases such as the Midwives' Notification System and the Hospital Morbidity System.

This study clearly showed the comparative success of IVF and GIFT treatments, and gave some useful information on PROST. There was no increasing trend in success with IVF/ET over time, but for women with at least one patent uterine tube it was clear that treatments such as GIFT and PROST offered much improved success. It also confirmed that IVF/GIFT pregnancies were indeed high-risk, due to older age and nulliparity of the mothers, and to the high plurality of the pregnancies, but also due to obstetric intervention for other reasons.

When WA's two IVF clinics were compared with other Australian IVF clinics, their success rates fell within the range of others⁽⁴⁾. However, they apparently produced significantly fewer spontaneous abortions, although this was perhaps due to differing assessment criteria. They produced more ectopic pregnancies, again perhaps due to differing criteria of assessment of pregnancy, significantly more triplet confinements and more infant deaths. Several other IVF clinics^(5,6) reported either more or similar use of caesarean section, however in general the Western Australian IVF units had caesarean fractions for singletons which were similar but for twins and triplets which were higher.⁽³⁾

There is a move towards completeness and clarity in the reporting of IVF data. The Fertility Society of Australia and the National Perinatal Statistics Unit are now collaborating in the collection of data on treatment and outcomes, and the provision of these data nationally by IVF units is a requirement for the registration of IVF units in Australia. However there is still a need for long-term projects to follow up potential maternal and child morbidity related to treatment, and these must be done on a State level. Discussion must continue on the availability and costs of the treatments, and on the social, legal and ethical problems that still surround them. As these treatments are now better documented than alternative, more conventional treatments for infertility, it is time to evaluate which are the most successful, most cost effective and safest methods for all concerned.

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TABLE 1

PARITY AND AGE OF ALL WOMEN CONFINED AFTER IVF AND GIFT

MOTHER'S AGE (YEAR)	PARITY					
	NULLIPAROUS		MULTIPAROUS		TOTAL	
	n	(%)	n	(%)	n	(%)
<29	31	(20.5)	8	(15.7)	39	(19.3)
30 - 34	78	(51.7)	17	(33.3)	95	(47.0)
		(82.1)		(17.9)		(100.0)
35 - 39	34	(22.5)	18	(35.3)	52	(25.7)
		(65.4)		(34.6)		(100.0)
>40	8	(5.3)	8	(15.7)	16	(7.9)
		(50.0)		(50.0)		(100.0)
Total	151	(100.0)	51	(100.0)	202	(100.0)
(Row %)		(74.8)		(25.2)		(100.0)

TABLE 2
PLURALITY IVF/GIFT CONFINEMENTS

	YEAR OF CONCEPTION					TOTAL
	1983	1984	1985	1986	1987*	
Singleton	14(87.5)	36(75.0)	28(66.6)	62(72.9)	7(63.6)	147(72.8)
Twin	1(6.3)	10(20.8)	7(16.7)	19(22.4) ⁺	4(36.4)	41(20.3)
Triplet	1(6.3)	2(4.2)	7(16.7)	4(4.7) [⊖]	0(0)	14(6.9)
Total	16(100.0)	48(100.0)	42(100.0)	85(100.0)	11(100.0)	202(100.0)

* 1987 data are not complete, as they only included confinements up to November 30th, 1987, and only for women who began treatment before December 31st 1986.

⁺ P-value of trend, 1983-1986 = 0.15

[⊖] P-value of trend, 1983-1986 = 0.73

TABLE 3

HOSPITAL OF CONFINEMENT OF IVF/GIFT WOMEN

HOSPITAL	1983		1984		1985		1986		1987		TOTAL	
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
Metropolitan Obstetric Teaching Hospital	5	(100.0)	16	(88.9)	37	(77.1)	27	(58.7)	31	(53.4)	116	(66.3)
Suburban Hospitals	0	(-)	1	(5.6)	9	(18.8)	16	(34.8)	21	(36.2)	47	(26.8)
Country Hospitals	0	(-)	0	(-)	2	(4.2)	1	(2.2)	2	(2.7)	5	(2.9)
Interstate ⁺	0	(-)	1	(5.6)	0	(-)	2	(4.4)	0	(-)	3	(1.7)
Overseas [*]	0	(-)	0	(-)	0	(-)	0	(-)	4	(3.4)	4	(2.3)
Total	5	(100.0)	8	(100.0)	48	(100.0)	46	(100.0)	58	(100.0)	175	
§(100.0)												

⁺ All Melbourne.

^{*} 2 New Zealand, 1 Scotland, 1 Indonesia.

[#] All probably local, midwives form unseen.

[§] 27 cases missing information, mainly 1987 conceptions.

TABLE 4

CAESAREAN SECTIONS AND PLURALITY FOR NULLIPAROUS WOMEN AGED 30-34 YEARS
IN IVF/GIFT CONFINEMENTS

	PLURALITY					
	SINGLETON		MULTIPLE		TOTAL	
	IVF/GIFT n (%)	OTHER* n (%)	IVF/GIFT n (%)	OTHER* n (%)	IVF/GIFT n (%)	OTHER* n (%)
Caesareans						
Elective	12 (19.7) ⁺	92 (8.5) ⁺	4 (23.5)	5 (22.7)	16 (20.5)	97 (8.8)
Emergency	12 (19.7)	162 (15.0)	9 (52.9)	6 (27.3)	21 (26.9)	168 (15.3)
Total caesareans	24 (39.3)	254 (23.5)	13 (76.5)	11 (50.0)	37 (47.4)	265 (24.1)
Total confinements	61 (100.0)	1079 (100.0)	17 (100.0)	22 (100.0)	78 (100.0)	1101 (100.0)
PR _{elective}	2.3 (1.4 - 4.0)		1.0 (0.3 - 3.2)		2.3	
PR _{emergency}	1.3 (0.8 - 2.2)		1.9 (0.8 - 4.3)		1.8	
PR _{total caesarean}	1.7		1.5		2.0	

* The 1985 non aboriginal midwives' comparison group.

⁺ PR 2.3; 95% CI 1.4-4.0

TABLE 5

CAESAREAN SECTIONS IN IVF/GIFT CONFINEMENTS, YEAR OF DELIVERY AND PLURALITY

PLURALITY	1983		1984		1985		1986		1987		TOTAL	P-VALUE OF TREND 1984-87
	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)		
Singleton												
Caesareans	1		8		15		11		13		48	
Singleton confinements	6 (100.0)		14 (100.0)		36 (100.0)		36 (100.0)		48 (100.0)		140 (100.0)	
Pcaesarean section	(16.7)		(57.1)		(41.7)		(30.5)		(27.0)		(34.3)	
PR	0.30		1.0		0.73		0.53		0.47			p = 0.03
Twin												
Caesareans	0		2		8		3		13		26	
Twin confinements	0 (100.0)		6 (100.0)		9 (100.0)		5 (100.0)		19 (100.0)		39	
Pcaesarean section	(0)		(33.3)		(88.8)		(60.0)		(68.4)		(66.6)	
PR	-		1.0		2.7		1.82		2.05			
Triplet												
Caesareans	0		2		5		5		2		14	
Triplet confinements	0 (100.0)		2 (100.0)		5 (100.0)		5 (100.0)		2 (100.0)		14 (100.0)	
Pcaesarean section	-		(100.0)		(100.0)		(100.0)		(100.0)		1.0	
All pluralities												
All caesarean confinements	1		12		28		19		28		88	
All confinements	6 (100.0)		22 (100.0)		50 (100.0)		46 (100.0)		69 (100.0)		193 *(100.0)	
Pcaesarean section	(16.7)		(54.5)		(56.0)		(41.3)		(40.5)		(45.6)	
PR	-		1.0		1.03		0.76		0.74			p = 0.09

* 9 cases missing information.

TABLE 6

BIRTHWEIGHT, GESTATIONAL AGE AND DEATH OF IVF/GIFT BABIES

	SINGLETONS		MULTIPLES		TOTAL	
	IVF		IVF		IVF	
	n	(%)	n	(%)	n	(%)
Very low birthweight (<1500g)	7	(4.7)	35	(29.4)	42	(15.7)
Low birthweight (<2500g)	19	(12.8)	93	(78.2)	112	(41.9)
Total births	148	(100.0)	119	(100.0)	267 ⁺	(100.0)
Early gestation (<37 weeks)	18	(12.2)	83	(68.6)	101	(37.7)
Total births	147	(100.0)	121	(100.0)	268 ⁺	(100.0)
Stillbirth	4	(2.8)	4	(3.3)	8	(3.0)
Infant death	0	(0)	7	(5.8)	7	(2.7)
Total deaths	4	(2.8)	11	(9.1)	15	(5.7)
Total births	144	(100.0)	120	(100.0)	264 ⁺	(100.0)

⁺ 6 cases of missing information on birthweight, 5 missing for gestational age, 9 missing for condition at birth.

TABLE 7

SUMMARY OF TOTAL DIRECT IVF COSTS*, 1986 : RETROSPECTIVE & PROSPECTIVE

EVENT	TOTAL RETROSPECTIVE COSTS (treatment costs) (\$)	TOTAL PROSPECTIVE COSTS (neonatal costs) (\$)	TOTAL COSTS (\$)	TOTAL GOVERNMENT COSTS (\$)
IVF confinement	52,889.41	5,062.27	57,952	30,971
Natural confinement	598.52	351.85	950	727
Excess cost of IVF confinement			57,002	30,244
IVF newborn	39,177.34	3,749.83	42,927	22,942
Natural newborn	592.60	348.36	941	719
Excess cost of IVF newborn			41,986	22,223

*Note: For a summary of considerably lower costs associated with GIFT and PROST refer to the body of this paper.

