



# Western Australia's Mothers and Babies, 2011

Twenty-ninth Annual Report of the Western Australian Midwives' Notification System



June 2014

Western Australia's Mothers and Babies 2011

Twenty-ninth Annual Report of the  
Western Australian Midwives' Notification System

June 2014

Maternal and Child Health Unit  
Data Integrity Directorate  
Performance Activity and Quality  
Department of Health, Western Australia

Statistical series number 98

ISSN: 0816-2999

## Acknowledgements

The authors wish to thank all midwives for continuing to provide high quality data to the Western Australian Maternal and Child Health Unit for all births in Western Australia. The completeness and accuracy of the data is dependent on their dedication.

Appreciation is also acknowledged for the contribution of:

Mrs Daelene Johnson, Mrs Maureen Cheong and other Maternal and Child Health Unit staff who process and validate these data;

Mrs Vivien Gee - Principal Consultant, Statutory Mortality Committees for providing information on Perinatal Mortality;

The staff at Western Australia Data Linkage Branch;

The Hospital Morbidity Data Collection staff for their support in the validation processes and provision of data this report;

The Registry of Births, Deaths and Marriages for assisting with ensuring the completeness of the collections for births and perinatal deaths in Western Australia via the Western Australia Data Linkage Branch.

The women who provided consent for images of themselves and their children to be used for health publications. The images have been used on the front page of this report.

## Further information

Enquiries or comments on this publication and/or requests for additional information should be addressed to:

Manager, Maternal and Child Health Unit  
Statutory and Non-Admitted Branch  
Data Integrity Directorate  
Performance, Activity & Quality  
Department of Health, Western Australia  
189 Royal Street  
EAST PERTH WA 6004

Telephone: (08) 9222 2417

Facsimile: (08) 9222 4408

Email: [Birthdata@health.wa.gov.au](mailto:Birthdata@health.wa.gov.au)

Internet: <http://www.health.wa.gov.au/healthdata/statewide/midwives.cfm>

## Citation

The citation below should be used in reference to this publication.

Hutchinson, M. & Joyce, A. (2014). *Western Australia's Mothers and Babies, 2011: Twenty-ninth Annual Report of the Western Australian Midwives' Notification System*, Department of Health, Western Australia.

## Table of Contents

Acknowledgements .....	ii
Further information .....	ii
Citation .....	ii
Table of Contents .....	iii
List of Tables .....	vi
List of Figures .....	x
Executive Summary .....	xi
Maternal demographics .....	xi
Place of birth .....	xi
Tobacco smoking during pregnancy .....	xi
Pregnancy Profile .....	xi
Labour and Birth .....	xii
Aboriginal Mothers .....	xii
Aboriginal infants .....	xiii
All Infants .....	xiii
Perinatal Mortality .....	xiv
1. Introduction .....	1
1.1. Changes to report format and content .....	1
1.2. Legal status of perinatal statistics in Western Australia .....	1
1.3. Midwives' Notification System .....	2
1.4. Aboriginal status .....	2
1.5. Data provision model for Midwives' Notification System - 2011 .....	3
1.6. Data Sources for the 2011 birth data .....	3
2. Mothers .....	4
2.1. Maternal demographics .....	4
2.1.1. Maternal age .....	4
2.1.2. Place of Residence .....	5
2.1.3. Country of birth .....	6
2.1.4. Marital status .....	7
2.1.5. Place of birth .....	8
2.1.6. Place of birth event .....	9
2.1.7. Smoking tobacco during pregnancy .....	12
2.1.8. Socio-economic status .....	15
2.2. Pregnancy profile .....	16
2.2.1. Parity .....	16
2.2.2. Pregnancy gestation at first antenatal care visit .....	18
2.2.3. Medical conditions .....	19
2.2.4. Complications of pregnancy .....	19
2.2.5. Procedures and treatments .....	20
2.3. Labour .....	21
2.3.1. Onset of labour .....	21
2.3.2. Augmentation of labour .....	22

2.3.3.	Methods of augmentation .....	23
2.3.4.	Induction of labour .....	24
2.3.5.	Induction of labour by maternity service .....	25
2.3.6.	Analgesia .....	26
2.4.	Rare complications of pregnancy and birth .....	27
2.4.1.	Eclampsia .....	27
2.4.2.	Morbidly adherent placenta .....	27
2.4.3.	Hysterectomy .....	28
2.4.4.	Hysterectomy and morbidly adherent placenta .....	28
2.5.	Anaesthesia .....	29
2.6.	Fetal presentation .....	31
2.6.1.	Vertex presentation and mode of birth in maternity services .....	32
2.7.	Mode of birth .....	33
2.7.1.	Caesarean section by maternity service .....	34
2.8.	Hours of established labour .....	35
2.9.	Complications of labour and birth .....	36
2.9.1.	Primary postpartum haemorrhage .....	37
2.9.2.	Reason for caesarean section .....	37
2.9.3.	Accoucheur .....	38
2.10.	Repair of perineum and/or vagina .....	39
3.	Aboriginal mothers and infants .....	40
3.1.	Maternal age .....	40
3.1.1.	Age-specific birth rates .....	41
3.2.	Health region of residence .....	43
3.3.	Care during pregnancy .....	44
3.4.	Previous pregnancies .....	45
3.5.	Smoking Tobacco during Pregnancy .....	46
3.6.	Complications of Pregnancy .....	48
3.7.	Medical conditions before pregnancy .....	49
3.8.	Procedures and treatments .....	49
3.9.	Labour and birth details .....	50
3.9.1.	Onset of labour .....	50
3.9.2.	Place of birth .....	50
3.9.3.	Method of birth .....	52
3.9.4.	Complications of labour or birth .....	52
3.10.	Repair of perineum and/or vagina .....	53
3.11.	Infants born to Aboriginal women .....	54
3.11.1.	Crude birth rate .....	56
3.11.2.	Birthweight and gestational age .....	57
3.11.3.	Birthweight .....	57
3.11.4.	Low Birthweight .....	59
3.11.5.	Low birthweight and place of residence .....	60
4.	Infants .....	61
4.1.	Metrics of infants born .....	61

4.1.1.	Crude birth rate.....	61
4.1.2.	Plurality .....	62
4.1.3.	Gender .....	62
4.1.4.	Gestational age.....	64
4.1.5.	Gestational age, birthweight and plurality .....	64
4.1.6.	Birthweight centiles.....	66
4.1.7.	Birth status and place of birth of preterm infants.....	67
4.1.8.	Birthweight .....	68
4.1.9.	Birth status and place of birth .....	70
4.1.10.	Plurality of infants born .....	71
4.1.11.	Plurality, presentation and birth mode .....	72
4.2.	Infant extra-uterine adjustment .....	72
4.2.1.	Apgar score at one minute and five minutes .....	72
4.2.2.	Infant resuscitation .....	74
4.3.	Birth trauma .....	75
4.4.	Birth defects .....	75
4.5.	Infant outcome .....	76
4.5.1.	Admission to Special Care Nursery.....	76
4.5.2.	Transfer from birth place .....	77
4.5.3.	Liveborn infant length of stay at birthplace .....	80
5.	Perinatal Mortality .....	81
5.1.1.	Perinatal mortality by gestational age in WA.....	82
5.1.2.	Perinatal mortality by birthweight in WA.....	82
6.	ACHS Obstetric Clinical Indicators (V6) by region of maternal residence .....	85
7.	References.....	86
	Appendix A: Glossary .....	87
	Appendix B: Supplementary Tables .....	90
	Appendix C: Notification of case attended form .....	98

## List of Tables

Table 1: Aboriginal Status of Women who gave birth in WA, 2011 .....	4
Table 2: Age of Mother giving birth in WA 1980-2011.....	4
Table 3: Region of Residence of Women who gave birth in WA, 2011 .....	5
Table 4: Maternal Country of Birth, WA 2011.....	6
Table 5: Maternal Country of Birth in WA, 2007-2011.....	7
Table 6: Marital Status and Plurality of Women who gave birth in WA, 2011 .....	7
Table 7: Place of Birth for Women Resident in Metropolitan Health Areas in WA, 2011 .....	8
Table 8: Place of Birth for Women Resident in Country Health Regions in WA, 2011 .....	9
Table 9: Place of Birth and Intended Place of Birth in WA, 2011 .....	10
Table 10: Place of Birth and Plurality in WA, 2011 .....	11
Table 11: Smoking and Age in WA, 2011.....	13
Table 12: Smoking Tobacco and Country of Birth in WA, 2011 .....	14
Table 13: Socio-Economic Status and Age of Women in WA, 2011.....	15
Table 14: Previous Infants and Age of Mother in WA, 2011 .....	16
Table 15: Gestation at First Antenatal Care Visit in WA, 2011.....	18
Table 16: Selected Pre-Existing Medical Conditions for Women in WA, 2011 .....	19
Table 17: Selected Complications of Pregnancy by Plurality in WA, 2011 .....	20
Table 18: Procedures and Treatments Provided to Women giving birth in WA, 2011 .....	20
Table 19: Onset of Labour and Plurality of Women Giving Birth in WA, 2011 .....	21
Table 20: Labour, Augmentation and Mode of Birth in WA, 2011 .....	22
Table 21: Augmentation and Hours of Labour for Women with Spontaneous Onset of Labour in WA, 2011.....	23
Table 22 Induction Method and Mode of Birth for Women who were Induced in WA, 2011.....	24
Table 23: Induction of Labour by Maternity Service in WA, 2011 .....	25
Table 24: Analgesia and Mode of Birth for Women in WA, 2011 .....	26
Table 25: Analgesia for Women who had vaginal births in WA, 2011 .....	26
Table 26: Eclampsia in Women who Gave Birth in WA 2005-2011 .....	27
Table 27: Morbidly Adherent Placenta in Women who Gave Birth in WA 2005-2011 .....	27
Table 28: Perinatal Hysterectomy in Women who Gave Birth in WA 2005-2011 .....	28
Table 29: Morbidly Adherent Placenta and Hysterectomy in Women who Gave Birth in WA 2005- 2011.....	28
Table 30: Anaesthesia and Mode of Birth for Women giving birth in WA, 2011 .....	29
Table 31: Anaesthesia for Women who had Vaginal Births in WA, 2011 .....	29
Table 32: Anaesthesia for Women who Birth by Caesarean Section in WA, 2011.....	30
Table 33: Anaesthesia for Women who Gave Birth by Caesarean Section in WA 1986-2011 .....	30

Table 34: Fetal Presentation and Mode of Birth for Singleton Births in WA, 2011.....	31
Table 35: Mode of Birth for Vertex Presentation by Maternity Service in WA, 2011.....	32
Table 36: Mode of Birth and Plurality for Women Giving Birth in WA, 2011 .....	33
Table 37: Birth Mode by Previous Birth Mode for Women in WA, 2011 .....	34
Table 38: Caesarean Sections by Maternity Service in WA, 2011 .....	34
Table 39: Vaginal Births - Hours of Labour by Onset of Labour for Women in WA, 2011 .....	35
Table 40: Complications of Labour and Birth for Women giving Birth in WA, 2011 .....	36
Table 41: Frequent Complications of Labour and Birth for Caesarean Section in WA, 2011 .....	37
Table 42: Mode of Birth and Accoucheur in WA, 2011 .....	38
Table 43: Mode of Birth and Perineal Status for Women giving birth in WA, 2011.....	39
Table 44: Age and Aboriginal Status of Women who gave birth in WA, 2011 .....	40
Table 45: Age-Specific Birth Rates by Aboriginal Status WA, 2011 .....	41
Table 46: Health Region of Residence and Aboriginal Status in WA, 2011.....	43
Table 47: Gestation at First Antenatal Care Visit and Aboriginal Status in WA, 2011 .....	44
Table 48: Gestation at First Antenatal Care Visit, Proportion for Health Region of Residence and Aboriginal Status in WA, 2011 .....	44
Table 49: Infants born previously and Aboriginal Status in WA, 2011 .....	45
Table 50: Prior Caesarean Section and Aboriginal Status in WA, 2011 .....	45
Table 51: Prior Infants that Died and Aboriginal Status in WA, 2011.....	46
Table 52: Tobacco Smoking and Aboriginal Status in WA, 2011.....	46
Table 53: Tobacco Smoking, Health Region and Aboriginal Status in WA, 2011.....	47
Table 54: Tobacco Smoking change during Pregnancy for Aboriginal Women in WA, 2011 .....	47
Table 55: Complication of Pregnancy, Health Region and Aboriginal Status in WA, 2011 .....	48
Table 56: Selected Complications of Pregnancy and Aboriginal Status in WA, 2011 .....	48
Table 57: Selected Pre-Existing Medical Conditions and Aboriginal Status in WA, 2011 .....	49
Table 58: Selected Procedures and Treatment and Aboriginal Status in WA, 2011 .....	49
Table 59: Onset of Labour and Aboriginal Status of Women Giving Birth in WA, 2011 .....	50
Table 60: Place of Giving Birth and Aboriginal Status of Women in WA, 2011 .....	50
Table 61: Method of Birth and Aboriginal Status for Women Giving Birth in WA, 2011.....	52
Table 62: Selected Complications of Labour or Birth and Aboriginal Status in WA, 2011 .....	53
Table 63: Perineal Status Following Vaginal Birth and Aboriginal Status in WA, 2011 .....	53
Table 64: Birth Status of Infants by Maternal Aboriginal Status in WA, 2011 .....	54
Table 65: Birth Status by Maternal Residence and Aboriginal Status in WA, 2011 .....	55
Table 66: Crude Birth Rate, Infants of Aboriginal Mothers in WA, 1983-2011.....	56
Table 67: Gestational Age and Birthweight for Infants Born to Aboriginal Mothers in WA, 2011 .....	57
Table 68: Birthweight Distribution of All Infants by Maternal Aboriginal Status in WA, 2011.....	57

Table 69: Birthweight by Maternal Aboriginal Status in WA 1980-2011.....	58
Table 70: Odds Ratio of Low Birthweight by Maternal Aboriginal Status in WA 1980-2011 .....	59
Table 71: Birthweight Distribution of Liveborn Infants by Maternal Aboriginal Status in WA 2011 .....	60
Table 72: Liveborn Infants with Low Birthweight by Maternal Residence and Aboriginal Status of Mother in WA, 2011.....	60
Table 73: Condition at Birth and Crude Birth Rate in WA, 1980-2011 .....	61
Table 74: Plurality of Birth and Maternal Aboriginal Status in WA, 2011 .....	62
Table 75: Condition at Birth and Gender of Infants Born in WA, 2011 .....	62
Table 76: Gestational Age and Birth Status for Infants Born in WA, 2011 .....	64
Table 77: Gestational Age and Birthweight for Singleton Infants in WA, 2011 .....	65
Table 78: Gestational Age and Birthweight for Infants of Multiple Births in WA, 2011 .....	65
Table 79: Gestational Age and Birthweight for Infants Born in WA, 2011 .....	65
Table 80: Birth Status by Place of Birth for infants born 23-31 weeks in WA, 2011 .....	67
Table 81: Trends for Birth Condition and Place of Birth Pre-Term Infants in WA 1986-2011 .....	67
Table 82: Birthweight and Condition at Birth for All Infants Born in WA, 2011 .....	69
Table 83: Birthweight and Resuscitation Methods for Babies Born Alive in WA, 2011 .....	69
Table 84: Birth Status and Place of Birth in WA, 2011 .....	70
Table 85: Plurality of Birth and Birth Status in WA, 2011 .....	71
Table 86: Plurality of Birth, Fetal Presentation and Infant Birth Mode in WA, 2011 .....	72
Table 87: Apgar Score at One Minute and Time to Spontaneous Respiration for Infants Born Alive in WA, 2011 .....	73
Table 88: Apgar Score at Five Minutes and Time to Spontaneous Respiration for Infants born Alive in WA, 2011 .....	73
Table 89: Resuscitation Methods for Liveborn Infants in WA, 2011 .....	74
Table 90: Resuscitation Methods for Liveborn Infants by Apgar Score at 5 Minutes in WA, 2011 .....	74
Table 91: Birth Trauma to Infants in WA, 2011 .....	75
Table 92: Length of Stay in Special Care by Plurality for Infants Liveborn in WA, 2011 .....	76
Table 93: Liveborn Infant and Transfer from Birth Place to Other Hospital in WA, 2011 .....	77
Table 94: Length of Stay by Birthweight for Infants Discharged Home in WA, 2011 .....	78
Table 95: Length of Stay at Birth Site by Gestational Age for Infants Discharged Home WA, 2011 .....	79
Table 96: Length of Stay at Birth Site by Gestational Age for Infants that Died or were Transferred WA, 2011.....	79
Table 97: Perinatal Mortality by Maternal Aboriginal Status in WA, 2011 .....	81
Table 98: Trend Data for Perinatal Mortality by Aboriginal Status in WA, 1994-2011 .....	82
Table 99: Perinatal Mortality by Gestational Age in WA, 2011.....	82
Table 100: Perinatal Mortality by Birthweight Split in WA, 2011 .....	82
Table 101: Birthweight for Perinatal Deaths in WA, 2011 .....	83

Table 102: Perinatal Mortality by Plurality of Birth in WA, 2011 .....	83
Table 103: Age at Neonatal Death for Infants born in WA, 2011 .....	83
Table 104: Autopsy Requests for Perinatal Deaths in WA, 2011 .....	84
Table 105: Causes of Perinatal Death in WA, 2011 .....	84
Table 106: Age-Specific Birth Rates by Aboriginal Status of Women in WA, 1983-2011 .....	90
Table 107: Maternal Aboriginal Status in WA 1980-2011 .....	91
Table 108: Place of Birth of Women Giving Birth in WA, 1980-2011 .....	92
Table 109: Trend in Smoking Tobacco in Pregnancy, WA 1999-2011 .....	93
Table 110: Number of Previous Infants for Women Giving Birth in WA, 1980-2011.....	94
Table 111: Onset of Labour 1986-2011.....	95
Table 112: Method of Birth for Women giving birth in WA, 1980-2011 .....	96
Table 113: Gender of Infants Born in WA, 1980-2011 .....	97

## List of Figures

Figure 1: Age Groups of Women Giving Birth in WA, 1980-2011 .....	5
Figure 2: Place of Birth for Women Resident in Metropolitan Health Area in WA, 2011 .....	8
Figure 3: Trend Use of Public and Private Hospitals by Women giving Birth WA, 1980-2011 .....	11
Figure 4: Proportion of Women Smoking Tobacco in First 20 weeks in WA, 2011.....	12
Figure 5: Proportion of Women Smoking Tobacco After 20 Weeks in WA, 2011 .....	13
Figure 6: Trend in Smoking Tobacco in Pregnancy, WA 1998-2011 .....	14
Figure 7: Parity of Women Giving Birth in WA 1980-2011 .....	17
Figure 8: Onset of Labour for Women in WA, 1986-2011 .....	21
Figure 9: Mode of Birth in WA 1980-2011 .....	33
Figure 10: Vaginal Births - Hours of Labour in WA, 2011 .....	35
Figure 11: Primary Postpartum Haemorrhage in WA, 1986-2011 .....	37
Figure 12: Perineal Status following Vaginal Births in WA, 1993-2011.....	39
Figure 13: Age Distribution by Aboriginal Status in WA, 2011 .....	40
Figure 14: Age-Specific Birth Rates by Aboriginal Status in WA, 2011 .....	42
Figure 15: Age-Specific Births Rates by Aboriginal Status of Women in WA, 1983-2011 .....	42
Figure 16: Infants born previously and Aboriginal Status of Women giving Birth in WA, 2011.....	45
Figure 17: Number of Liveborn Infants and Crude Birth Rate in WA, 1980-2011 .....	62
Figure 18: Gender of Infants Born in WA, 1980-2011 .....	63
Figure 19: Birthweight Centile for Singleton Liveborn Males in WA, 2011 .....	66
Figure 20: Birthweight Centile for Singleton Liveborn Females in WA, 2011.....	66
Figure 21: Preterm (23-31 completed weeks) liveborn infants by Birth Place in WA 1986-2011 .....	68
Figure 22: Trend data for Infants Discharged Home within 1 day of birth in WA, 1980-2011.....	80

## Executive Summary

This is the 29<sup>th</sup> annual report on births in Western Australia (WA) from the Midwives' Notification System. All tables presented here are in aggregated form without identification of individual women, midwives or doctors.

The report contains information on women who gave birth in WA in 2011, and their infants. Pregnancies that resulted in the birth of an infant of at least 20 weeks gestation or more than 400 grams in weight have been included. These criteria are in accordance with definitions provided by the National Health Data Dictionary.

In January 2011, data collection was expanded. This report presents these new data. Also presented are data sourced from the Hospital Morbidity Data System and trend data.

Permission has been received from health services to publish data at a hospital level in this report. These data were first presented for 2010 births and describe percentage rates for induction of labour, caesarean section and spontaneous vaginal birth for infants with a vertex presentation.

### Maternal demographics

In 2011, there were 31,734 women that gave birth in Western Australia, and the average age of mothers was 29.7 years (Table 1).

Teenage mothers, 19 years or younger, represented 4.3 per cent, and mothers aged 35 years or older represented 20.9 per cent of women who gave birth (Table 4).

The age-specific birth rate for teenaged women 19 years and younger decreased from 19.1 in 1990 to 18.1 per 1000 teenaged women in 2011 (Figure 15).

For women aged 35-44 years, the age-specific birth rate increased from 19.1 in 1990 to 39.3 per 1000 women in 2011 (Table 45).

The largest proportion of women (77.6 per cent) resided in the metropolitan health regions. For country health regions, the largest proportion of women (6.5 per cent) was in the Southwest (Table 3).

### Place of birth

The majority (98.0 per cent) of women gave birth in hospitals. Non-hospital births (2.0 per cent) included mothers who gave birth at a birth centre (1.2 per cent) and homebirths (0.8 per cent) (Table 9).

Of women resident in metropolitan regions, 72.5 per cent gave birth in hospitals in their own regions (Table 7). In country regions, 75.6 per cent of women gave birth in their own region (Table 8). The proportion of metropolitan women giving birth in the teaching hospital was 20.2 per cent and for country women was 10.0 per cent.

### Tobacco smoking during pregnancy

The proportion of women that smoked tobacco during pregnancy was 12.1 per cent. Among teenaged women the smoking proportion was 32.1 per cent (Table 11).

The highest proportions of women that smoked tobacco were born in New Zealand (23.9 per cent) and Australia (15.2 per cent) (Table 12).

### Pregnancy Profile

Mothers that gave birth for the first time represented 42.5 per cent of all women that gave birth (Table 14). Their average age was 28.0 years.

Among women who were aged 35 years or more, 27.3 per cent had their first baby (Table 14).

Antenatal care in the first trimester of pregnancy occurred for 48.2 per cent of women. A further 39.9 per cent had some antenatal care before birth. The remaining women did not attend antenatal care (0.4 per cent) or attendance was not able to be determined (11.6 per cent) (Table 15).

Women's pregnancies were affected by one or more pre-existing medical conditions (36.3 per cent) and/or one or more complications of pregnancy (33.3 per cent). The most common were Asthma (10.4 per cent) and gestational diabetes (6.9 per cent) (Table 16, Table 17).

### Labour and Birth

Labour had a spontaneous onset for 51.2 per cent of pregnant women and 28.6 per cent had labour induced. The remaining women (20.2 per cent) did not experience labour prior to birth by caesarean section (Table 19).

Thirty-nine per cent of women with spontaneous onset of labour had their labour augmented (Table 20).

There was wide variation in the rate of Induction of labour across maternity sites. The range was from 18.5 to 37.2 per cent (Table 23).

Epidural and/or spinal analgesia was used by 37.8 per cent of women during labour (Table 24).

The occurrence of rare, severe conditions included eclampsia for 0.3 per 1000 women (Table 26), morbidly adherent placenta in 3.5 per 1000 women (Table 27), and hysterectomy for 0.4 per 1000 women (Table 28). Of the women who had a hysterectomy, 42.9 per cent also had a morbidly adherent placenta (Table 29).

For women with a vertex presentation (first fetus in a multiple pregnancy), a spontaneous vaginal birth occurred for 53.2 per cent. Within individual maternity sites, these rates ranged between 31.2 and 71.5 per cent (Table 35).

The caesarean section rate in 2011 was 33.9 per cent (10,360 women). There was wide variation in the rate of caesarean section across maternity sites. The range was from 17.5 to 57.1 per cent (Table 38).

Complications of labour and birth, including reasons for caesarean section, were reported for 61.5 per cent of women. The most common complications reported were previous caesarean section (16.4 per cent), primary postpartum haemorrhage (16.5 per cent) and suspected fetal compromise (10.7 per cent) (Table 40).

The rate of primary postpartum haemorrhage has escalated in the past nine years from 8.2 to 16.5 per cent of women (Figure 11). This reflects national rates reported.

### Aboriginal Mothers

Aboriginal women represented 5.4 per cent of those who gave birth in WA (Table 1). They had a higher birth rate (95.8 per 1000) than non-Aboriginal women (62.3 per 1000) (Table 45).

The birth rate for Aboriginal teenage mothers (93.5 per 1000) was more than six times the rate for non-Aboriginal teenage mothers (13.9 per 1000) (Table 45).

A higher proportion of Aboriginal women (64.4 per cent) lived in rural WA (Table 46). Most (52.7 per cent) Aboriginal women gave birth in public hospitals in rural regions (Table 60).

Aboriginal women were half as likely to attend antenatal care within first trimester and six times more likely to never attend antenatal care than non-Aboriginal women (Table 47).

Aboriginal women with a history of stillbirth or children who died were almost twice the proportion of non-Aboriginal women with this history (Table 51).

Almost half of the Aboriginal women smoked tobacco during pregnancy (45.2 per cent) (Table 52).

Aboriginal women living in Perth had a higher proportion that were smoking tobacco (48.7 per cent) than those living in country regions (43.1 per cent) although 60.8 per cent of Aboriginal women that lived in the Wheatbelt reported smoking tobacco in pregnancy.

More Aboriginal women had complications of pregnancy (43.5 per cent) than did non-Aboriginal women (32.8 per cent). The proportion of Aboriginal women with gestational diabetes (6.4 per cent) was slightly lower than for non-Aboriginal women (7.0 per cent) (Table 56). However, a higher proportion of Aboriginal women had pre-existing diabetes (1.9 per cent) than non-Aboriginal woman (0.6 per cent) (Table 57).

Following vaginal birth, compared to non-Aboriginal women, Aboriginal women had a higher proportion of intact perineum and less than half the proportion having an episiotomy (Table 63).

### Aboriginal infants

Of infants born to Aboriginal women, 2.0 per cent were stillborn compared to 0.8 per cent of those born to non-Aboriginal women. The proportion of stillbirths that occurred before onset of labour were almost equal for these groups (Table 64).

The proportion of infants born to Aboriginal women that had low birthweight was 14.1 per cent compared with 6.2 per cent for infants of non-Aboriginal mothers (Table 67).

In the most recent decade, since 2001, the relative risk for an infant of an Aboriginal mother having a low birthweight compared to an infant of other mothers decreased from 2.5 times to 2.3 times the risk (Table 70).

### All Infants

In 2011, there were 32,191 infants born in Western Australia. Of these, 31,922 (99.2 per cent) were born alive and 269 were fetal deaths (0.8 per cent) (Table 73).

Despite an increase in number of infants born in the state, the crude birth rate declined from a high of 17.0 per 1000 total population in 1981 to 12.5 per 1000 in 2003. The crude birth rate was 13.6 per 1000 in 2011 (Table 73).

There were 31,286 singleton infants born, representing 97.2 per cent of total infants born. Of the 905 infants born as multiples (2.8 per cent) there were 438 sets of twins and 9 sets of triplets (Table 74). There were no births of higher order than triplet reported.

The proportion of births that were preterm was 8.6 per cent. Of all preterm infants, 92.3 per cent were born alive. The majority (74.4 per cent) of stillborn preterm infants were born before 28 weeks gestation (Table 76). Of the preterm liveborn infants, 92.1 per cent of those less than 32 weeks gestation were born in the Teaching hospital (Table 80).

An Apgar score between eight and ten at one minute of age was reported for 84.7 per cent of liveborn infants. An Apgar score at five minutes of eight to ten was recorded for 96.9 per cent liveborn infants (Table 87 and Table 88).

For liveborn infants, 22.8 per cent received some form of resuscitation at birth (Table 89).

There were 400 (1.2 per cent) live infants born at 23 to 31 weeks gestation. Of these, the majority were born in the public teaching hospital (87.5 per cent) (Table 80).

Of the liveborn infants, 10.5 per cent were admitted to a Special Care Nursery at the birth site. Length of stay in Special Care Nursery exceeded 7 days for 29.2 per cent of infants (Table 92).

Since 1980, the proportion of infants discharged home within one day of birth increased, particularly in the recent five years from 2006 (9.5 per cent) to the highest ever proportion of 16.5 per cent in 2011 (Figure 22).

### **Perinatal Mortality**

Among infants born in 2011 there were 269 fetal deaths and 63 neonatal deaths, a perinatal mortality rate of 10.3 per 1000 total births (Table 97).

The perinatal mortality rate for infants of Aboriginal mothers was 23.6 per 1000 infants born compared to 9.6 per 1000 infants of non-Aboriginal mothers (Table 97).

The perinatal mortality rate for infants of multiple births (35.4 per 1000 infants born) was almost four times the rate for singleton infants (9.6 per 1000) (Table 102).

Cause of death for almost two-thirds of fetal deaths was determined to be either extremely low birthweight (31.6 per cent) or lethal birth defects (30.1 per cent) (Table 105).

Cause of death for more than two-thirds of neonatal deaths was determined to be either extremely low birthweight (36.5 per cent) or lethal birth defects (30.2 per cent) (Table 105).

## 1. Introduction

This is the twenty-ninth annual report on perinatal statistics in Western Australia (WA) from the Midwives' Notification System (MNS).

All data presented here are in statistical form with values less than 5 suppressed and suppression indicated with \*\*\*. There is no identification of individual patients, midwives or doctors. Some data identifies hospitals when permitted. Readers requiring suppressed values can request these data directly from the Maternal and Child Health Unit.

The report contains information on women who gave birth in WA in 2011 and their infants. Pregnancies that resulted in an infant at or greater than 20 weeks gestation or more than 400 grams in weight have been included. These criteria are in accordance with national reporting methods (AIHW 2009).

The report presents an overview of data on births for 2011 in terms of maternal demography, procedures and infant outcomes. It also describes trends over the collection period from 1980 to 2011 (where available). Information on women resident in this State who gave birth outside WA is not included in this report.

To ensure complete ascertainment of births and perinatal deaths within WA, information is collated from the WA MNS, the WA Hospital Morbidity System and the WA Registry of Births, Deaths and Marriages. These data are maintained separately as state-wide data collections.

This report includes some hospital level data with the permission of the Chief Executive Officers of maternity services in Western Australia. The WA Country Health Service data is presented in regions in these tables to more appropriately reflect the service model provided in those regions.

### 1.1. Changes to report format and content

Changes were introduced to notification of birth data required of midwives. These additional data have been used in this report to describe births in 2011. The changes were:

- addition of “combined spinal/epidural” as value to be reported for analgesia during labour
- addition of “combined spinal/epidural” as value to be reported for anaesthesia at delivery
- addition of “4<sup>th</sup> degree tear” as value separate from “3<sup>rd</sup> degree tear” to be reported for perineal status; and
- addition of “anteartum stillborn” and “intrapartum stillborn” as values separate from “stillborn unspecified” to be reported for infant’s birth status.

Aboriginal women, their pregnancies, births and infants have been described in a separate chapter in this report for the first time.

Data about significant morbidity as an outcome of pregnancy and childbirth have been included in this report for the first time.

Trend data from previous years has been updated with current data from the MNS Collection and population data. This publication presents trend data that is different from trend data published in previous versions of this report.

Tables for ACHS Indicators for 2011 births in WA have been excluded from this Report. The Western Australia's Mothers and Babies Report for 2012 births will report these Indicator results for both 2011 and 2012 births.

### 1.2. Legal status of perinatal statistics in Western Australia

Western Australia's statutory reporting requirements are outlined in the Health Act 1911, Section 355(1): “It shall be the duty of every midwife to furnish to the Executive Director, Public Health and to the medical officer of health of the district in which she practises a report in writing in the manner and at the time and in the form prescribed of every case attended by her, whether of living, premature or full-term birth, or stillbirth, or abortion.”

The birth notification report should be submitted within 48 hours of the birth. This enables the Community Child Health Nurse to monitor the health and welfare of the mother and her infant.

A more comprehensive Notification of Case Attended (NOCA) (Form 2, Appendix C) form is also to be submitted as required by the Health (Notifications by Midwives) Regulations 1994. The submission of data should happen after the infant has been discharged from hospital, or in the case of home birth, when the midwife is satisfied the birth event has been completed.

The NOCA form can be updated without amendments to the Act. The last update to include new variables and values was in 2011. In 2011, one new data item was added to the collection to comply with National Minimum Data Set requirements.

A midwife who enters into private practice must notify the Executive Director of Public Health of this intention. Initial contact should be made to the Principal Midwifery Adviser to the Chief Nurse and Midwifery Officer to formalise the process. The Midwifery Adviser to the Chief Nursing Officer is now the delegate for the Executive Director of Public Health for receiving notice from midwives to undertake private practice.

### 1.3. Midwives' Notification System

The MNS is an Oracle database storing birth data since 1980. Data are submitted electronically from a number of feeder systems or manually in paper forms. The main electronic feeder systems providing birth data in 2011 were Stork, the Midwives' Data Entry Package (MDEP), the South West System until replaced by Stork in July 2011, the IBA system from the Ramsay Group hospitals and the Midwives System from the SJOG Group. Stork is managed by the Department of Health's Health Information Network and the MDEP is maintained by the Maternal and Child Health Unit. Rural public maternity services provided their 2011 data via Stork, MDEP or paper form.

### 1.4. Aboriginal status

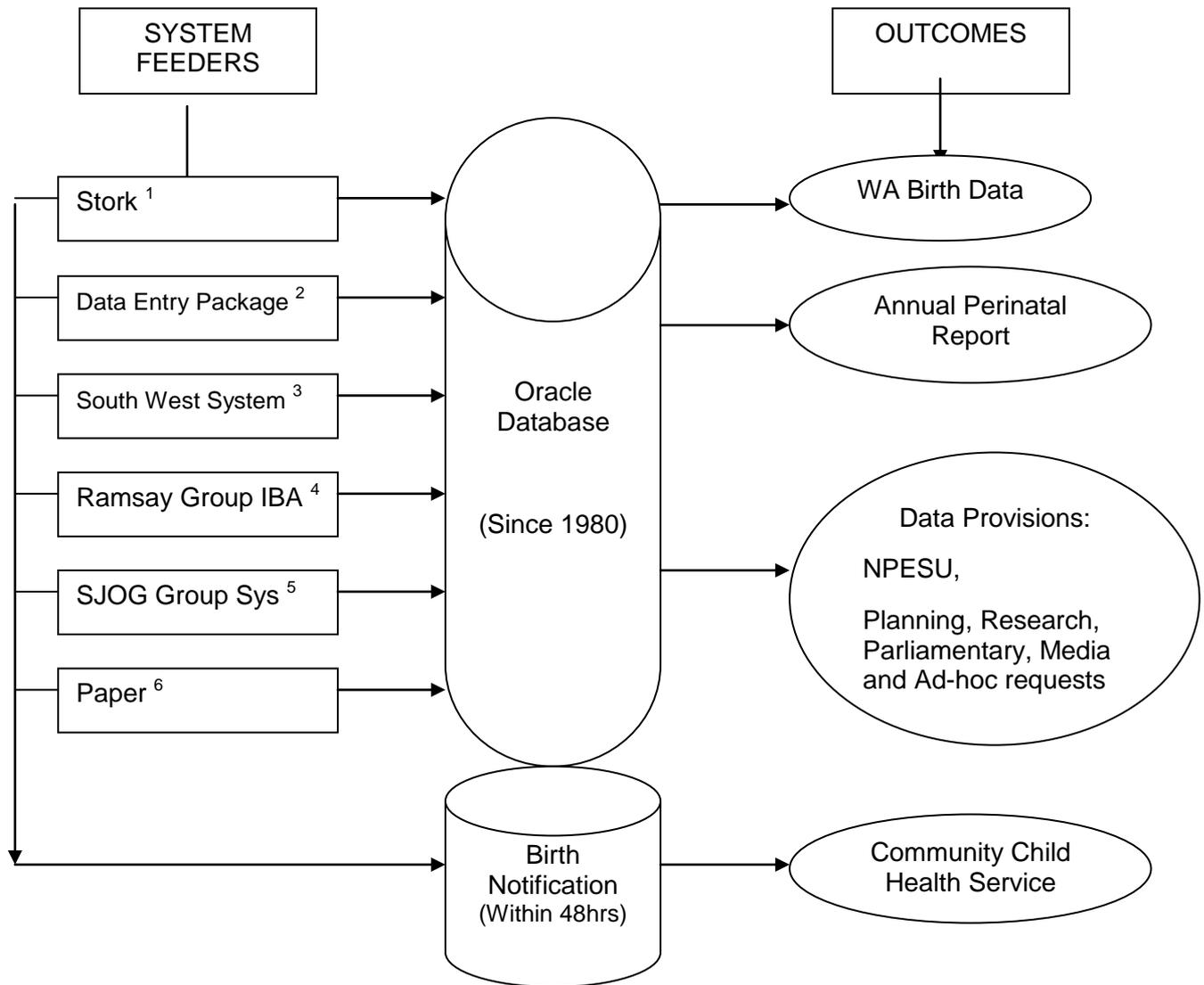
Within Western Australia, the term Aboriginal is used in preference to Aboriginal and Torres Strait Islander, in recognition that Aboriginal people are the original inhabitants of Western Australia. No disrespect is intended to our Torres Strait Islander colleagues and community.

Reporting Aboriginal status for women included in this report relied on multi-step processes in place at health services. Usually, women completed a "Patient Registration" health record form which included a requirement to respond yes or no to the question of whether they are of Aboriginal or Torres Strait Islander descent". This form was completed at every presentation to a health service with most women expected to confirm the content multiple times during a pregnancy and birth admission. When notifying a birth to the MNS, the midwife would have referred to this health record form to complete the ethnicity data item. The relationship between the midwife and the woman could have provided knowledge and opportunity to report a different ethnicity to MNS than that recorded on the health record form.

A WA Department of Health Audit conducted in 2001 found that Aboriginal status was under ascertained in WA hospitals with 85.8 per cent of Aboriginal people found to be accurately reported in the hospital morbidity data. There was a range across health regions of 78.3 to 93.5 per cent. A recommendation of the audit was for a correction factor to be used when reporting health data to overcome under-ascertainment of Aboriginal status (Young, M 2001). This Mothers and Babies report has not employed the correction factor, nor have previous reports in this series.

A validation of MNS data was last conducted in 2007 on data for the calendar year 2005. A review of the medical records for 525 (2%) randomly selected midwives' birth reports received to the MNS was conducted where data received was compared to the physical medical record. The MNS data field "Ethnicity" includes reporting of Aboriginal/TSI as one of a number of other ethnicities for the mother. 5.9% of birth records were found to have a different ethnicity to that recorded in the medical record (Downey, F 2007). Considering that the Young (2001) audit found that the Aboriginal status recorded in the health medical record was incorrect in a proportion of records, it is unknown whether the smaller difference found in the validation of Aboriginal status in birth data in MNS was due to improved ascertainment as a consequence of the Young audit. Validation of MNS data is due to be repeated and the design of the project will include accuracy of ascertainment of maternal Aboriginal status and infant Aboriginal status for births occurring from Jan 2012.

**1.5. Data provision model for Midwives' Notification System - 2011**



**1.6. Data Sources for the 2011 birth data**

- |   |                                |                                                                                                                                                                                                                                                                                                                                                                        |
|---|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Stork                          | Armadale Kelmscott Memorial Hospital, Bentley Health Service, Bunbury Regional Hospital, Community Midwife Program, Kaleeya Hospital, King Edward Memorial Hospital, Osborne Park Hospital, Rockingham General Hospital and Swan District Hospital (from Jul 2011, Bridgetown Hospital, Busselton Hospital, Collie Hospital, Margaret River Hospital, Warren Hospital) |
| 2 | Midwives Data Entry Package    | Albany Hospital, Broome Hospital, Carnarvon Hospital, Esperance Hospital, Geraldton Hospital, Kalgoorlie Hospital, Katanning Hospital, Kellerberrin Memorial Hospital, Mercy Hospital, Narrogin Hospital, Nickol Bay Hospital, Peel Health Campus, St John of God – Murdoch, St John of God – Subiaco, St John of God – Geraldton, St John of God - Bunbury            |
| 3 | South West System til Jun 2011 | Bridgetown Hospital, Busselton Hospital, Collie Hospital, Margaret River Hospital, Warren Hospital                                                                                                                                                                                                                                                                     |
| 4 | Ramsay Group IBA               | Attadale Hospital, Glengarry Hospital, Joondalup Health Campus                                                                                                                                                                                                                                                                                                         |
| 5 | SJOG Group System              | Commenced use in late 2011.                                                                                                                                                                                                                                                                                                                                            |
| 6 | Paper Forms                    | Denmark Hospital, Halls Creek Hospital, Kununnurra Hospital, Northam Hospital, Plantagenet Hospital, Port Hedland Hospital, private practising midwives, and others.                                                                                                                                                                                                   |

## 2. Mothers

In 2011, there were 31,734 women who gave birth in WA (Table 1). This was an increase of 891 women (2.9 per cent) from 2010 and was the highest annual number of women giving birth since 1974. Of women who gave birth, 5.4 per cent were Aboriginal, the remaining including those reported as caucasian, asian, indian or other (Table 1).

**Table 1: Aboriginal Status of Women who gave birth in WA, 2011**

Aboriginal Status	Number	Percentage
Aboriginal	1723	5.4
non-Aboriginal	30011	94.6
<b>Total</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

### 2.1. Maternal demographics

#### 2.1.1. Maternal age

The age of mothers that gave birth in 2011, ranged from 13 to 54 years with a mean of 29.7 years and a median of 30 years.

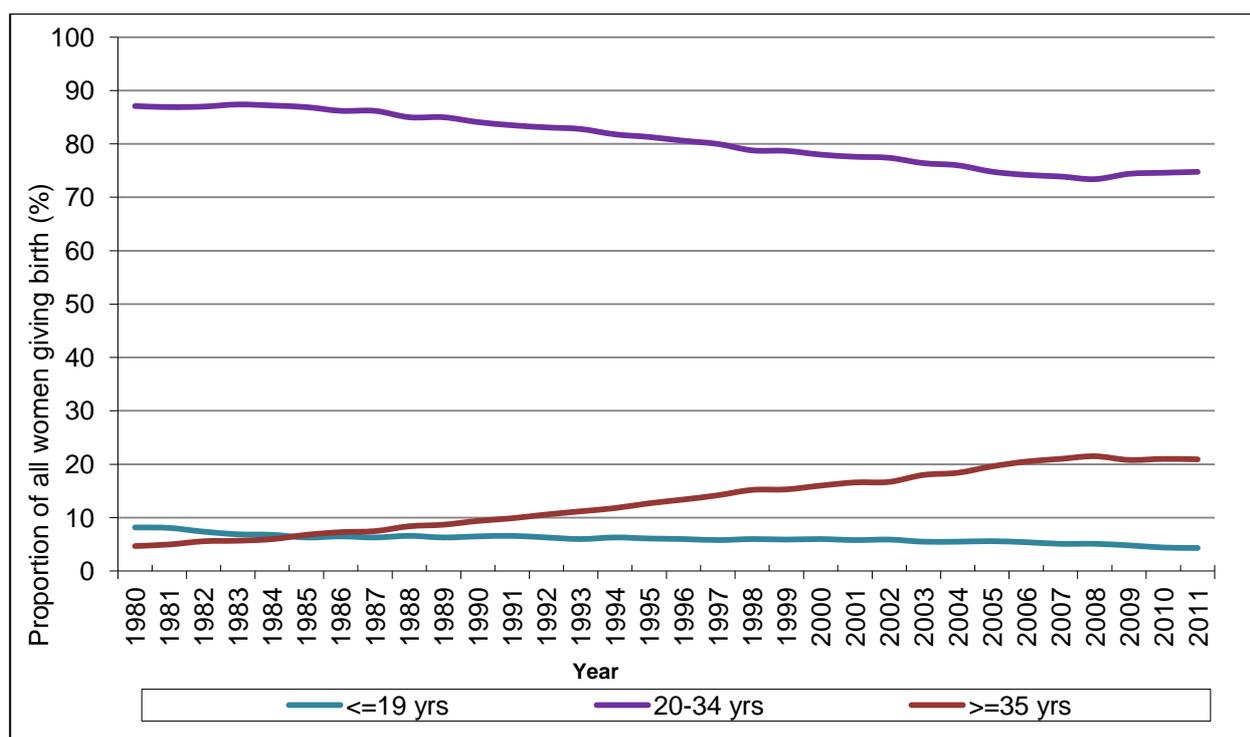
Over the past three decades, the proportion of women giving birth that were teenaged declined from 8.2 per cent in 1980 to 4.3 per cent in 2011. The proportion of women aged 20 to 34 years also decreased from 87.4 per cent in 1983 to 73.4 per cent in 2007. This proportion increased slightly to 74.8 per cent in 2011. In the same period, the proportion of women aged 35 years or older increased from 4.7 per cent in 1980 and was 20.9 per cent in 2011 (Figure 1, Table 2).

**Table 2: Age of Mother giving birth in WA 1980-2011**

Year of Birth	Maternal Age						Total No.
	≤19		20-34		≥ 35		
	No.	%	No.	%	No.	%	
1980	1698	8.2	17928	87.1	969	4.7	20595
1981	1770	8.1	19110	86.9	1100	5.0	21980
1982	1643	7.4	19271	87.0	1238	5.6	22152
1983	1577	6.9	19955	87.4	1294	5.7	22826
1984	1542	6.8	19807	87.2	1354	6.0	22703
1985	1455	6.3	20062	86.9	1559	6.8	23076
1986	1535	6.5	20344	86.2	1724	7.3	23603
1987	1494	6.3	20597	86.2	1804	7.5	23895
1988	1635	6.6	21084	85.0	2083	8.4	24802
1989	1586	6.3	21372	85.0	2199	8.7	25157
1990	1662	6.5	21617	84.1	2423	9.4	25702
1991	1639	6.6	20599	83.5	2440	9.9	24678
1992	1574	6.3	20756	83.1	2639	10.6	24969
1993	1496	6.0	20670	82.8	2807	11.2	24973
1994	1592	6.3	20515	81.8	2964	11.8	25071
1995	1521	6.1	20391	81.3	3176	12.7	25088
1996	1521	6.0	20298	80.6	3374	13.4	25193
1997	1446	5.8	19898	80.0	3524	14.2	24868
1998	1520	6.0	19926	78.8	3846	15.2	25292
1999	1509	5.9	19977	78.7	3891	15.3	25377
2000	1479	6.0	19366	78.0	3972	16.0	24817
2001	1423	5.8	19007	77.6	4065	16.6	24495
2002	1438	5.9	18874	77.4	4084	16.7	24396
2003	1338	5.5	18557	76.4	4380	18.0	24275
2004	1390	5.5	19092	76.0	4630	18.4	25112
2005	1484	5.6	19849	74.8	5192	19.6	26525
2006	1514	5.4	20960	74.2	5780	20.5	28254
2007	1512	5.1	21900	73.9	6217	21.0	29629
2008	1534	5.1	22188	73.4	6509	21.5	30231
2009	1468	4.8	22880	74.4	6400	20.8	30748
2010	1351	4.4	22998	74.6	6486	21.0	30835
2011	1367	4.3	23727	74.8	6640	20.9	31734

Extracted from Midwives' Notification System on 17 December 2013.

Figure 1: Age Groups of Women Giving Birth in WA, 1980-2011



### 2.1.2. Place of Residence

The state of Western Australia is divided geographically into three health areas and nine health regions. The metropolitan areas are also defined as regions, while the country area has seven regions<sup>1</sup>.

The majority of women that gave birth in WA in 2011 (77.6 per cent) resided in the metropolitan health regions. Of the country health regions, the Southwest had the largest proportion (6.5 per cent) (Table 3).

Table 3: Region of Residence of Women who gave birth in WA, 2011

Region of Residence (postcode)	Total	
	No.	%
<b>Metropolitan Health Regions</b>	<b>24632</b>	<b>77.6</b>
North	12562	39.6
South	12070	38.0
<b>Country Health Regions</b>	<b>7075</b>	<b>22.3</b>
Kimberley	651	2.1
Pilbara	856	2.7
Midwest	934	2.9
Wheatbelt	910	2.9
Goldfields	899	2.8
Southwest	2051	6.5
Great Southern	774	2.4
Not resident in WA health region	27	0.1
<b>Total</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> See Glossary for explanation of Health Area and Health Region

### 2.1.3. Country of birth

The country of birth was recorded in the Hospital Morbidity Data System (HMDS) for 31,123 of the 31,734 women who gave birth in WA in 2011 (Table 4).

Of these women, approximately one-third (33.9 per cent) were born in countries other than Australia. Mothers born in the United Kingdom accounted for a relatively high proportion of all mothers in WA (7.2 per cent). New Zealand-born mothers constituted 3.9 per cent of all women giving birth. Mothers born in Asian countries had the highest proportion of non-Australian birthplaces (12.3 per cent) (Table 4).

**Table 4: Maternal Country of Birth, WA 2011**

Country of birth	Maternal age						Total	
	≤ 19		20–34		≥ 35		No.	%
	No.	%	No.	%	No.	%	No.	%
<b>Oceania</b>								
Australia	1180	87.3	15496	66.6	3885	59.8	20561	66.1
New Zealand	64	4.7	909	3.9	238	3.7	1211	3.9
<b>Europe</b>								
United Kingdom and Ireland	39	2.9	1474	6.3	725	11.2	2238	7.2
Other Europe	7	0.5	596	2.6	223	3.4	826	2.7
<b>Asia</b>								
Vietnam	***	***	206	0.9	68-71	1.1	278	0.9
Malaysia	***	***	300	1.3	104-107	1.6	408	1.3
Other SE Asia	9	0.7	895	3.8	323	5.0	1227	3.9
Other Asia	***	***	1590	6.8	330-333	5.1	1924	6.2
<b>Africa</b>								
South Africa and Zimbabwe	11	0.8	483	2.1	195	3.0	689	2.2
Other Africa and Middle East	32	2.4	932	4.0	239	3.7	1203	3.9
<b>Americas</b>								
North America	***	***	182	0.8	71-74	1.1	257	0.8
South and Central America	-	-	135	0.6	69	1.1	204	0.7
Other Pacific	***	***	73	0.3	20-23	0.4	97	0.3
<b>Total</b>	<b>1352</b>	<b>100.0</b>	<b>23271</b>	<b>100.0</b>	<b>6500</b>	<b>100.0</b>	<b>31123</b>	<b>100.0</b>

Extracted from Midwives' Notification system 17 December 2013 with country of birth data provided from the Hospital Morbidity Data System.

There were 611 cases (1.9 per cent) where the mother's county of birth was unable to be ascertained.

Values <5 are suppressed and indicated with \*\*\*, values in the same row are provided as a range to prevent calculation of the suppressed value.

In the 5-year period 2007 to 2011, 70.4 per cent of all mothers were born in Australia (Table 5). The proportion of Australian born women giving birth continued to decline.

**Table 5: Maternal Country of Birth in WA, 2007-2011**

Country groups	2007		2008		2009		2010		2011	
	No.	%								
<b>Oceania</b>										
Australia	21145	73.0	20856	71.1	20997	70.0	20552	68.3	20560	66.1
New Zealand	953	3.3	1063	3.6	1155	3.9	1156	3.8	1212	3.9
<b>Europe</b>										
UK & Ireland	2291	7.9	2210	7.5	2168	7.2	2173	7.2	2238	7.2
Other Europe	689	2.4	739	2.5	752	2.5	753	2.5	826	2.7
<b>Asia</b>										
Vietnam	307	1.1	311	1.1	298	1.0	268	0.9	278	0.9
Malaysia	299	1.0	295	1.0	316	1.1	334	1.1	408	1.3
Other SE Asia	810	2.8	914	3.1	991	3.3	1045	3.5	1227	3.9
Other Asia	792	2.7	965	3.3	1229	4.1	1603	5.3	1924	6.2
<b>Africa</b>										
South Africa & Zimbabwe	456	1.6	598	2.0	640	2.1	653	2.2	689	2.2
Other Africa & Middle East	827	2.9	915	3.1	977	3.3	1099	3.7	1203	3.9
<b>Americas</b>										
North America	199	0.7	212	0.7	231	0.8	211	0.7	257	0.8
South & Central America	127	0.4	168	0.6	177	0.6	173	0.6	204	0.7
Other Pacific	64	0.2	83	0.3	64	0.2	89	0.3	97	0.3
<b>Total</b>	<b>28959</b>	<b>100.0</b>	<b>29329</b>	<b>100.0</b>	<b>29995</b>	<b>100.0</b>	<b>30109</b>	<b>100.0</b>	<b>31123</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

There were 3,662 cases (670, 902, 753, 726 and 611 by year) where the mother's county of birth was unable to be ascertained.

#### 2.1.4. Marital status

At the time of giving birth, 85.0 per cent of women in WA were reported as being in a married or defacto relationship. Single women represented 12.8 per cent and the remaining women (2.2 per cent) were either separated, divorced or widowed (Table 6).

Single women have increased in proportion by 3.6 per cent from 9.2 per cent in 2009 and married/defacto women have decreased in proportion by 3.5 per cent.

**Table 6: Marital Status and Plurality of Women who gave birth in WA, 2011**

Marital status	Plurality				Total	
	Single		Multiple		No.	%
	No.	%	No.	%		
Single	3985	12.7	67	15.0	4052	12.8
Married/Defacto	26604	85.0	368	82.1	26972	85.0
Other <sup>1</sup>	697	2.2	13	2.9	710	2.2
<b>Total</b>	<b>31286</b>	<b>100.0</b>	<b>448</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> "Other" marital status included separated, divorced and widowed.

### 2.1.5. Place of birth

Among women resident in the metropolitan health areas, the majority of women gave birth in hospitals within their own health area (72.5 per cent) or at the Teaching hospital (20.2 per cent) (Table 7 and Figure 2).

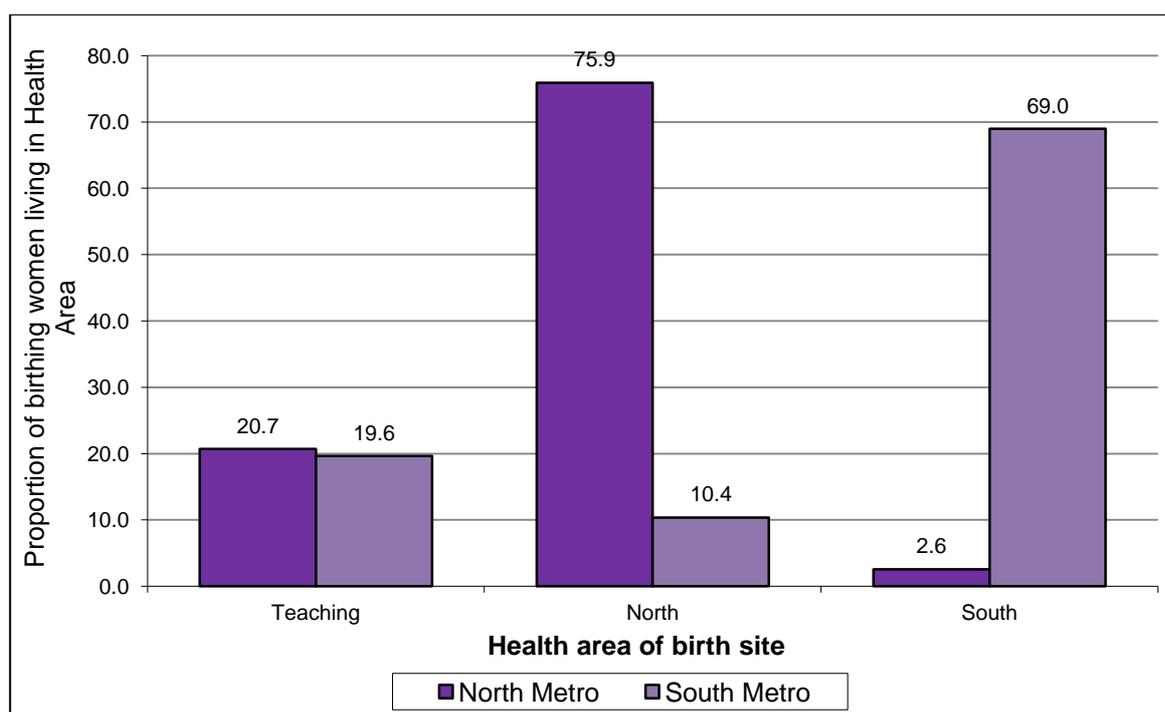
Table 7: Place of Birth for Women Resident in Metropolitan Health Areas in WA, 2011

Health area of residence	Health area of birth site					Total
	Own area	Other metro area	Teaching	Country area	Homebirths	
<b>Number</b>						
North Metro	9534	322	2601	4	101	12562
South Metro	8323	1250	2370	17	110	12070
<b>Total</b>	<b>17857</b>	<b>1572</b>	<b>4971</b>	<b>21</b>	<b>211</b>	<b>24632</b>
<b>Row Percentage</b>						
North Metro	75.9	2.6	20.7	0.0	0.8	100.0
South Metro	69.0	10.4	19.6	0.1	0.9	100.0
<b>Total</b>	<b>72.5</b>	<b>6.4</b>	<b>20.2</b>	<b>0.1</b>	<b>0.9</b>	<b>100.0</b>
<b>Column Percentage</b>						
North Metro	53.4	20.5	52.3	19.0	48.1	51.0
South Metro	46.6	79.5	47.7	81.0	51.9	49.0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Homebirths are allocated to a health area of birth site by assuming the birth took place in woman's own home.

Figure 2: Place of Birth for Women Resident in Metropolitan Health Area in WA, 2011



Among women who were resident in the country area, 77.1 per cent (5,454) of the women gave birth at a country hospital and 31 (0.4 per cent) women had homebirths. A further 1,590 (22.5 per cent) country women gave birth in the metropolitan Teaching hospital (708) or other metropolitan hospital (882).

Three-quarters of country women (75.6 per cent) gave birth in their own health region. (Table 8).

**Table 8: Place of Birth for Women Resident in Country Health Regions in WA, 2011**

Health region of residence	Birth hospital health region						Total
	Own Region	Other WACHS	Teaching	North Metro	South Metro	Home	
<b>Number</b>							
Kimberley	536	***	93	14	***	***	651
Pilbara	562	40	86	107	61	-	856
Midwest	777	9	92	41	15	-	934
Wheatbelt	189	31	194	377	118	***	910
Goldfields	811	***	57	20	10	-	899
Southwest	1849	***	112	43	20	23	2051
Great Southern	626	16	74	39	16	***	774
<b>Total</b>	<b>5350</b>	<b>104</b>	<b>708</b>	<b>641</b>	<b>241</b>	<b>31</b>	<b>7075</b>
<b>Row Percentage</b>							
Kimberley	82.3	***	14.3	2.2	***	***	100.0
Pilbara	65.7	4.7	10.0	12.5	7.1	-	100.0
Midwest	83.2	1.0	9.9	4.4	1.6	-	100.0
Wheatbelt	20.8	3.4	21.3	41.4	13.0	***	100.0
Goldfields	90.2	***	6.3	2.2	1.1	-	100.0
Southwest	90.2	***	5.5	2.1	1.0	1.1	100.0
Great Southern	80.9	2.1	9.6	5.0	2.1	***	100.0
<b>Total</b>	<b>75.6</b>	<b>1.5</b>	<b>10.0</b>	<b>9.1</b>	<b>3.4</b>	<b>0.4</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row are provided as a range to prevent calculation of the suppressed value.

### 2.1.6. Place of birth event

As well as the actual place of birth of an infant, midwives reported the Intended Place of Birth at the time of onset of labour.

Eighty-two women of 31,734 (0.3 per cent) who gave birth in WA in 2011 had no intended place of birth recorded. Of the remaining women, 97.0 per cent intended to give birth in a hospital, 2.0 per cent in a birth centre and 1.0 per cent at home.

Of the women intending to give birth in a hospital, 15 gave birth at a birth centre or at home. Of the 629 women intending to give birth in a birth centre, 349 (55.5 per cent) achieved this goal. For women intending to have birth at home, 78.0 per cent achieved a birth at home.

The teaching hospital reported births for 286 women that did not intend to give birth in a hospital. These comprised 4.6 per cent (birth centre) and 0.8 per cent (homebirth) of the total women giving birth at the Teaching hospital (Table 9).

**Table 9: Place of Birth and Intended Place of Birth in WA, 2011**

Actual place of birth	Intended place of birth			Total
	Hospital	Birth Centre	Home	
<b>Number</b>				
Teaching hospital <sup>1</sup>	4995	244	42	5281
Public hospital <sup>2</sup>	12983	16	21	13020
Private hospital <sup>3</sup>	12725	19	***	12747
Birth centre	14	349	***	364
Home	***	***	238	240
<b>Total</b>	<b>30718</b>	<b>629</b>	<b>305</b>	<b>31652</b>
<b>Percentage by actual place of birth</b>				
Teaching hospital	94.6	4.6	0.8	100.0
Public hospital	99.7	0.1	0.2	100.0
Private hospital	99.8	0.1	0.0	100.0
Birth centre	3.8	95.9	0.3	100.0
Home	***	0.4	99.2	100.0
<b>Total</b>	<b>97.0</b>	<b>2.0</b>	<b>1.0</b>	<b>100.0</b>
<b>Percentage by intended place of birth at onset of labour</b>				
Teaching hospital	16.3	38.8	13.8	16.7
Public hospital	42.3	2.5	6.9	41.1
Private hospital	41.4	3.0	***	40.3
Birth centre	0.0	55.5	***	1.2
Home	***	***	78.0	0.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

126 cases that were reported as Born Before Arrival were included for reporting site's place of birth type.

82 cases did not have intended place of birth specified and were excluded from data presented in this table.

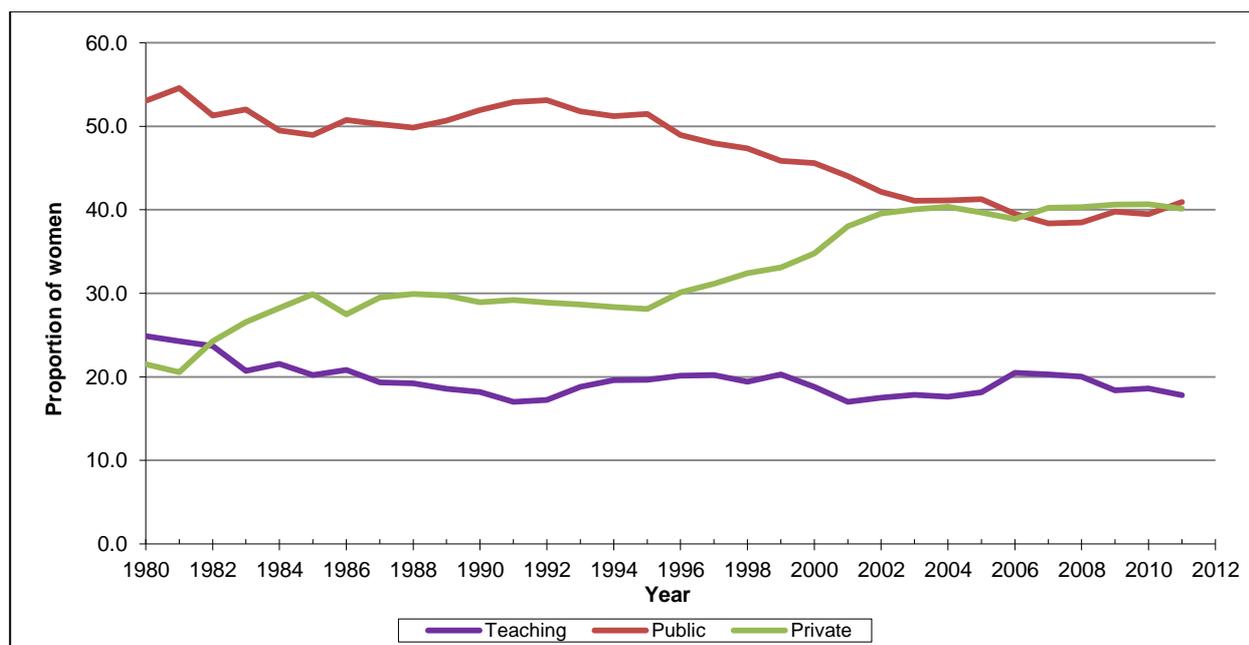
Values <5 are suppressed and indicated with \*\*\*, values in the same row are provided as a range to prevent calculation of the suppressed value.

Trend data indicate that the proportion of births at private hospitals over the past 30 years has increased and now equals the proportion that occurred at public hospitals, excluding the Teaching hospital. This increase mostly occurred in the period 1997–2001. The proportion of births at the Teaching hospital remained relatively constant. In the most recent 5-year period, this proportion was between 16.7 and 20.3 per cent of the women giving birth (Table 108 and Figure 3).

<sup>1</sup> Maternity Hospitals recognised as a Teaching Hospital for the University Medical Schools (University Medical School, Teaching Hospitals, Act 1955 n.d.)

<sup>2</sup> Includes all maternity services located at public hospitals in Western Australia

<sup>3</sup> Includes private and public admissions at private hospitals in Western Australia

**Figure 3: Trend Use of Public and Private Hospitals by Women giving Birth WA, 1980-2011**

Women who gave birth while admitted publicly in private hospitals are reported here as occurring in private hospitals.

Plurality of pregnancy influenced the place of birth. Metropolitan teaching hospitals were the place of birth for 49.8 per cent of women with multiple pregnancy and 17.5 per cent of those with a single pregnancy.

Private hospitals in metropolitan or country areas were the location for 35.3 per cent of the multiple births and except for four mothers, the remaining women with multiple pregnancies gave birth at metropolitan non-teaching public hospitals (8.5 per cent) or regional country maternity services ((5.6 per cent) (Table 10).

**Table 10: Place of Birth and Plurality in WA, 2011**

Place of birth	Plurality				Total	
	Single		Multiple		No.	%
	No.	%	No.	%		
<b>Metropolitan</b>	<b>25604</b>	<b>81.8</b>	<b>410</b>	<b>91.5</b>	<b>26014</b>	<b>82.0</b>
Teaching hospital	5467	17.5	223	49.8	5690	17.9
Public hospital	8323	26.6	38	8.5	8361	26.3
Private hospital	11814	37.8	149	33.3	11963	37.7
<b>Country</b>	<b>5440</b>	<b>17.4</b>	<b>38</b>	<b>8.5</b>	<b>5478</b>	<b>17.3</b>
Regional hospital <sup>1</sup>	3213	10.3	25	5.6	3238	10.2
Private hospital	775	2.5	9	2.0	784	2.5
Other <sup>2</sup>	1452	4.6	***	***	1456	4.6
<b>Homebirths</b>	<b>242</b>	<b>0.8</b>	<b>-</b>	<b>-</b>	<b>242</b>	<b>0.8</b>
<b>Grand Total</b>	<b>31286</b>	<b>100.0</b>	<b>448</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

126 cases that were reported as Born Before Arrival were included for reporting site's place of birth type.

Values <5 are suppressed and indicated with \*\*\*, values in the same row or column are provided as a range to prevent calculation of the suppressed value.

<sup>1</sup> Country regional hospital – public hospital in regional centre.

<sup>2</sup> Other Country hospital – public hospital in the country but not in a regional centre.

### 2.1.7. Smoking tobacco during pregnancy

Smoking tobacco during pregnancy is associated with low birth weight, premature birth, and perinatal death.

From January 2010, the method for reporting tobacco smoking during pregnancy changed from a Yes or No response to providing the average number of tobacco cigarettes smoked each day before 20 weeks of pregnancy and after 20 weeks of pregnancy.

When the two new data values reported for tobacco smoking were combined, they indicated if the woman smoked tobacco in pregnancy. These combined data are presented below to enable comparison reporting with data published in previous annual reports. Because of the change in method of reporting, changes in rates between 2009 and 2010 should be interpreted with caution.

Data presented in Figure 4 and Figure 5 display the variation in rate of tobacco smoking across health regions of maternal residence. Many country regions have a higher proportion of women smoking or occasionally smoking than the metropolitan regions. For WA, the proportion of women not smoking increased after 20 weeks gestation by 1.5 per cent (470 women). There was no change after 20 weeks gestation in the proportion of women where smoking status was undetermined.

**Figure 4: Proportion of Women Smoking Tobacco in First 20 weeks in WA, 2011**

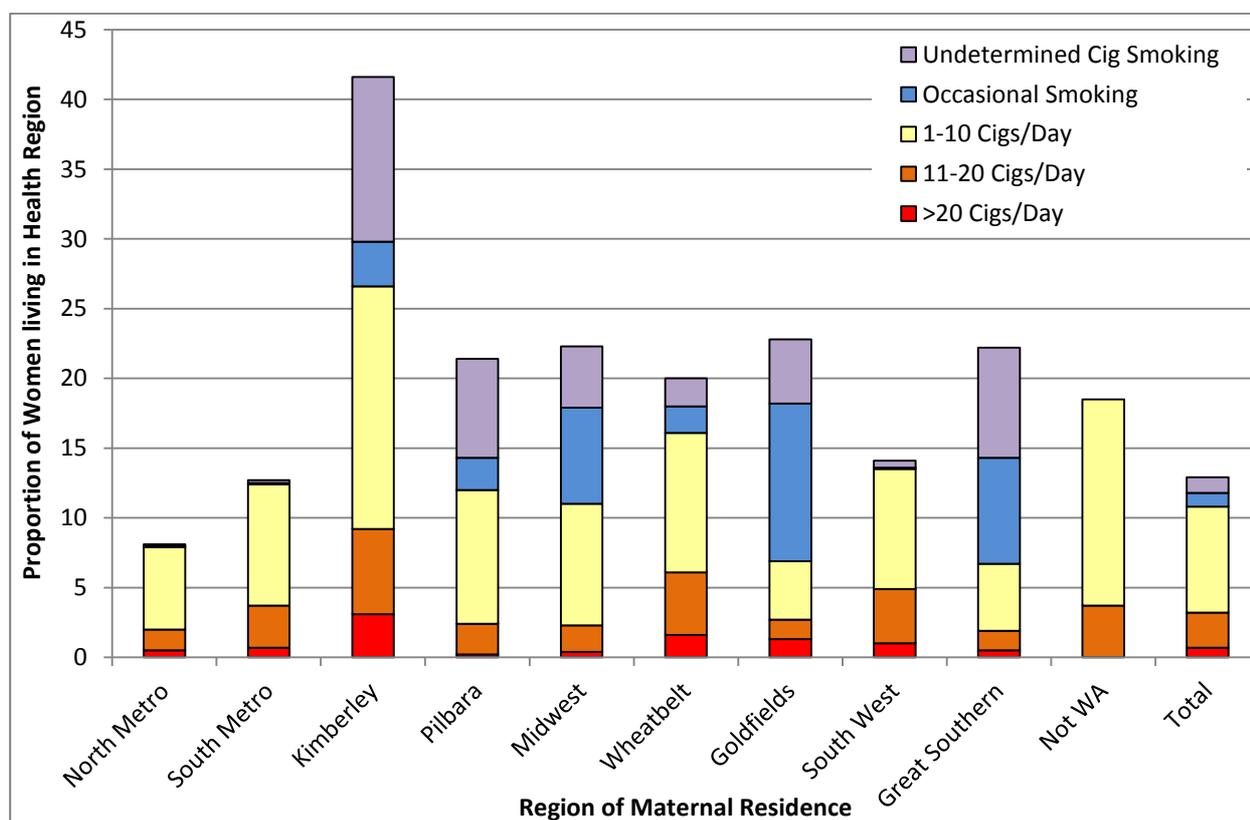
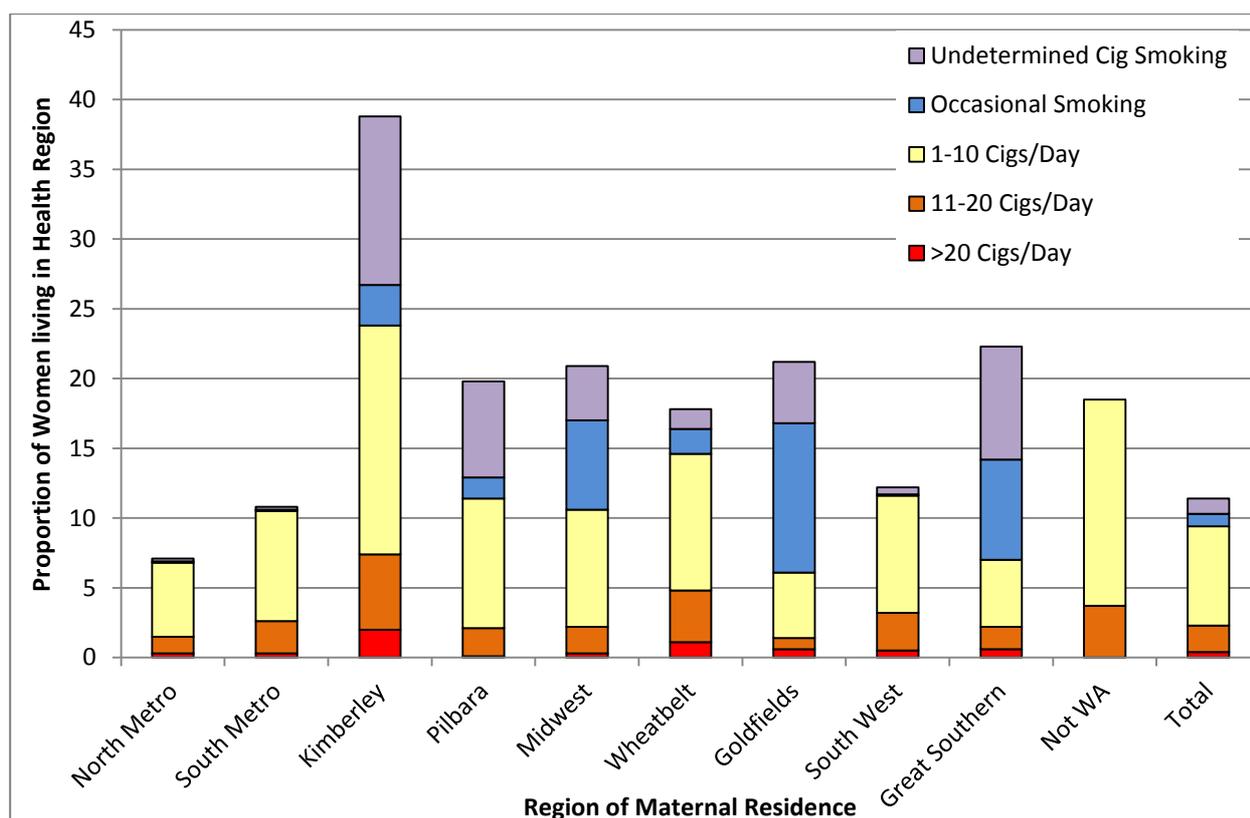


Figure 5: Proportion of Women Smoking Tobacco After 20 Weeks in WA, 2011



In 2011, 32.2 per cent of teenaged mothers smoking during pregnancy. As maternal age increased the proportion of women smoking tobacco decreased to 8.2 per cent of women who were 35 years or older. Women aged 30 to 34 years had the lowest proportion smoking tobacco (7.3 per cent). Overall, 12.1 per cent of women pregnant in WA were reported as smoking tobacco during pregnancy (Table 36).

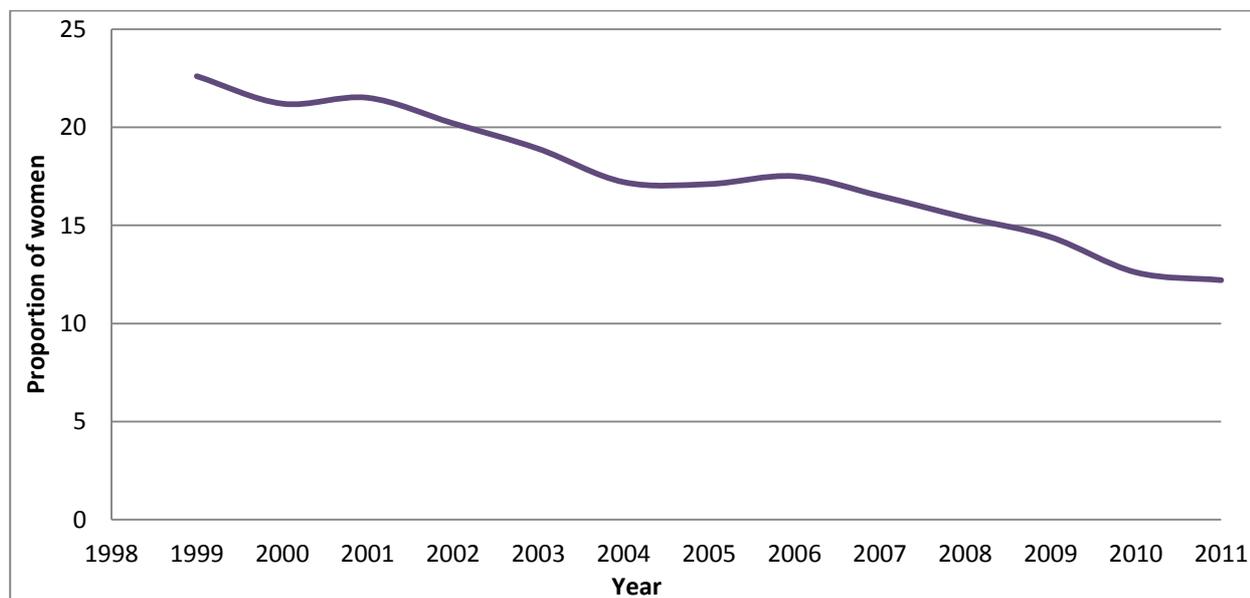
Table 11: Smoking and Age in WA, 2011

Age	Smoking in pregnancy				Total	
	Smoking		Non-smoking		No.	%
	No.	%	No.	%	No.	%
<=15	12	32.4	25	67.6	37	100.0
16	41	36.3	72	63.7	113	100.0
17	66	30.1	153	69.9	219	100.0
18	123	32.4	257	67.6	380	100.0
19	197	31.9	421	68.1	618	100.0
<b>≤19</b>	<b>439</b>	<b>32.1</b>	<b>928</b>	<b>67.9</b>	<b>1367</b>	<b>100.0</b>
20-24	1030	21.7	3718	78.3	4748	100.0
25-29	1090	12.0	7982	88.0	9072	100.0
30-34	722	7.3	9185	92.7	9907	100.0
35-39	442	8.2	4949	91.8	5391	100.0
>=40	102	8.2	1147	91.8	1249	100.0
<b>Total</b>	<b>3825</b>	<b>12.1</b>	<b>27909</b>	<b>87.9</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification system on 17 December 2013,  
70 women were aged 45 years and above.

The proportion of women reported as smoking tobacco during pregnancy declined from 22.6 per cent in 1999, when data was first collected in WA, to 12.1 per cent in 2011 (Figure 6 and Table 109).

**Figure 6: Trend in Smoking Tobacco in Pregnancy, WA 1998-2011**



In 2011, smoking tobacco during pregnancy was more likely in mothers born in New Zealand (22.9 per cent) and Australia (15.0 per cent) (Table 37). Mothers born in Asian or African countries were least likely to smoke tobacco during pregnancy. Eight per cent of European born mothers were reported as smoking tobacco in pregnancy.

**Table 12: Smoking Tobacco and Country of Birth in WA, 2011**

Country of birth	Smoking in pregnancy				Total	
	Smoking No.	Smoking %	Non-smoking No.	Non-smoking %	Total No.	Total %
<b>Oceania</b>						
Australia	3131	15.2	17451	84.8	20582	100.0
New Zealand	290	23.9	921	76.1	1211	100.0
<b>Europe</b>						
UK & Ireland	189	8.4	2049	91.6	2238	100.0
Other Europe	52	6.5	753	93.5	805	100.0
<b>Asia</b>						
Vietnam	***	0.4	277	99.6	278	100.0
Malaysia	***	0.7	405	99.3	408	100.0
Other SE Asia	28	2.3	1199	97.7	1227	100.0
Other Asia	19	1.0	1905	99.0	1924	100.0
<b>Africa</b>						
South Africa & Zimbabwe	35	5.1	654	94.9	689	100.0
Other Africa & Middle East	21	1.7	1182	98.3	1203	100.0
<b>America</b>						
North America	10	3.9	248	96.1	258	100.0
Other Pacific	8	7.4	100	92.6	108	100.0
South & Central America	***	1.5	191	98.5	194	100.0
<b>Total</b>	<b>3790</b>	<b>12.2</b>	<b>27335</b>	<b>87.8</b>	<b>31125</b>	<b>100.0</b>

Extracted from Midwives' Notification system on 17 December 2013.

609 women excluded in table as their country of birth was not reported.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

### 2.1.8. Socio-economic status

Socio-economic status was assessed for residential area all women who gave birth in WA in 2011. A small number of women (859 or 2.7 per cent) had insufficient data to be included.

The Index of Relative Socio-Economic Disadvantage (IRSD) from the Socio-Economic Index for Areas (SEIFA) determined from the 2011 Australian Census data was used<sup>1</sup>. The Index summarises different measures like low income, low education, and high unemployment to obtain a ranking of each area's disadvantage called the index value, average index value and quantiles. Quantiles which divide the distribution of index values into five equal parts are referred to as quintiles.

In the quintiles presented below in Table 13, "I" indicates women who gave birth while living in areas within the 20 per cent most disadvantaged of IRSD values in WA in 2011. "V" indicates women who gave birth while living within areas within the 20 per cent least disadvantaged of IRSD in WA in 2011.

In women aged 19 years or less, most (61.0 per cent) have an IRSD value in the first and second quintile, indicating most of these women live in areas that are disadvantaged. In women aged 20 to 34 years that gave birth in 2011, the largest proportion (24.1 per cent) was in the fourth quintile indicating residence in areas of less disadvantage. For older women aged 35 years or more, the largest proportion (26.6 per cent) were also in the fourth quintile.

When comparing contribution by age group in each quintile, women aged 35 years had their highest proportion in the fifth quintile or least disadvantaged group for residential area (29.9 per cent), while teenaged women had their highest proportion in the first quintile or most disadvantaged group (8.9 per cent).

**Table 13: Socio-Economic Status and Age of Women in WA, 2011**

Disadvantage <sup>1</sup>	Maternal age (years)			Total
	≤ 19	20–34	≥ 35	
<b>Number</b>				
I	525	4485	890	5900
II	294	4089	949	5332
III	247	5276	1329	6852
IV	208	5547	1720	7475
V	70	3657	1589	5316
<b>Total</b>	<b>1344</b>	<b>23054</b>	<b>6477</b>	<b>30875</b>
<b>Percentage by Column</b>				
I	39.1	19.5	13.7	19.1
II	21.9	17.7	14.7	17.3
III	18.4	22.9	20.5	22.2
IV	15.5	24.1	26.6	24.2
V	5.2	15.9	24.5	17.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Percentage by Row</b>				
I	8.9	76.0	15.1	100.0
II	5.5	76.7	17.8	100.0
III	3.6	77.0	19.4	100.0
IV	2.8	74.2	23.0	100.0
V	1.3	68.8	29.9	100.0
<b>Total</b>	<b>4.4</b>	<b>74.7</b>	<b>21.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

IRSD values were determined from maternal address using the Statistical Area 2 value (SA2).

859 cases were excluded as there was no SA2 value able to be assigned.

<sup>1</sup> For more information on the Disadvantage Index from SEIFA go to <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2033.0.55.001Main+Features12011?OpenDocument>.

## 2.2. Pregnancy profile

### 2.2.1. Parity

Data collected in WA, reported parity as number of infants born from previous pregnancies rather than number of previous pregnancies resulting in birth.

In Table 14, 42.5 per cent of the women who gave birth in WA during 2011 gave birth to their first infant. The average age of mothers having their first baby in 2011 was 27.9 years and the median age was 28.0 years.

Of the 13,487 women giving birth for the first time (Table 14):

- 8.3 per cent (1,118) were teenagers ( $\leq 19$  years)
- 78.3 per cent (10,553) were aged 20–34 years
- 13.5 per cent (1,816) were aged 35 years or more
- mean maternal age was 28.0 years
- median maternal age was 28 years and
- mode for maternal age was 29 years.

Of the 15,622 women who have had either one or two previous infants (Table 14):

- 1.6 per cent (248) were teenage women
- 73.8 per cent (11,529) were women aged 20–34
- 24.6 per cent (3,845) were women aged 35 or more
- mean maternal age was 30.6 years
- median maternal age was 31 years and
- mode for maternal age was 32 years.

Among the 6,640 women giving birth who were aged 35 years or more, 1,816 (27.3 per cent) were having their first baby.

**Table 14: Previous Infants and Age of Mother in WA, 2011**

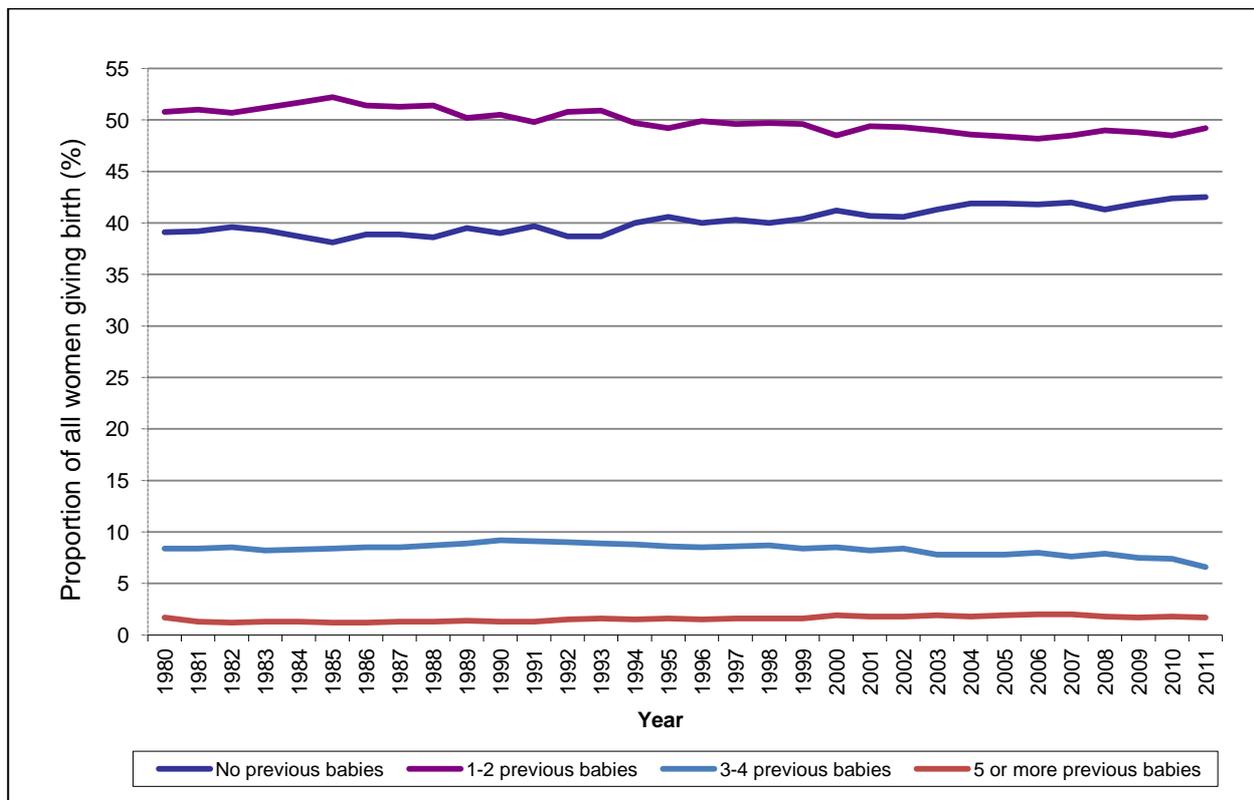
Number of Previous Infants	Maternal age						Total	
	$\leq 19$		20–34		$\geq 35$		No.	%
	No.	%	No.	%	No.	%		
Nil	1118	81.8	10553	44.5	1816	27.3	13487	42.5
<b>% of Total</b>	<b>8.3</b>		<b>78.3</b>		<b>13.5</b>		<b>100.0</b>	
One or two	248	18.1	11529	48.6	3845	57.9	15622	49.2
<b>% of Total</b>	<b>1.6</b>		<b>73.8</b>		<b>24.6</b>		<b>15622</b>	
Three or four	***	***	1393	5.9	687	10.3	2081	6.6
Five or more	-	-	252	1.1	292	4.4	544	1.7
<b>Total</b>	<b>1367</b>	<b>100.0</b>	<b>23727</b>	<b>100.0</b>	<b>6640</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>
<b>% of Total</b>	<b>4.3</b>		<b>74.8</b>		<b>20.9%</b>		<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*. A small number of women (<5) giving birth to triplets have been included in the Multiple column.

Trend data shows that the proportion of women that gave birth to their first infant increased since 2002 from 40.6 per cent to 42.5 per cent in 2011. The proportion of women that had fourth and fifth infants declined from 8.4 per cent in 2002 to 6.6 per cent in 2011 (Figure 7).

**Figure 7: Parity of Women Giving Birth in WA 1980-2011**



### 2.2.2. Pregnancy gestation at first antenatal care visit

Midwives began reporting these data in January 2010. For 2011, data collection improved with better ascertainment of gestational age at first visit, a decrease from 24.4 per cent to 11.6 per cent of women with gestation at this time reported as unable to be determined.

In 2011, the largest proportion of women had their first antenatal care in the first trimester of pregnancy (48.2 per cent). A small number of women received no antenatal care (0.4 per cent).

Women that lived in the Southwest health region had the highest proportion (59.2 per cent) that received antenatal care in the first trimester of all health regions. Women that resided in the Great Southern region had the lowest proportion (7.8 per cent) and the highest undetermined proportion (71.0 per cent). This may reflect availability of the information at time of birth rather than lack of antenatal care (Table 15).

**Table 15: Gestation at First Antenatal Care Visit in WA, 2011**

Health Region maternal residence	Gestational Age Groups (weeks)					Total
	1-12	13-24	>24	Did not Attend	Not Determ	
<b>Number</b>						
North Metropolitan	6054	4636	1415	137	320	12562
South Metropolitan	6540	3566	1126	169	669	12070
Kimberley	248	186	93	10	114	651
Pilbara	266	263	121	34	172	856
Midwest	357	182	83	85	227	934
Wheatbelt	367	267	170	19	87	910
Goldfields	122	47	74	64	592	899
Southwest	1215	231	69	42	494	2051
Great Southern	110	63	50	56	495	774
Outside WA	12	9	5	-	***	27
<b>Total</b>	<b>15291</b>	<b>9450</b>	<b>3206</b>	<b>616</b>	<b>3171</b>	<b>31734</b>
<b>Row Percentage</b>						
North Metropolitan	48.2	36.9	11.3	1.1	2.5	100.0
South Metropolitan	54.2	29.5	9.3	1.4	5.5	100.0
Kimberley	38.1	28.6	14.3	1.5	17.5	100.0
Pilbara	31.1	30.7	14.1	4.0	20.1	100.0
Midwest	38.2	19.5	8.9	9.1	24.3	100.0
Wheatbelt	40.3	29.3	18.7	2.1	9.6	100.0
Goldfields	13.6	5.2	8.2	7.1	65.9	100.0
Southwest	59.2	11.3	3.4	2.0	24.1	100.0
Great Southern	14.2	8.1	6.5	7.2	64.0	100.0
Outside WA	44.4	33.3	18.5	-	3.7	100.0
<b>Total</b>	<b>48.2</b>	<b>29.8</b>	<b>10.1</b>	<b>1.9</b>	<b>10.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

### 2.2.3. Medical conditions

There were four medical conditions able to be selected when reporting a birth. A fifth option was "Other" described with ICD-10 Codes. More than one-third (36.3 per cent) of the women who gave birth during 2011 had one or more pre-existing medical conditions. Women with no pre-existing medical condition totalled 19,970.

The most frequent medical condition was asthma (10.4 per cent) (Table 16).

**Table 16: Selected Pre-Existing Medical Conditions for Women in WA, 2011**

Medical Conditions <sup>1</sup>	Plurality		Total	
	Single No.	Multiple No.	No.	%
Essential Hypertension	363	***	365	1.2
Pre-existing diabetes	226	***	228	0.7
Asthma	3234	49	3283	10.4
Genital Herpes	517	5	522	1.6
Other	8545	161	8706	27.4
One or more medical conditions	11316	198	11514	36.3
No Medical Conditions	19970	250	20220	63.7
<b>Total Women</b>	<b>31286</b>	<b>448</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*. A small number of women (<5) giving birth to triplets have been included in the Multiple column.

### 2.2.4. Complications of pregnancy

There were nine complications able to be selected when reporting a birth. A tenth option was "Other" described with ICD-10 Codes. One-third (33.1 per cent) of the women who gave birth during 2011, were reported as having one or more complications during pregnancy.

The most common complications were gestational diabetes (6.9 per cent), premature rupture of membranes<sup>2</sup> (3.7 per cent), urinary tract infection (3.3 per cent), and threatened miscarriage (2.9 per cent).

The most common complications experienced by women giving birth to twins or higher multiples were threatened preterm labour (17.6 per cent), premature rupture of membranes<sup>1</sup> (13.6 per cent), gestational diabetes (8.3%) and Pre-eclampsia (6.0 per cent) (Table 17).

<sup>1</sup> A woman may have more than one pre-existing medical condition.

<sup>2</sup> Prelabour rupture of membranes at any gestation, not preterm rupture of membranes

Table 17: Selected Complications of Pregnancy by Plurality in WA, 2011

Complications of pregnancy <sup>1</sup>	Plurality				Total	
	Single		Multiple		No.	% <sup>4</sup>
	No.	% <sup>2</sup>	No.	% <sup>3</sup>		
Threatened miscarriage	907	2.9	12	2.7	919	2.9
Threatened preterm labour	690	2.2	79	17.6	769	2.4
Urinary tract infection	1031	3.3	20	4.5	1051	3.3
Pre-eclampsia	729	2.3	27	6.0	756	2.4
Antepartum haemorrhage						
— placenta praevia	142	0.5	***	0.4	144	0.5
— abruption	74	0.2	***	0.2	75	0.2
— other	823	2.6	20	4.5	843	2.7
Premature rupture of membranes	1117	3.6	61	13.6	1178	3.7
Gestational diabetes	2165	6.9	37	8.3	2202	6.9
Other	4806	15.4	353	78.8	5159	16.3
<b>One or more complications</b>	<b>10189</b>	<b>32.6</b>	<b>392</b>	<b>87.5</b>	<b>10581</b>	<b>33.3</b>
No complications of pregnancy	21097	67.4	56	12.5	21153	66.7
<b>Total</b>	<b>31286</b>	<b>100.0</b>	<b>448</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*. A small number of women (<5) giving birth to triplets have been included in the Multiple column.

### 2.2.5. Procedures and treatments

In 2011, 30,788 women that gave birth had a procedure or treatment reported. The most common procedure was ultrasound examination, with 94.5 per cent of women having at least one during pregnancy. 55.5 per cent of women had an intrapartum cardiotocograph (CTG).

Reporting fertility treatment for women commenced for births in 1994. This proportion has increased from 307 women (1.2 per cent) in 1994 to 1,090 women (3.4 per cent) that had fertility treatment in 2011. For women that had multiple births, 17.0% had fertility treatment (Table 18).

Table 18: Procedures and Treatments Provided to Women giving birth in WA, 2011

Procedures and Treatments <sup>5</sup>	Plurality				Total	
	Single		Multiple		No.	% <sup>4</sup>
	No.	%	No.	%		
Fertility treatments	1014	3.2	76	17.0	1090	3.4
Cervical suture	93	0.3	10	2.2	103	0.3
CVS (placental biopsy)	138	0.4	***	***	140	0.4
Amniocentesis	793	2.5	22	4.9	815	2.6
Ultrasound	29567	94.5	433	96.7	30000	94.5
CTG antepartum	8213	26.3	210	46.9	8423	26.5
CTG intrapartum	17412	55.7	199	44.4	17611	55.5
<b>One or more procedures</b>	<b>30345</b>	<b>97.0</b>	<b>443</b>	<b>98.9</b>	<b>30788</b>	<b>97.0</b>
No procedures	941	3.0	5	1.1	946	3.0
<b>Total Women</b>	<b>31734</b>	<b>100.0</b>	<b>448</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

A small number of women gave birth to triplets and were included in "Multiple" with twins.

Values <5 are suppressed and indicated with \*\*\*. A small number of women (<5) giving birth to triplets have been included in the Multiple column.

<sup>1</sup> A woman may have more than one complication during pregnancy.

<sup>2</sup> Percentage of women with a single birth (n=31,286).

<sup>3</sup> Percentage of women having a multiple birth (n= 448).

<sup>4</sup> Percentage of women who gave birth (n=31,734).

<sup>5</sup> A woman may have more than one treatment or procedure during the pregnancy.

## 2.3. Labour

### 2.3.1. Onset of labour

Labour is defined as painful, regular uterine contractions that dilate the cervix. The first stage of labour is timed from when dilatation of the cervix commenced. The second stage of labour begins when the cervix is fully dilated and ends with the complete expulsion of the final infant of the pregnancy. The third stage of labour ends with the delivery of the placenta of the final infant of the pregnancy.

Onset of labour can be spontaneous, induced or never occur. Labour that has a spontaneous onset can be augmented with medical or surgical procedures. Labour established spontaneously for 51.2 per cent of the women who gave birth in WA in 2011.

Labour was induced for 28.6 per cent of all women who gave birth. Twenty point two per cent of women did not experience labour, having a birth by caesarean section (Table 19).

**Table 19: Onset of Labour and Plurality of Women Giving Birth in WA, 2011**

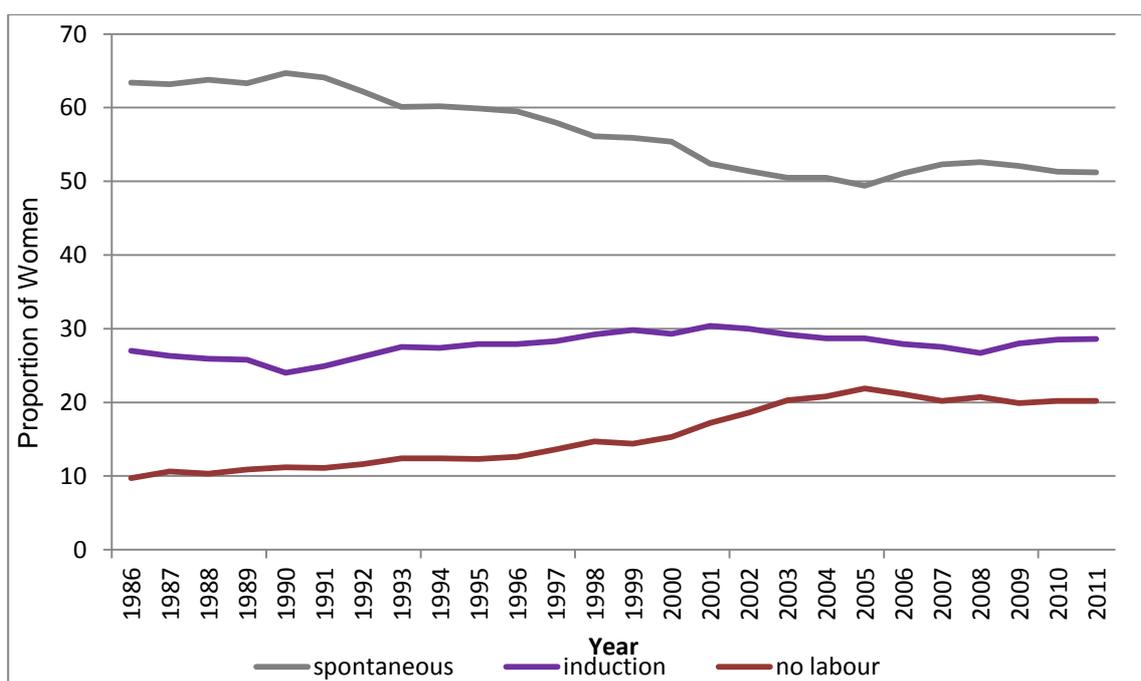
Onset of labour	Plurality				Total	
	Single		Multiple		No.	%
	No.	%	No.	%	No.	%
Spontaneous	16103	51.5	157	35.0	16260	51.2
Induced	8992	28.7	76	17.0	9068	28.6
No labour	6191	19.8	215	48.0	6406	20.2
<b>Total</b>	<b>31286</b>	<b>100.0</b>	<b>448</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Trend data from 1986 indicated little change in the proportion of women with a singleton birth where labour was induced. However, there were an increasing number of women who did not experience labour. From 9.7 per cent in 1986 to a high of 22.0 per cent in 2005 with a decrease to 20.2 per cent in 2010 and 2011.

There was a general decrease in the proportion of women who established labour spontaneously, from a high of 63.4 per cent in 1986, to a low of 49.4 per cent in 2005. There has been a slight overall increase since then to 51.2 per cent in 2011. Over this period, slightly more women experienced induction of labour. In 2011 the proportion of women that had no labour and caesarean section has been a similar rate since 2003, when the rate was double that in 1986 (9.7 per cent) (Figure 8 and Table 111).

**Figure 8: Onset of Labour for Women in WA, 1986-2011**



### 2.3.2. Augmentation of labour

Augmentation of labour refers to the use of a medication or procedure to hasten the process of labour that spontaneously commenced. Augmentation may assist with improving strength and efficiency of contractions, or to quickly advance labour if the health of the mother or baby is at risk.

Augmentation of spontaneous labour by surgical and/or medical intervention was administered to 6,349 (39.1 per cent) of women who established labour spontaneously (16,260). Of the women who had their spontaneous labour augmented, 3,513 (55.3 per cent) progressed to a spontaneous birth, 1,722 (27.1 per cent) progressed to assisted vaginal birth and 1,114 (17.5 per cent) required delivery by caesarean section<sup>1</sup>.

Of the women who had spontaneous onset of labour without augmentation 7,394 (74.6 per cent) had a spontaneous vaginal birth Table 20.

**Table 20: Labour, Augmentation and Mode of Birth in WA, 2011**

Onset of labour	Mode of birth for first or only infant						Total	
	Spontaneous vaginal		Assisted vaginal		Emergency caesarean		No.	%
	No.	%	No.	%	No.	%		
Spontaneous	10907	67.1	2828	17.4	2525	15.5	16260	100.0
- No augmentation	7394	74.6	1106	11.2	1411	14.2	9911	100.0
- Augmentation	3513	55.3	1722	27.1	1114	17.5	6349	100.0
Induction	5288	58.3	1945	21.4	1835	20.2	9068	100.0
<b>Total</b>	<b>16195</b>	<b>63.9</b>	<b>4773</b>	<b>18.8</b>	<b>4360</b>	<b>17.2</b>	<b>25328</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Excludes 6,406 women who did not labour before birth by caesarean section.

<sup>1</sup> Women with multiple births were classified by the birth mode of the first infant born.

### 2.3.3. Methods of augmentation

Among 6,349 women who had an augmentation of spontaneous onset of labour in 2011, artificial rupture of membranes (ARM) was reported for 2,766 (43.6 per cent), and oxytocin for 1,977 women (31.1 per cent). A further 1,540 (24.3 per cent) had a combination of Oxytocin and ARM reported. A small proportion (1.0 per cent) of women had Prostaglandin or Other reported.

Methods of birth after spontaneous onset of labour included Caesarean Section and could have been before labour achieved full cervical dilatation.

Of women with augmentation of spontaneous onset labour, 86.2 per cent gave birth within 12 hours while 95.6 per cent of women without augmentation achieved birth within 12 hours.

The highest proportion of women with augmented labour (52.3 per cent) gave birth within five to 12 hours.

Women who laboured more than 12 hours comprised 4.4 per cent of those that were not augmented and 13.8 per cent of those that were augmented.

Oxytocin, or ARM or a combination of both was used for augmentation of labour in 65.8% of women who had duration of labour greater than 12 hours (Table 21).

**Table 21: Augmentation and Hours of Labour for Women with Spontaneous Onset of Labour in WA, 2011**

Type of augmentation	Hours of labour <sup>1</sup>				Total
	Less than 1 hr	1 to 4 hrs	5 to 12 hrs	More than 12 hrs	
<b>Number</b>					
None	791	4845	3829	439	9904
Oxytocin	153	459	1040	325	1977
Art rupture membranes (ARM)	102	987	1439	238	2766
Oxytocin and ARM	113	307	812	308	1540
Prostaglandin or Other	7	24	28	7	66
<b>Total Augmented</b>	<b>375</b>	<b>1777</b>	<b>3319</b>	<b>878</b>	<b>6342</b>
<b>Row Percentage</b>					
None	8.0	48.9	38.7	4.4	100.0
Oxytocin	7.7	23.2	52.6	16.4	100.0
Art rupture membranes (ARM)	3.7	35.7	52.0	8.6	100.0
Oxytocin and ARM	7.3	19.9	52.7	20.0	100.0
Prostaglandin or Other	10.6	36.4	42.4	10.6	100.0
<b>Total Augmented</b>	<b>5.9</b>	<b>28.0</b>	<b>52.3</b>	<b>13.8</b>	<b>100.0</b>
<b>Column Percentage</b>					
None					
Oxytocin	40.8	25.8	31.3	37.0	31.1
Art rupture membranes (ARM)	27.2	55.5	43.4	27.1	43.6
Oxytocin and ARM	30.1	17.3	24.5	35.1	24.3
Prostaglandin or Other	1.9	1.4	0.8	0.8	1.0
<b>Total Augmented</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Excludes 7 cases of spontaneous onset labour without augmentation and no duration of labour reported.

<sup>1</sup> Hours of labour include total of first and second stage, and includes labours interrupted by Caesarean Section.

### 2.3.4. Induction of labour

Induction of labour is the process of using medications or procedures to artificially start labour. Induction is performed to expedite the birth of the infant/s where maternal or fetal health would be compromised if timing of the birth awaited spontaneous onset of labour.

Labour was induced by medical and/or surgical means for 9,068 (28.6 per cent) women.

The methods of induction were usually combined. Artificial rupture of membranes (ARM) combined with an Oxytocin infusion was recorded for 38.6 per cent (3,502) of the women whose labour was induced. ARM or Oxytocin infusion alone was recorded for 5.6 per cent (503) and 7.9 per cent (720) of women labouring, respectively (Table 47).

**Table 22 Induction Method and Mode of Birth for Women who were Induced in WA, 2011**

Induction Method	Mode of Birth <sup>1</sup>				Total
	Spont vertex	Assisted vaginal	Spont Breech	Emergency caesarean	
	<b>Number</b>				
Oxytocin	414	151	5	150	720
Prostaglandin	500	129	29	223	881
Artificial ruptured membrane (ARM)	389	59	-	55	503
Oxytocin and ARM	2287	741	***	470	3502
Prostaglandin and ARM	339	65	***	77	484
Prostaglandin and Oxytocin	110	84	-	76	270
Prostaglandin, Oxytocin and ARM	647	396	***	346	1392
Other	602	262	14	438	1316
<b>Total</b>	<b>5288</b>	<b>1887</b>	<b>58</b>	<b>1835</b>	<b>9068</b>
	<b>Row Percentage</b>				
Oxytocin	57.5	21.0	0.7	20.8	100.0
Prostaglandin	56.8	14.6	3.3	25.3	100.0
Artificial ruptured membrane (ARM)	77.3	11.7	-	10.9	100.0
Oxytocin and ARM	65.3	21.2	***	13.4	100.0
Prostaglandin and ARM	70.0	13.4	***	15.9	100.0
Prostaglandin and Oxytocin	40.7	31.1	-	28.1	100.0
Prostaglandin, Oxytocin and ARM	46.5	28.4	***	24.9	100.0
Other	45.7	19.9	1.1	33.3	100.0
<b>Total</b>	<b>58.3</b>	<b>20.8</b>	<b>0.6</b>	<b>20.2</b>	<b>100.0</b>
	<b>Column Percentage</b>				
Oxytocin	7.8	8.0	8.6	8.2	7.9
Prostaglandin	9.5	6.8	50.0	12.2	9.7
Artificial ruptured membrane (ARM)	7.4	3.1	-	3.0	5.5
Oxytocin and ARM	43.2	39.3	6.9	25.6	38.6
Prostaglandin and ARM	6.4	3.4	5.2	4.2	5.3
Prostaglandin and Oxytocin	2.1	4.5	-	4.1	3.0
Prostaglandin, Oxytocin and ARM	12.2	21.0	5.2	18.9	15.4
Other	11.4	13.9	24.1	23.9	14.5
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*. A small number of women (<5) giving birth to triplets have been included in the Multiple column.

<sup>1</sup> Women with multiple births were classified by the method of birth of the first infant born.

### 2.3.5. Induction of labour by maternity service

In WA in 2011, 28.6 per cent of women had an induction of labour. The Teaching hospital had a slightly higher proportion (30.4 per cent) than the whole of WA (28.6 per cent). Rates at other health services ranged from 18.5 to 37.2 per cent (Table 23).

**Table 23: Induction of Labour by Maternity Service in WA, 2011**

Hospital	Onset of Labour				Total	
	Induced		Other <sup>1</sup>			
	No.	%	No.	%	No.	%
Armadale Kelmscott	468	23.4	1533	76.6	2001	100.0
Attadale	145	23.5	471	76.5	616	100.0
Bentley	165	20.2	651	79.8	816	100.0
Glengarry	353	37.2	597	62.8	950	100.0
Goldfields	275	33.1	557	66.9	832	100.0
Great Southern	169	26.6	467	73.4	636	100.0
Joondalup HC	953	36.7	1642	63.3	2595	100.0
Kaleeya	314	24.2	985	75.8	1299	100.0
KEMH	1730	30.4	3960	69.9	5690	100.0
Kimberley	124	23.1	412	76.9	536	100.0
Mercy	498	36.5	868	63.5	1366	100.0
Midwest	146	26.2	412	73.8	558	100.0
Osborne Park	500	26.9	1358	73.1	1858	100.0
Peel HC	324	30.0	756	70.0	1080	100.0
Pilbara	106	18.5	466	81.5	572	100.0
Rockingham Kwinana	356	26.6	983	73.4	1339	100.0
SJOG Bunbury	128	23.4	419	76.6	547	100.0
SJOG Geraldton	94	39.7	143	60.3	237	100.0
SJOG Murdoch	506	29.0	1237	71.0	1743	100.0
SJOG Subiaco	1121	31.0	2492	69.0	3613	100.0
South West	313	22.9	1053	77.1	1366	100.0
Swan	239	22.8	809	77.2	1048	100.0
Wheatbelt	39	20.1	155	79.9	194	100.0
<b>Total</b>	<b>9066</b>	<b>28.6</b>	<b>22666</b>	<b>71.4</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> Other labour onsets were spontaneous and no labour before caesarean section.

### 2.3.6. Analgesia

Analgesia is often administered during labour to reduce the pain experienced while allowing sensations of touch, pressure and mobility. Anaesthesia provided at time of birth is described in section 2.5 of this report.

Of the 31,734 women that gave birth, 63.8 per cent received single or multiple types of analgesia during labour. Analgesia via the epidural or spinal route was received by 12,011 (37.8 per cent) women with or without other analgesia. Inhalation of a mix of Nitrous Oxide was used by 16.7 per cent women. Narcotic analgesic was received by 8.4 per cent of women (Table 24).

**Table 24: Analgesia and Mode of Birth for Women in WA, 2011**

Type of Analgesia <sup>1</sup>	Mode of Birth <sup>2</sup>								Total	
	Spontaneous vaginal		Assisted vaginal		Breech		Emergency caesarean		No.	%
	No.	%	No.	%	No.	%	No.	%		
Nitrous oxide	4552	28.1	499	10.7	16	12.6	227	4.3	5294	16.7
Intra-muscular narcotics	2105	13.0	317	6.8	39	30.7	206	3.9	2667	8.4
<b>Epidural and/or Spinal</b>	<b>5456</b>	<b>33.7</b>	<b>3542</b>	<b>76.2</b>	<b>33</b>	<b>26.0</b>	<b>2980</b>	<b>56.3</b>	<b>12011</b>	<b>37.8</b>
Epidural	5234	32.3	3360	72.3	31	24.4	2547	48.1	11172	35.2
Spinal	54	0.3	38	0.8	***	0.8	211	4.0	304	1.0
Combined Spinal Epidural	168	1.0	144	3.1	***	0.8	222	4.2	535	1.7
Other	208	1.3	28	0.6	***	2.4	32	0.6	271	0.9
<b>Women with any analgesia</b>	<b>12321</b>	<b>76.1</b>	<b>4386</b>	<b>94.4</b>	<b>91</b>	<b>71.7</b>	<b>3445</b>	<b>65.1</b>	<b>20243</b>	<b>63.8</b>
Women with no analgesia	3874	23.9	260	5.6	36	28.3	1849	34.9	11491	36.2
<b>Total women</b>	<b>16195</b>	<b>100.0</b>	<b>4646</b>	<b>100.0</b>	<b>127</b>	<b>100.0</b>	<b>5294</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*.

Among the 20,968 women who gave birth vaginally, 43.0 per cent had an epidural, spinal or combined spinal epidural, 24.2 per cent received nitrous oxide and oxygen. Nineteen point nine per cent received no pharmacological analgesia (Table 25).

**Table 25: Analgesia for Women who had vaginal births in WA, 2011**

Vaginal Births		
Type of analgesia	No.	%
Nitrous oxide & oxygen	5067	24.2
Intra-muscular narcotics	2461	11.7
<b>Epidural and/or Spinal</b>	<b>9031</b>	<b>43.0</b>
Epidural	8625	41.1
Spinal	93	0.4
Combined Spinal Epidural	313	1.5
Other	239	1.1
<b>Women with any analgesia</b>	<b>16798</b>	<b>80.1</b>
Women with no analgesia	4170	19.9
<b>Total women</b>	<b>20968</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> Analgesia has been assigned an ascending rank order of None, Nitrous Oxide, IM Narcotics, Epidural/Caudal, Spinal, and Combined Spinal/Epidural. The highest Analgesia recorded for each woman determines her "Type of Analgesia". If "Other" is only option recorded then "Other" is reported in this table.

<sup>2</sup> Women with multiple births were classified by the method of birth of the first infant born.

## 2.4. Rare complications of pregnancy and birth

Women who gave birth in 2011 in Western Australia were more likely to have a birth by Caesarean Section, be older than 34 years and have pre-existing medical conditions or complications in pregnancy than women giving birth in previous years. Information about serious conditions treated during hospital admissions for pregnancy and birth not collected in the Midwives Notification System but available in the Hospital Morbidity Data System are presented below. These data enable observation of the occurrence of a small number of rare but severe complications of pregnancy and birth.

### 2.4.1. Eclampsia

Eclampsia is a rare condition associated with severe morbidity for both the mother and baby. Eclampsia is the occurrence of convulsions, not caused by any coincidental neurological disease such as epilepsy, in a woman whose condition also meets the diagnostic criteria for pre-eclampsia (a hypertensive disorder of pregnancy).

Of women who gave birth in WA in 2011, 11 women had Eclampsia reported at least once during the period of their pregnancy, birth and 42 days following birth. The incidence was 0.3 per 1000 women giving birth in that year, which was less than all but one of the six preceding years where the incidence was as high as 0.5 per 1000 women in 2008 (Table 26).

**Table 26: Eclampsia in Women who Gave Birth in WA 2005-2011**

Year	With Eclampsia	Giving Birth	Rate per 1000
2005	10	26526	0.4
2006	6	28254	0.2
2007	9	29631	0.3
2008	15	30237	0.5
2009	12	30760	0.4
2010	13	30843	0.4
2011	11	31734	0.3
<b>Average for 7 years</b>	<b>10.9</b>	<b>29712.1</b>	<b>0.4</b>

Extracted from Hospital Morbidity Data Collection and Midwives' Notification System on 17 June 2013.

### 2.4.2. Morbidly adherent placenta

A placenta is considered morbidly adherent if there is an abnormally deep attachment to the myometrium diagnosed as placenta accreta, increta or percreta. These conditions are associated with severe morbidity for the mother and often result in birth by caesarean section, operative procedures following a vaginal birth, damage to the uterus and surrounding organs, perinatal hysterectomy or the placenta being left in situ.

Of women who gave birth in WA in 2011, 112 women had a morbidly adherent placenta reported at time of birth or in the 42 days following birth. The incidence was 3.5 per 1000 women giving birth in that year. In the seven years reported here, the annual average rate was 3.2 and there was a general upward trend (Table 27).

**Table 27: Morbidly Adherent Placenta in Women who Gave Birth in WA 2005-2011**

Year	Morbidly Adherent Placenta	Giving Birth	Rate per 1000
2005	66	26526	2.5
2006	89	28254	3.1
2007	79	29631	2.7
2008	100	30237	3.3
2009	103	30760	3.3
2010	124	30843	4.0
2011	112	31734	3.5
<b>Average of 7 years</b>	<b>96.1</b>	<b>29712.1</b>	<b>3.2</b>

Extracted from Hospital Morbidity Data Collection and Midwives' Notification System on 17 June 2013.

### 2.4.3. Hysterectomy

A hysterectomy is the permanent removal of the uterus which for perinatal hysterectomies usually includes removal of the cervix. A hysterectomy in the perinatal period can be a planned or emergency procedure. It is generally performed as an emergency procedure as a last resort to manage severe haemorrhage as a result of uterine atony or morbidly adherent placenta.

Of women who gave birth in WA in 2011, 14 women had a hysterectomy at time of giving birth or in the 42 days following birth. The incidence was 0.4 per 1000 women giving birth in that year. In the seven years reported here, the rate in 2011 was the lowest. The highest rate was 0.8 per 1000 for women giving birth in 2006 (Table 28).

**Table 28: Perinatal Hysterectomy in Women who Gave Birth in WA 2005-2011**

Year	Hysterectomies	Women Giving Birth	Rate per 1000
2005	12	26526	0.5
2006	22	28254	0.8
2007	19	29631	0.6
2008	21	30237	0.7
2009	18	30760	0.6
2010	17	30843	0.6
2011	14	31734	0.4
<b>Average of 7 years</b>	<b>17.6</b>	<b>29712.1</b>	<b>0.6</b>

Extracted from Hospital Morbidity Data Collection and Midwives' Notification System on 17 June 2013.

### 2.4.4. Hysterectomy and morbidly adherent placenta

In recent decades, the use of procedures other than hysterectomy to manage uterine haemorrhage has increased, however the rate of adherent placenta has also increased and this morbidity is often only able to be managed with hysterectomy.

Of the 14 that had a perinatal hysterectomy in 2011, 6 women also had a morbidly adherent placenta. The proportion of hysterectomies in the presence of adherent placenta was 42.9 per cent. Women giving birth in 2010 had the lowest proportion of hysterectomies with adherent placenta (29.4 per cent). The highest proportion in the seven years reported was 61.9 per cent in 2008 (Table 29).

**Table 29: Morbidly Adherent Placenta and Hysterectomy in Women who Gave Birth in WA 2005-2011**

Year	Morbidly Adherent Placenta and Hysterectomy	Hysterectomy	Percentage
2005	7	12	58.3
2006	10	22	45.5
2007	8	19	42.1
2008	13	21	61.9
2009	7	18	38.9
2010	5	17	29.4
2011	6	14	42.9
<b>Average of 7 years</b>	<b>8</b>	<b>17.6</b>	<b>45.6</b>

Extracted from Hospital Morbidity Data Collection and Midwives' Notification System on 17 June 2013.

## 2.5. Anaesthesia

Anaesthesia is often administered during the birth and differs from analgesia in that its action is to block sensation, interfere with some reflexes and can impact mobility. General Anaesthesia also causes loss of consciousness. Each woman who gave birth may have had nil, one or multiple types of anaesthesia reported. They may also have had different anaesthesia for each of multiple infants born. Data reported in Table 55 presents one method for each woman. That method is the most intensive method for first infant born.

Of the 31,734 women who gave birth in WA during 2011, 10,618 cases (33.5 per cent) had no anaesthesia, 35.6 per cent received anaesthesia via the epidural route, 13.1 per cent via the spinal route and 9.5 per cent had combined spinal and epidural anaesthesia. A further 0.3 per cent had epidural or spinal anaesthesia in combination with a general anaesthetic. In total, 499 (1.6 per cent) women received general anaesthesia (Table 30).

**Table 30: Anaesthesia and Mode of Birth for Women giving birth in WA, 2011**

Type of Anaesthesia	Mode of Birth									
	Spontaneous Vaginal		Instrumental vaginal		Elective caesarean		Emergency caesarean		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
None	10077	31.8	541	1.7	-	-	-	-	10618	33.5
Local anaesthesia to perineum	920	2.9	600	1.9	-	-	-	-	1520	4.8
Pudendal	21	0.1	143	0.5	-	-	-	-	164	0.5
Epidural	4670	14.7	3131	9.9	1012	3.2	2480	7.8	11293	35.6
Spinal	52	0.2	75	0.2	2641	8.3	1391	4.4	4159	13.1
Combined Spinal Epidural	141	0.4	123	0.4	1701	5.4	1051	3.3	3016	9.5
General Anaesthesia	5	0.0	***	***	84	0.3	314	1.0	406	1.3
Epidural or Spinal as well as General Anaesthesia	-	-	***	***	34	0.1	58	0.2	93	0.3
Other	436	1.4	29	0.1	-	-	-	-	465	1.5
<b>Total</b>	<b>16322</b>	<b>51.4</b>	<b>4646</b>	<b>14.6</b>	<b>5472</b>	<b>17.2</b>	<b>5294</b>	<b>16.7</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Most intensive method for first baby born is reported.

Values <5 are suppressed and indicated with \*\*\*. A small number of women (<5) giving birth to triplets have been included in the Multiple column.

Among the 20,968 women who gave birth vaginally, 10,618 (50.6 per cent) did not have anaesthesia at birth (Table 31).

Epidural and/or spinal anaesthesia was the most frequently administered (38.1 per cent) to woman who gave birth.

**Table 31: Anaesthesia for Women who had Vaginal Births in WA, 2011**

Type of anaesthesia	Vaginal Births	
	No.	%
None	10618	50.6
Local anaesthesia to perineum	1520	7.3
Pudendal	164	0.8
Epidural	7801	37.2
Spinal	127	0.6
Combined Spinal Epidural	264	1.3
General	9	0.0
Other	465	2.2
<b>Total</b>	<b>20968</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Among the 10,766 women who gave birth by caesarean section, general anaesthesia only was received by 3.7 per cent and a further 0.9 per cent had general anaesthesia as well as a spinal and/or epidural anaesthetic. Most women (95.4%) had regional anaesthesia, epidural (32.4 per cent), spinal (37.5 per cent) or combined spinal epidural (25.6 per cent) (Table 32).

**Table 32: Anaesthesia for Women who Birth by Caesarean Section in WA, 2011**

Caesarean Births		
Type of Anaesthesia	No.	%
Epidural	3492	32.4
Spinal	4032	37.5
Combined spinal epidural	2752	25.6
General anaesthesia	398	3.7
Epidural or Spinal as well as General Anaesthesia	92	0.9
Other	-	-
<b>Total</b>	<b>10766</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Trend data over the period 1986 to 2011 demonstrated a decrease in use of general anaesthesia (GA) for caesarean birth. In 1986, GA was used for 42.5 per cent of women giving birth compared to 4.9 per cent in 2011. For emergency caesareans, GA was used in 24.2 per cent of cases in 1986 and continued to reduce with a proportion of 3.7 per cent in 2011 (Table 33).

**Table 33: Anaesthesia for Women who Gave Birth by Caesarean Section in WA 1986-2011**

Year	Urgency of Caesarean Section												
	Elective Caesarean						Emergency Caesarean						
	Epidural/Spinal		General		Total		Epidural/Spinal		General		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Total
1986	1089	32.0	622	18.3	1711	50.3	868	25.5	823	24.2	1691	49.7	3402
1987	1436	36.0	610	15.3	2046	51.3	1008	25.3	931	23.4	1939	48.7	3985
1988	1562	37.5	632	15.2	2194	52.6	1047	25.1	929	22.3	1976	47.4	4170
1989	1774	39.2	582	12.9	2356	52.1	1258	27.8	907	20.1	2165	47.9	4521
1990	1923	39.8	570	11.8	2493	51.6	1436	29.7	902	18.7	2338	48.4	4831
1991	1845	40.6	516	11.3	2361	51.9	1432	31.5	755	16.6	2187	48.1	4548
1992	2070	43.0	489	10.2	2559	53.2	1486	30.9	768	16.0	2254	46.8	4813
1993	2282	43.7	481	9.2	2763	52.9	1749	33.5	710	13.6	2459	47.1	5222
1994	2347	44.9	382	7.3	2729	52.2	1891	36.2	603	11.5	2494	47.8	5223
1995	2371	46.9	369	7.3	2740	54.2	1807	35.7	511	10.1	2318	45.8	5058
1996	2548	49.5	317	6.2	2865	55.7	1860	36.1	423	8.2	2283	44.3	5148
1997	2761	50.6	281	5.2	3042	55.8	2004	36.8	407	7.5	2411	44.2	5453
1998	3008	50.9	262	4.4	3270	55.4	2257	38.2	379	6.4	2636	44.6	5906
1999	3100	52.3	210	3.5	3310	55.8	2262	38.2	356	6.0	2618	44.2	5928
2000	3289	52.4	231	3.7	3520	56.1	2439	38.8	321	5.1	2760	43.9	6280
2001	3563	52.7	181	2.7	3744	55.3	2703	39.9	319	4.7	3022	44.7	6766
2002	3844	53.6	160	2.2	4004	55.9	2823	39.4	339	4.7	3162	44.1	7166
2003	4159	55.4	167	2.2	4326	57.6	2856	38.1	322	4.3	3178	42.4	7504
2004	4385	53.9	152	1.9	4537	55.8	3250	40.0	341	4.2	3591	44.2	8128
2005	4913	54.7	154	1.7	5067	56.4	3534	39.3	387	4.3	3921	43.6	8988
2006	4698	56.2	114	1.4	4812	57.6	3225	38.6	322	3.9	3547	42.4	8359
2007	4495	53.5	117	1.4	4612	54.9	3487	41.5	305	3.6	3792	45.1	8404
2008	4525	53.0	140	1.6	4665	54.6	3528	41.3	348	4.1	3876	45.4	8541
2009	4338	50.0	110	1.3	4448	51.3	3842	44.3	382	4.4	4224	48.7	8672
2010	4200	48.8	99	1.2	4299	50.0	3985	46.3	316	3.7	4301	50.0	8600
2011	3658	44.2	118	1.4	3776	45.6	4134	49.9	372	4.5	4506	54.4	8282

Extracted from Midwives' Notification System on 17 December 2013.

## 2.6. Fetal presentation

The majority of infants born from singleton births were vertex presentations<sup>1</sup> (95.0 per cent), of which 68.9 per cent were born vaginally.

There were 1,165 (3.7 per cent) infants with breech presentations among singleton births. Eighty-nine point six per cent of these infants were born by caesarean section. The minority of these were emergency procedures.

Fourteen point eight per cent of singleton births were instrumental vaginal births<sup>2</sup>, 12.2 per cent by vacuum extraction and 2.6 per cent by forceps. There were 121 breech infants born vaginally with or without breech manoeuvres (Table 34).

**Table 34: Fetal Presentation and Mode of Birth for Singleton Births in WA, 2011**

Mode of Birth	Fetal Presentation						Total	
	Vertex		Breech		Other		No.	%
	No.	%	No.	%	No.	%	No.	%
Spontaneous	15886	53.5	-	-	195	47.9	16081	51.4
Vacuum	3781	12.7	-	-	31	7.6	3812	12.2
Forceps	794	2.7	-	-	7	1.7	801	2.6
Breech Vaginal	-	-	121	10.4	-	-	121	0.4
Elective Caesarean	4607	15.5	659	56.6	49	12.0	5315	17.0
Emergency Caesarean	4646	15.6	385	33.0	125	30.7	5156	16.5
<b>Total</b>	<b>29714</b>	<b>100.0</b>	<b>1165</b>	<b>100.0</b>	<b>407</b>	<b>100.0</b>	<b>31286</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> Other Cephalic presentations like Brow and Face are included in "Other" with shoulder or compound presentations

<sup>2</sup> Where multiple modes were reported for an infant, the highest mode was reported with ascending rank order being Spontaneous (Cephalic or Breech), Vacuum, Forceps, Breech Manoeuvre, Caesarean Section

### 2.6.1. Vertex presentation and mode of birth in maternity services

Women with a vertex presentation of the first or only infant of the pregnancy may be more likely to have a spontaneous vaginal birth unless they have a history of caesarean section or complication of pregnancy or labour requiring caesarean section. In WA, just over half (54.0 per cent) of the women that gave birth to an infant with a vertex presentation had a spontaneous vaginal birth. The only teaching maternity service in Western Australia had a slightly lower proportion than the whole of WA (53.1 per cent). Rates at other metropolitan health services ranged from 31.8 to 70.4 per cent (Table 35).

**Table 35: Mode of Birth for Vertex Presentation by Maternity Service in WA, 2011**

Hospital	Mode of Birth				Total	
	Spont Vaginal		Other <sup>1</sup>			
	No.	%	No.	%	No.	%
Armadale Kelmscott	1240	65.6	650	34.4	1890	100.0
Attadale	231	39.4	356	60.6	587	100.0
Bentley	467	60.6	303	39.4	770	100.0
Glengarry	359	39.8	544	60.2	903	100.0
Goldfields	575	71.5	229	28.5	804	100.0
Great Southern	406	66.9	201	33.1	607	100.0
Joondalup	1269	50.9	1224	49.1	2493	100.0
Kaleeya	725	58.2	521	41.8	1246	100.0
KEMH	2795	53.6	2421	46.4	5216	100.0
Kimberley	326	63.2	190	36.8	516	100.0
Mercy	621	47.4	689	52.6	1310	100.0
Midwest	357	66.4	181	33.6	538	100.0
Osborne Park	1005	56.1	787	43.9	1792	100.0
Peel	576	55.5	461	44.5	1037	100.0
Pilbara	332	60.5	217	39.5	549	100.0
Rockingham Kwinana	870	68.1	408	31.9	1278	100.0
SJOG Bunbury	242	45.8	286	54.2	528	100.0
SJOG Geraldton	131	57.2	98	42.8	229	100.0
SJOG Murdoch	510	31.2	1125	68.8	1635	100.0
SJOG Subiaco	1158	33.8	2273	66.2	3431	100.0
South West	775	60.7	501	39.3	1276	100.0
Swan Districts	657	66.4	332	33.6	989	100.0
Wheatbelt	130	68.8	59	31.2	189	100.0
Homebirths	241	100.0	-	-	241	100.0
<b>Total</b>	<b>15998</b>	<b>53.2</b>	<b>14056</b>	<b>46.8</b>	<b>30054</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Includes pregnancies of multiple plurality if first infant was vertex.

Includes infants born before arrival.

Includes infants born at non-maternity sites.

<sup>1</sup> Other modes of birth include breech vaginal, vacuum, forceps and caesarean section.

## 2.7. Mode of birth

In 2011, more than half of the women gave birth vaginally (51.0 per cent). Caesarean section was the birth mode for 10,766 (33.9 per cent) women. This comprised 5,472 (17.2 per cent) elective and 5,294 (16.7 per cent) emergency (Table 36).

Women with more than one fetus had a higher probability of caesarean section. In 2011, there were 295 (62.9 per cent) women with a twin or triplet pregnancy who gave birth by caesarean section (Table 36).

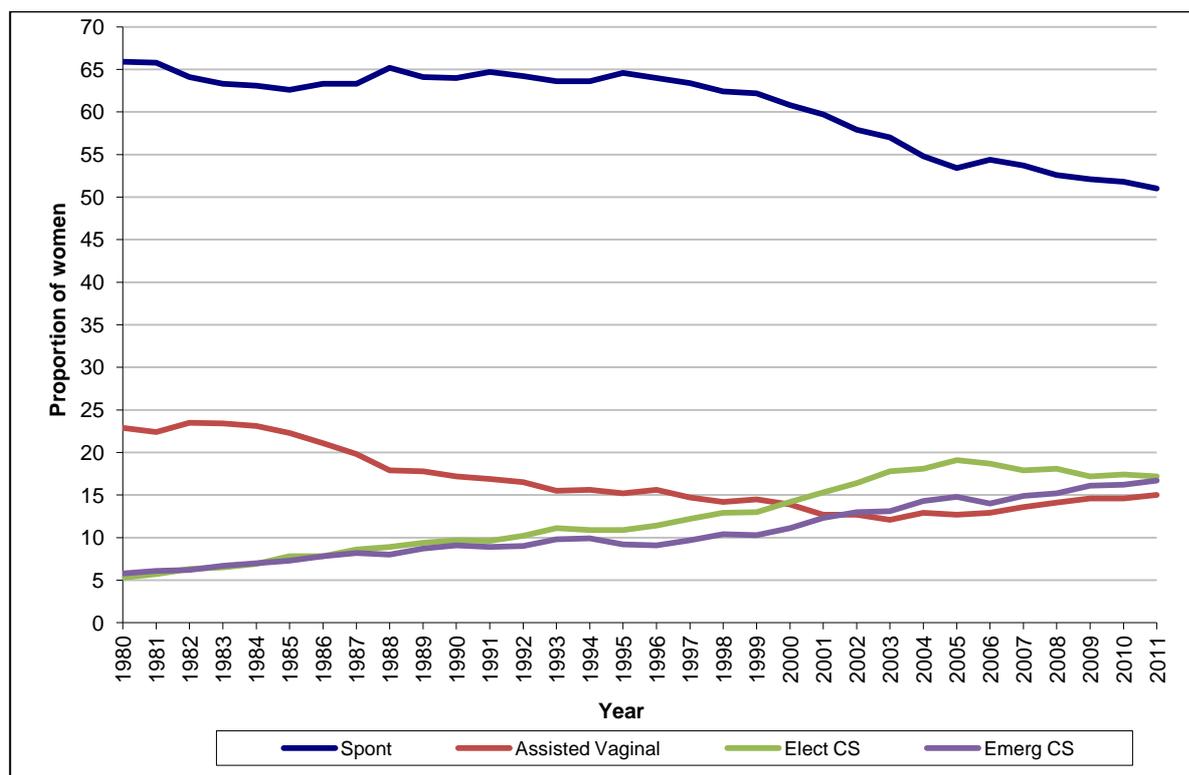
**Table 36: Mode of Birth and Plurality for Women Giving Birth in WA, 2011**

Mode of Birth of First Infant	Plurality						Total	
	Single		Twin		Triplet			
	No.	%	No.	%	No.	%	No.	%
Spontaneous Vertex	16081	51.4	114	26.0	-	-	16195	51.0
Breech	121	0.4	6	1.4	-	-	127	0.4
Vacuum	3812	12.2	21	4.8	-	-	3833	12.1
Forceps	801	2.6	12	2.7	-	-	813	2.6
Elective Caesarean	5315	17.0	156	35.5	1	11.1	5472	17.2
Emergency Caesarean	5156	16.5	130	29.6	8	88.9	5294	16.7
<b>Total</b>	<b>31286</b>	<b>100.0</b>	<b>439</b>	<b>100.0</b>	<b>9</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

The incidence of both elective and emergency caesarean section has tripled over the past 30 years. While the increase in rate of elective caesarean section appears to have slowed in the last five years, the rate of emergency caesarean section continues to rise (Figure 9). Births by instrument or caesarean section accounted for almost 50.0 per cent of births in WA in 2011.

**Figure 9: Mode of Birth in WA 1980-2011**



Breech, Vacuum and Forceps were combined to determine "Assisted Vaginal" numbers.

Most women (86.9 per cent) who had a prior caesarean section had their 2011 birth by caesarean section. These included women where they had a history of caesarean section but their last birth was vaginal (90 women) or last birth was by caesarean section (4,643 women). 35.2 per cent of women that gave birth for the first time had a caesarean section in 2011 in WA. Less than a third (29.8 per cent) of these was reported as elective (Table 1).

Table 37: Birth Mode by Previous Birth Mode for Women in WA, 2011

Previous Birth Mode	Mode of Birth										Total	
	Spontaneous		Breech		Instrumental		Elective Caesarean		Emergency Caesarean			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
First Birth	5174	38.4	45	0.3	3526	26.1	1412	10.5	3330	24.7	13487	100.0
Previous births, no caesareans	10523	81.6	72	0.6	925	7.2	603	4.7	778	6.0	12901	100.0
No previous caesarean	15697	59.5	117	0.4	4451	16.9	2015	7.6	4108	15.6	26388	100.0
Previous caesarean, last birth vaginal	191	62.6	-	-	24	7.9	45	14.8	45	14.8	305	100.0
Previous caesarean, last birth caesarean	307	6.1	10	0.2	171	3.4	3412	67.7	1141	22.6	5041	100.0
Previous caesarean	498	9.3	10	0.2	195	3.7	3457	64.7	1186	22.2	5346	100.0
<b>Total</b>	<b>16195</b>	<b>51.0</b>	<b>127</b>	<b>0.4</b>	<b>4646</b>	<b>14.6</b>	<b>5472</b>	<b>17.2</b>	<b>5294</b>	<b>16.7</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

### 2.7.1. Caesarean section by maternity service

The only teaching maternity service in Western Australia had 35.0 per cent of women having a birth by caesarean section. Rural health services' caesarean section rates ranged between 17.5 per cent in the Goldfields and 30.8 per cent in the Pilbara. Caesarean section rates at private health services ranged between and 23.6 and 57.1 per cent (Table 38).

Table 38: Caesarean Sections by Maternity Service in WA, 2011

Hospital	Mode of Birth					
	Vaginal Birth		Caesarean		Total	
	No.	%	No.	%	No.	%
Armadale Kelmscott	1480	74.0	521	26.0	2001	100.0
Attadale	333	54.1	283	45.9	616	100.0
Bentley	579	71.0	237	29.0	816	100.0
Glengarry	541	56.9	409	43.1	950	100.0
Goldfields	686	82.5	146	17.5	832	100.0
Great Southern	464	73.0	172	27.0	636	100.0
Homebirths	242	100.0	-	-	242	100.0
Joondalup	1711	65.9	884	34.1	2595	100.0
Kaleeya	898	69.1	401	30.9	1299	100.0
KEMH	3696	65.0	1994	35.0	5690	100.0
Kimberley	394	73.5	142	26.5	536	100.0
Mercy	859	62.9	507	37.1	1366	100.0
Midwest	431	77.2	127	22.8	558	100.0
Osborne Park	1333	71.7	525	28.3	1858	100.0
Peel	757	70.1	323	29.9	1080	100.0
Pilbara	396	69.2	176	30.8	572	100.0
Rockingham Kwinana	1025	76.5	314	23.5	1339	100.0
SJOG Bunbury	339	62.0	208	38.0	547	100.0
SJOG Geraldton	181	76.4	56	23.6	237	100.0
SJOG Murdoch	747	42.9	996	57.1	1743	100.0
SJOG Subiaco	1961	54.3	1652	45.7	3613	100.0
South West	979	71.7	387	28.3	1366	100.0
Swan Districts	786	75.0	262	25.0	1048	100.0
Wheatbelt	150	77.3	44	22.7	194	100.0
<b>Total</b>	<b>20968</b>	<b>66.1</b>	<b>10766</b>	<b>33.9</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

## 2.8. Hours of established labour

For women that gave birth vaginally following a spontaneous onset of labour, 57.3 per cent had duration of labour of 6 hours or less and 33.5 per cent laboured between 6 and 12 hours. Within 12 hours of spontaneous onset of labour, 91.7 per cent of these women had given birth.

Proportionally, more women that gave birth vaginally following an induction of labour had a labour duration of 12 hours or less (96.7 per cent) than those with spontaneous onset of labour (Table 39 and Figure 10).

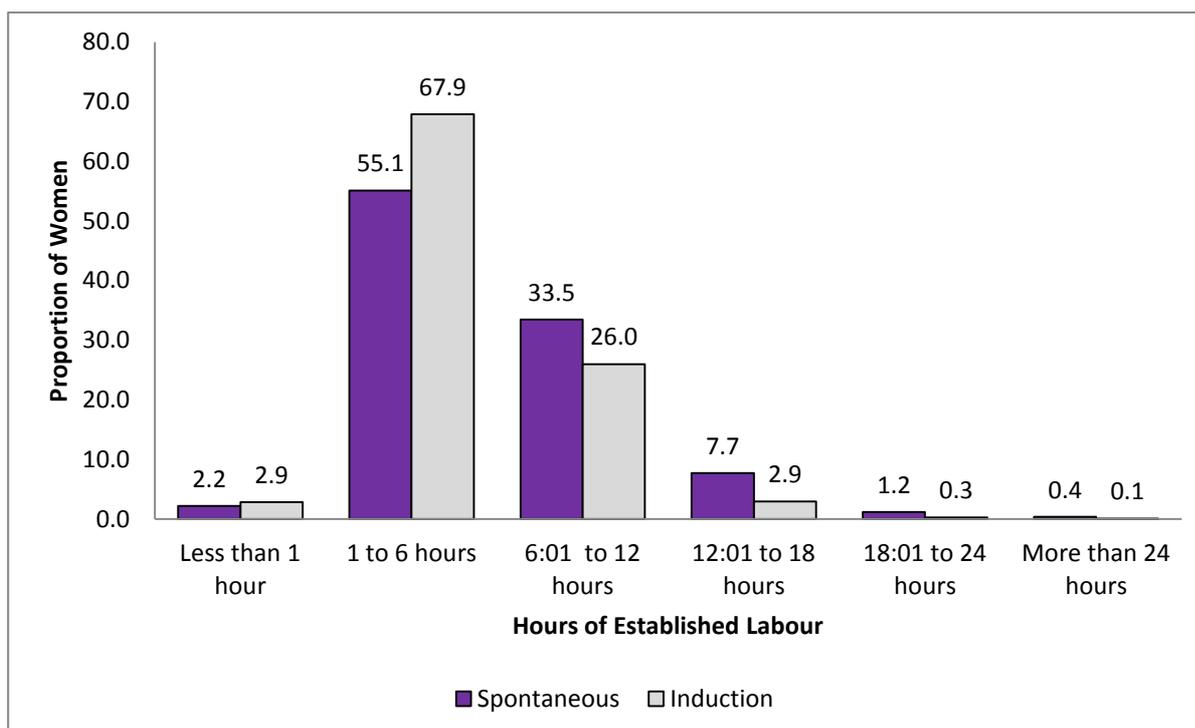
**Table 39: Vaginal Births - Hours of Labour by Onset of Labour for Women in WA, 2011**

Hours of labour	Onset of labour				Total	
	Spontaneous		Induction		No.	%
	No.	%	No.	%	No.	%
Less than 1 hour	300	2.2	207	2.9	507	2.4
1 to 6 hours	7561	55.1	4910	67.9	12471	59.5
6:01 to 12 hours	4593	33.5	1880	26.0	6473	30.9
12:01 to 18 hours	1061	7.7	212	2.9	1273	6.1
18:01 to 24 hours	164	1.2	19	0.3	183	0.9
More than 24 hours	49	0.4	5	0.1	54	0.3
<b>Total</b>	<b>13728</b>	<b>100.0</b>	<b>7233</b>	<b>100.0</b>	<b>20961</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

7 women with spontaneous onset of labour were excluded as no duration of labour reported.

**Figure 10: Vaginal Births - Hours of Labour in WA, 2011**



## 2.9. Complications of labour and birth

In 2011, 38.9 per cent of women who had a singleton birth had no complications during labour and birth (Table 65).

Of the women who had a multiple birth, 4.5 per cent had no complications during labour and birth.

There were differences in the rate of complications during labour and birth between single and multiple births. Fetal compromise was reported more often for women with singleton than multiple births. Primary postpartum haemorrhage (PPH) was recorded more often for multiple births than singleton births.

The most common complications reported that influenced the labour, mode of birth and birth outcome of the index pregnancy were primary PPH (16.5 per cent), previous caesarean section (16.4 per cent) and fetal compromise (10.7 per cent) (Table 40).

**Table 40: Complications of Labour and Birth for Women giving Birth in WA, 2011**

Complications of labour and birth <sup>1</sup>	Plurality of Birth				Total	
	Singleton		Multiple		No.	%
	No.	%	No.	%	No.	%
Precipitate delivery	1179	3.8	***	***	1182	3.7
Fetal compromise	3355	10.7	39	8.7	3394	10.7
Prolapsed cord	44	0.1	***	***	47	0.1
Cord tight around neck	728	2.3	***	***	730	2.3
Cephalopelvic disproportion	355	1.1	***	***	356	1.1
Primary Postpartum Haemorrhage (PPH)	5060	16.2	171	38.2	5231	16.5
Retained placenta manual removal	330	1.1	7	1.6	337	1.1
Persistent occipito posterior	594	1.9	6	1.3	600	1.9
Shoulder dystocia	506	1.6	-	-	506	1.6
Failure to progress <=3cms	1897	6.1	11	2.5	1908	6.0
Failure to progress >3cms	1475	4.7	11	2.5	1486	4.7
Previous caesarean section	5132	16.4	66	14.7	5198	16.4
Other	10783	34.5	417	93.1	11200	35.3
<b>Any complication</b>	<b>19101</b>	<b>61.1</b>	<b>428</b>	<b>95.5</b>	<b>19529</b>	<b>61.5</b>
No complications of labour and birth	12185	38.9	20	4.5	12205	38.5
<b>Total Women</b>	<b>31286</b>	<b>100.0</b>	<b>448</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

These data include reasons for instrumental delivery or caesarean section of the first or only infant born from the pregnancy.

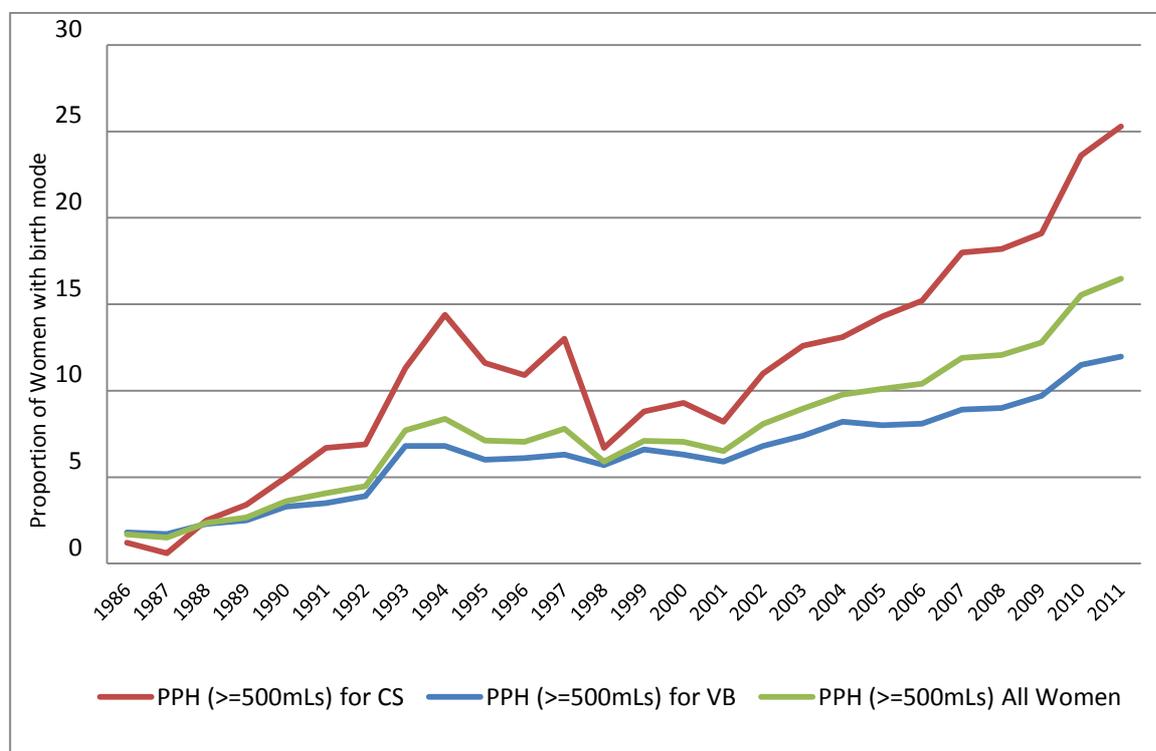
Values <5 are suppressed and indicated with \*\*\*.

<sup>1</sup> A woman may have more than one complication of labour and birth

### 2.9.1. Primary postpartum haemorrhage

The overall primary postpartum haemorrhage (PPH) rate for 2011 was 16.5 per cent. The proportion of women that had a PPH of 500 mLs or more has risen each year (1.7 per cent in 1986) particularly in women that had a birth by Caesarean Section (from 1.2 to 25.3 per cent in 2011) (Figure 11).

Figure 11: Primary Postpartum Haemorrhage in WA, 1986-2011



### 2.9.2. Reason for caesarean section

The Midwives Notification System did not collect a specified reason for caesarean section. However, midwives were required to include the reason for caesarean section when reporting complications of labour and birth. More than one complication may have been recorded and women that gave birth by caesarean section had at least one complication reported (Table 41).

Table 41: Frequent Complications of Labour and Birth for Caesarean Section in WA, 2011

Complications of Labour and Birth <sup>1</sup>	No.	% <sup>2</sup>
Previous caesarean section	4627	43.0
Fetal distress	2125	19.7
Maternal care — known/suspected malpresentation of fetus	1356	12.6
Maternal care — known/suspected abnormality of pelvic organs	1726	16.0
Abnormalities of forces of labour	727	6.8
Other	1674	15.5

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> A woman may have more than one complication of labour and birth recorded

<sup>2</sup> Percentage of women who gave birth by Caesarean Section (n=10,766)

### 2.9.3. Accoucheur

A woman may give birth to more than one infant. Each infant of a birth may have one or more birth attendants reported. These data reflect the highest value reported for the first or only infant resulting from a pregnancy.

Table 42 below displays the rank order of the birth attendant from highest to lowest. Midwives and obstetricians were accoucheurs in almost equal numbers of birth performing 33.7 and 34.4 per cent respectively. Other medical officers performed 28.8 per cent, supervised students in 2.5 per cent, and the remaining 0.6 per cent of births had no trained birth attendant or had a primary attendant of other health professional like ambulance officer or registered nurse. A midwife, or a supervised student, was the accoucheur for 72.0 per cent (11,647) of women who had a spontaneous vertex birth (Table 42).

**Table 42: Mode of Birth and Accoucheur in WA, 2011**

Accoucheur	Mode of Birth											
	Spontaneous Vertex		Assisted Vaginal		Breech		Elective Caesarean		Emergency Caesarean		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Obstetrician	1913	11.8	2230	47.8	34	27.0	3647	66.6	2885	54.5	10709	33.7
Other Medical Officer <sup>1</sup>	2461	15.2	2436	52.2	21	16.7	1825	33.4	2409	45.5	9152	28.8
Midwife	10843	67.0	-	-	63	50.0	-	-	-	-	10906	34.4
Student	804	5.0	-	-	-	-	-	-	-	-	804	2.5
Self/no attendant	48	0.3	-	-	***	***	-	-	-	-	50	0.2
Other	107	0.7	-	-	6	4.8	-	-	-	-	113	0.4
<b>Total</b>	<b>16176</b>	<b>100.0</b>	<b>4666</b>	<b>100.0</b>	<b>126</b>	<b>100.0</b>	<b>5472</b>	<b>100.0</b>	<b>5294</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, some values in the same row/column are provided as a range to prevent calculation of the suppressed value.

<sup>1</sup> Other Medical Officer includes GP Obstetricians, Obstetric Registrars and Residents, District Medical Officers etc

## 2.10. Repair of perineum and/or vagina

Among the 20,968 women who gave birth vaginally, there were 36.4 per cent with an intact perineum, 20.1 per cent had an episiotomy performed, and 2.1 per cent had a 3<sup>rd</sup> or 4<sup>th</sup> degree tear traumatising the anal sphincter. For 30.1 per cent (1269) of the women that had an episiotomy, a tear extended the episiotomy. Instrumental births had the highest rates for episiotomy and anal sphincter trauma (Table 43).

Table 43: Mode of Birth and Perineal Status for Women giving birth in WA, 2011

Mode of Birth	Perineal Status					TOTAL
	None	Episiotomy <sup>1</sup>	1 or 2 degree	3 or 4 degree	Other	
<b>Number</b>						
Spontaneous	7050	1623	6962	217	343	16195
Vacuum	452	1974	1220	141	46	3833
Forceps	31	603	96	80	***	813
Breech	102	13	10	***	***	127
<b>Total</b>	<b>7635</b>	<b>4213</b>	<b>8288</b>	<b>439</b>	<b>393</b>	<b>20968</b>
<b>Row Percentage</b>						
Spontaneous	43.5	10.0	43.0	1.3	2.1	100.0
Vacuum	11.8	51.5	31.8	3.7	1.2	100.0
Forceps	3.8	74.2	11.8	9.8	***	100.0
Breech	80.3	10.2	7.9	***	***	100.0
<b>Total</b>	<b>36.4</b>	<b>20.1</b>	<b>39.5</b>	<b>2.1</b>	<b>1.9</b>	<b>100.0</b>

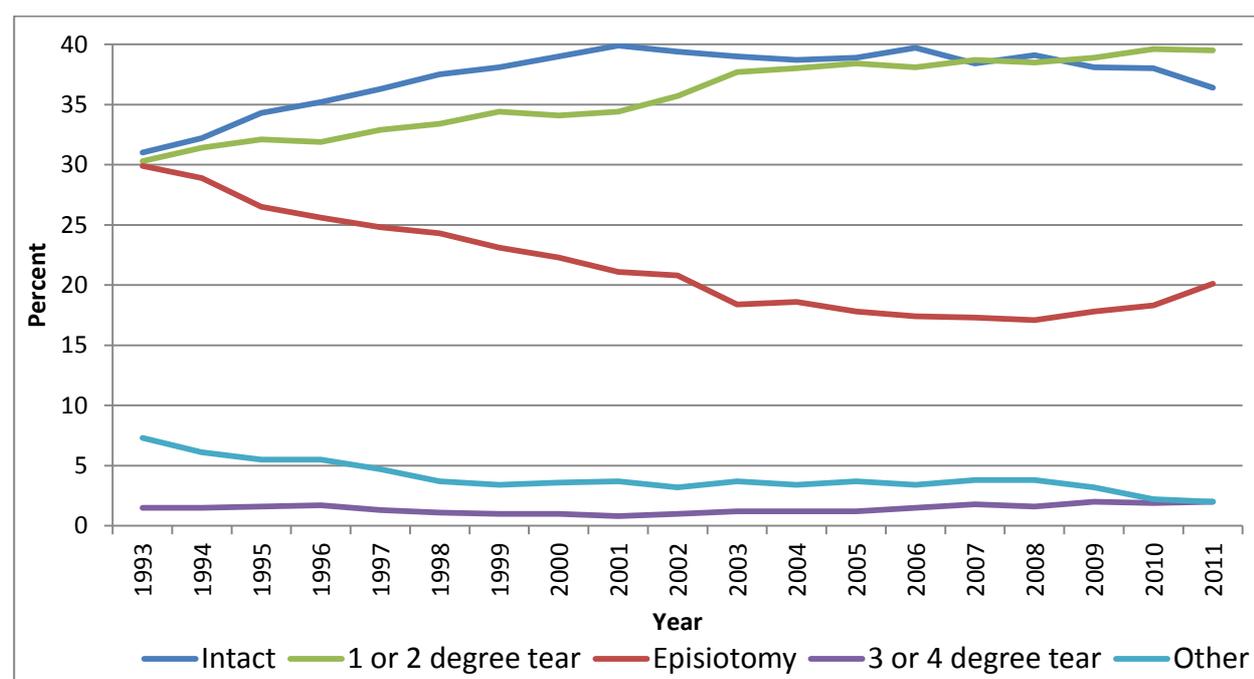
Extracted from Midwives' Notification System on 17 December 2013.

Birth mode presented is for the singleton infant or first infant of a multiple birth, whereas perineal status is determined after all infants are born.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

Trends since 1993 indicate a decreasing rate of episiotomy from 29.9 per cent in 1993 to 17.1 per cent in 2008. The proportion of women with 1<sup>st</sup> or 2<sup>nd</sup> degree perineal trauma increased from 30.5 per cent in 1993 to 39.5 per cent in 2011. The rate per 100 women that had anal sphincter trauma increased from a low of 0.8 per cent in 2001 to a high of 2.0 per cent in 2009 and 2011. The change in proportion of women with "Other" perineal status is unable to be explained (Figure 12).

Figure 12: Perineal Status following Vaginal Births in WA, 1993-2011



<sup>1</sup> Includes 1,269 women who had an episiotomy plus tear reported. The degree of the tear is unknown.

### 3. Aboriginal mothers and infants

In 2011, there were 1,723 Aboriginal women who gave birth in WA. These women comprised 5.4 per cent of all women giving birth. This was an increase of 40 Aboriginal women (2.4 per cent) from the number that gave birth in 2010 (Table 44).

#### 3.1. Maternal age

Maternal age for all women ranged from 13 to 54 years with a mean of 29.7 years and a median of 30 years. For Aboriginal women, the highest proportion was in the 20-24 year age group (33.5 per cent). Aboriginal women, in general, gave birth at a younger age than did non-Aboriginal women. Among the non-Aboriginal women, the highest proportion of those that gave birth in 2011 was in the 30-34 year age group (32.2 per cent) (Table 44).

**Table 44: Age and Aboriginal Status of Women who gave birth in WA, 2011**

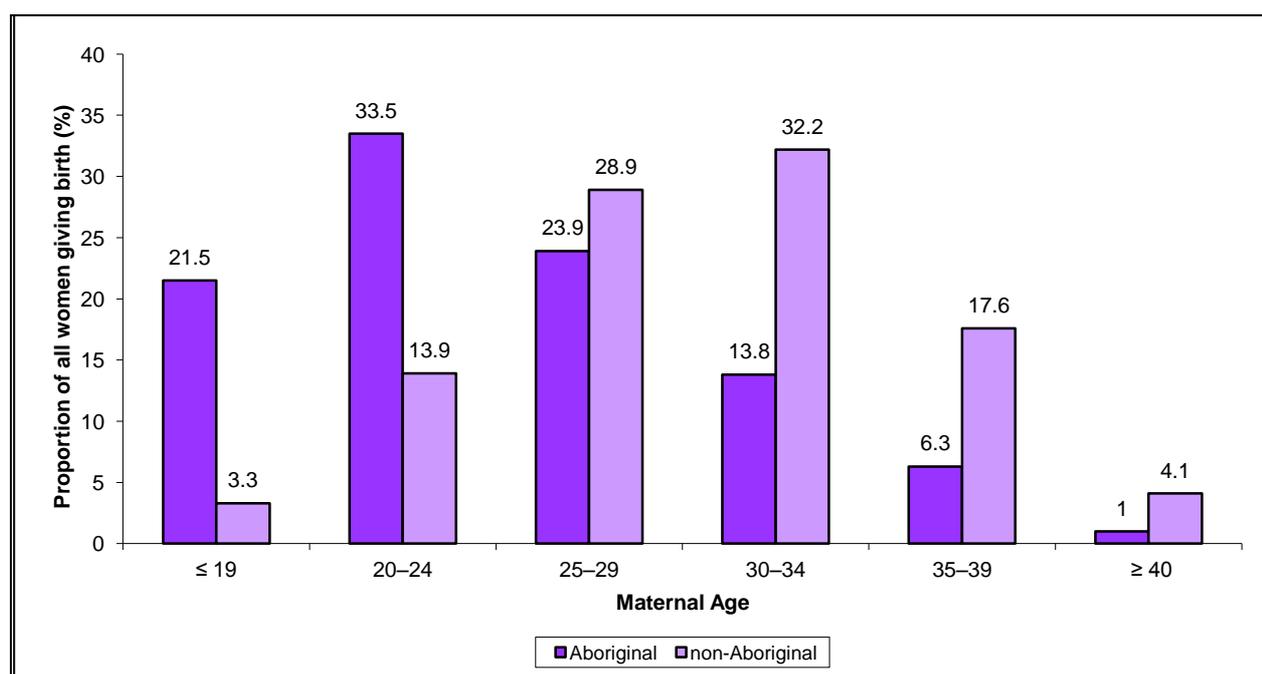
Maternal age	Aboriginal Status of mother				Total	
	Aboriginal		non-Aboriginal		No.	%
	No.	%	No.	%	No.	%
<=15	20	1.2	17	0.1	37	0.1
16	55	3.2	58	0.2	113	0.4
17	72	4.2	147	0.5	219	0.7
18	98	5.7	282	0.9	380	1.2
19	126	7.3	492	1.6	618	1.9
<=19	371	21.5	996	3.3	1367	4.3
20-24	577	33.5	4171	13.9	4748	15.0
25-29	411	23.9	8661	28.9	9072	28.6
30-34	238	13.8	9669	32.2	9907	31.2
35-39	108	6.3	5283	17.6	5391	17.0
>=40	18	1.0	1231	4.1	1249	3.9
<b>Total</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Mean = 29.7 years, standard deviation = 5.7 years, Median = 30 years. 70 women were 45 years or more.

The proportion of teenagers among all Aboriginal women that gave birth (21.5 per cent) was more than six times greater than the corresponding group's proportion among non-Aboriginal women (3.3 per cent). Thirteen point eight per cent of Aboriginal women that gave birth were aged 30-34 years, half the proportion of non-Aboriginal women in the same age group (32.2 per cent) (Figure 13).

**Figure 13: Age Distribution by Aboriginal Status in WA, 2011**



Over the past 30 years, the proportion of women giving birth in WA that were Aboriginal remained relatively consistent, ranging from 5.0 per cent in 1980 to 6.8 per cent in 2002 (Table 106).

### 3.1.1. Age-specific birth rates

The age-specific birth rate of Aboriginal women was 95.8 per 1000 women of child-bearing age which was higher than the age-specific rate for non-Aboriginal women of 62.3 per 1000 women of child-bearing age (Table 45 and Figure 14).

For the 15–19 year age group, the birth rate for Aboriginal women (93.5 per 1000) was more than six times the rate for non-Aboriginal women (13.9 per 1000).

For the 20–24 year age group, the birth rate for Aboriginal women (162.0 per 1000 women) was more than three times the rate for non-Aboriginal women (51.0 per 1000 women).

For women in the 30–34 year age group, the birth rate for Aboriginal women (92.5 per 1000) was three quarters the rate for non-Aboriginal women (122.6 per 1000 women).

For women in the 40–44 year age group, the birth rate for Aboriginal women (7.7 per 1000) was slightly more than half the rate for non-Aboriginal women (14.8 per 1000 women).

**Table 45: Age-Specific Birth Rates by Aboriginal Status WA, 2011**

Age	Aboriginal Status of mother						Total		
	Aboriginal			non-Aboriginal			Births	Pop'n	Birth rate <sup>2</sup>
Births	Pop'n <sup>1</sup>	Birth rate <sup>2</sup>	Births	Pop'n	Birth rate <sup>2</sup>				
15–19	371	3,968	93.5	996	71,640	13.9	1,367	75,608	18.1
20–24	577	3,561	162.0	4,171	81,725	51.0	4,748	85,286	55.7
25–29	411	3,022	136.0	8,661	85,274	101.6	9,072	88,296	102.7
30–34	238	2,574	92.5	9,669	78,891	122.6	9,907	81,465	121.6
35–39	108	2,507	43.1	5,283	80,827	65.4	5,391	83,334	64.7
40–44	18	2,351	7.7	1,231	83,268	14.8	1,249	85,619	14.6
<b>Total</b>	<b>1,723</b>	<b>17,983</b>	<b>95.8</b>	<b>30,011</b>	<b>481,625</b>	<b>62.3</b>	<b>31,734</b>	<b>499,608</b>	<b>63.5</b>

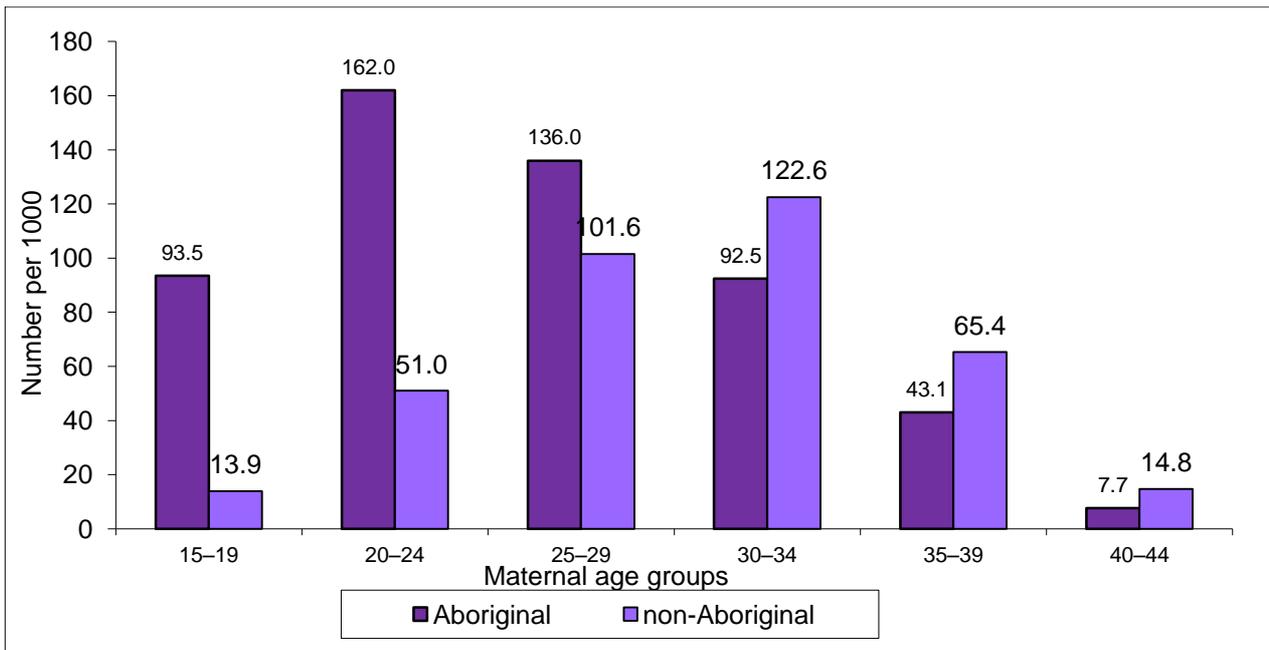
Data extracted from Midwives' Notification System on 17 December 2013.

The 15–19 year age group includes births to mothers younger than 15 years of age. The 40–45 age group includes births to mothers aged 45 years or more.

<sup>1</sup> Source of population data: ABS Estimated Resident Populations for WA downloaded from the Epidemiology Branch website 9 Jan 2013, Epidemiology Branch, Public Health Division, DoHWA <http://intranet.health.wa.gov.au/epidemiology/downloads/index.cfm>

<sup>2</sup> Age-Specific Birth Rate — the total number of births in one year per 1000 women of the same age group.

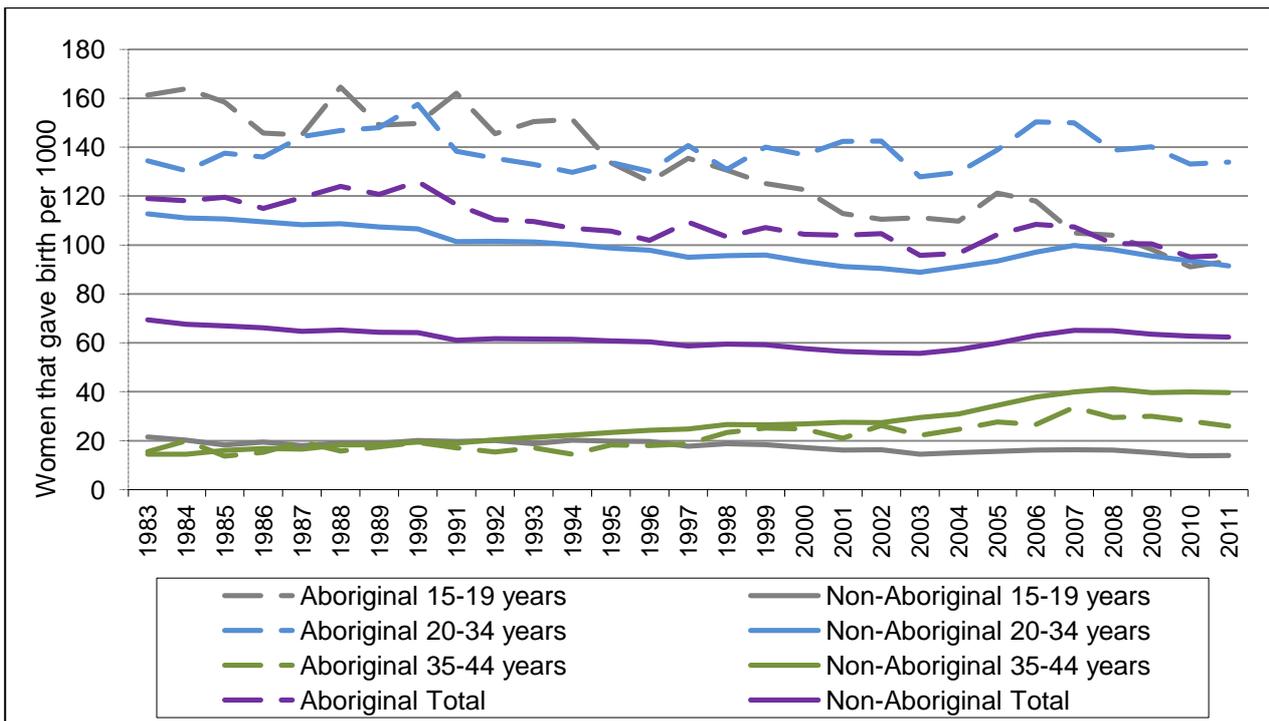
Figure 14: Age-Specific Birth Rates by Aboriginal Status in WA, 2011



Trend data for the period 1983 to 2011 indicate that the age-specific birth rate for women in the age group 15 to 19 years varied between a high of 27.6 births per 1000 women in 1983 and a low of 17.8 in 2010. These data also indicate that the rate of women aged 35 to 44 years that gave birth increased. The birth rate for women aged 35 to 44 increased from a low of 14.5 in 1983 to 40.9 per 1000 women in 2008. The rate for 2011 was 39.3 per 1000 women in 2011.

For Aboriginal women, the age-specific birth rate for teenaged women has almost halved since 1988, from 164.6 to 91.0 per 1000 in 2010. The birth rate for 20 to 34 year old Aboriginal women has varied only slightly since 1983, starting at 134.4 in 1983 and being 133.9 per 1000 women in 2011. Older Aboriginal women, aged 35 years or more had a birth rate that increased from 15.5 in 1983 to 25.9 per 1000 in 2011 varying in those years from a low of 13.7 to a high of 33.6 in 2007 (Figure 15 and Table 106).

Figure 15: Age-Specific Births Rates by Aboriginal Status of Women in WA, 1983-2011



### 3.2. Health region of residence

Five point four per cent of women that gave birth in 2011 were Aboriginal but this proportion varied across health regions.

Women that resided in metropolitan areas had the lowest proportion of Aboriginal women with 1.9 per cent in the northern health area and 3.1 per cent in the south. Women that lived in the country health regions that gave birth were comprised of 15.7 per cent Aboriginal women with the range of proportion between 3.4 per cent in the Southwest and 61.0 per cent in the Kimberley.

Of the Aboriginal women that gave birth who were resident in Western Australia, 35.6 per cent were metropolitan residents and 64.4 per cent lived in a country health region. For non-Aboriginal women resident in Western Australia, 80.1 per cent lived in a metropolitan health region, 19.9 per cent lived in a country health region (Table 46).

**Table 46: Health Region of Residence and Aboriginal Status in WA, 2011**

Health region of residence	Aboriginal Status of mother		Total
	Aboriginal	non-Aboriginal	
<b>Numbers</b>			
<b>Metropolitan</b>	<b>612</b>	<b>24020</b>	<b>24632</b>
North	243	12319	12562
South	369	11701	12070
<b>Country</b>	<b>1109</b>	<b>5966</b>	<b>7075</b>
Kimberley	397	254	651
Pilbara	181	675	856
Midwest	200	734	934
Wheatbelt	74	836	910
Goldfields	128	771	899
Southwest	70	1981	2051
Great Southern	59	715	774
<b>Total</b>	<b>1721</b>	<b>29986</b>	<b>31707</b>
<b>Row Percentage</b>			
<b>Metropolitan</b>	<b>2.5</b>	<b>97.5</b>	<b>100.0</b>
North	1.9	98.1	100.0
South	3.1	96.9	100.0
<b>Country</b>	<b>15.7</b>	<b>84.3</b>	<b>100.0</b>
Kimberley	61.0	39.0	100.0
Pilbara	21.1	78.9	100.0
Midwest	21.4	78.6	100.0
Wheatbelt	8.1	91.9	100.0
Goldfields	14.2	85.8	100.0
Southwest	3.4	96.6	100.0
Great Southern	7.6	92.4	100.0
<b>Total</b>	<b>5.4</b>	<b>94.6</b>	<b>100.0</b>
<b>Column Percentage</b>			
<b>Metropolitan</b>	<b>35.6</b>	<b>80.1</b>	<b>77.7</b>
North	14.1	41.1	39.6
South	21.4	39.0	38.1
<b>Country</b>	<b>64.4</b>	<b>19.9</b>	<b>22.3</b>
Kimberley	23.1	0.8	2.1
Pilbara	10.5	2.3	2.7
Midwest	11.6	2.4	2.9
Wheatbelt	4.3	2.8	2.9
Goldfields	7.4	2.6	2.8
Southwest	4.1	6.6	6.5
Great Southern	3.4	2.4	2.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

27 women, including 2 who were Aboriginal, were excluded as their residence was not within Western Australia<sup>1</sup>.

<sup>1</sup> Permanent residence reported was an external Australian Territory like Christmas Island, other Australian state or other country.

### 3.3. Care during pregnancy

For Aboriginal women that gave birth in 2011, a quarter commenced antenatal care in the first trimester (25.3 per cent). They were half as likely as other WA women to commence antenatal care in the first trimester and were fifteen times more likely to not attend any antenatal care. Aboriginal women were twice as likely as other women to commence antenatal care in the second or third trimester or for gestation at first antenatal visit to be unknown at the time of reporting (Table 47).

**Table 47: Gestation at First Antenatal Care Visit and Aboriginal Status in WA, 2011**

Aboriginal Status	Gestational Age Groups (weeks)					Total
	1-12	13-24	>24	Did not Attend	Not Determ	
<b>Number</b>						
Aboriginal	436	498	364	85	340	1723
non-Aboriginal	14855	8952	2830	97	3277	30011
<b>Total</b>	<b>15291</b>	<b>9450</b>	<b>3194</b>	<b>182</b>	<b>3617</b>	<b>31734</b>
<b>Percentage</b>						
Aboriginal	25.3	28.9	21.1	4.9	19.7	100.0
non-Aboriginal	49.5	29.8	9.4	0.3	10.9	100.0
<b>Total</b>	<b>48.2</b>	<b>29.8</b>	<b>10.1</b>	<b>0.6</b>	<b>11.4</b>	<b>100.0</b>
<b>Relative Risk</b>						
Aboriginal	0.5	1.0	2.2	15.3	1.8	
non-Aboriginal	1.0	1.0	1.0	1.0	1.0	

Extracted from Midwives' Notification System on 17 December 2013.

For Aboriginal women, antenatal care provision in the first trimester was received by the highest proportion in the Southwest (54.3 per cent) and the Kimberley (36.8 per cent) regions. For non-Aboriginal women the highest proportions were for residents in the Southwest (59.4 per cent) and the south metropolitan (55.0 per cent) health regions (Table 48).

**Table 48: Gestation at First Antenatal Care Visit, Proportion for Health Region of Residence and Aboriginal Status in WA, 2011**

Aboriginal Status	Health Regions	Gestational Age Groups (weeks)					Total
		1-12	13-24	>24	Did not Attend	Not Determ	
Aboriginal	North Metro	21.0	38.7	34.6	2.1	3.7	100.0
	South Metro	27.4	37.7	26.3	4.6	4.1	100.0
	Kimberley	36.8	29.0	14.9	1.8	17.6	100.0
	Pilbara	19.9	24.3	22.1	6.6	27.1	100.0
	Midwest	21.0	23.0	16.5	10.5	29.0	100.0
	Wheatbelt	14.9	31.1	37.8	4.1	12.2	100.0
	Goldfields	5.5	8.6	9.4	9.4	67.2	100.0
	Southwest	54.3	21.4	10.0	1.4	12.9	100.0
	Great Southern	6.8	16.9	6.8	11.9	57.6	100.0
<b>Aboriginal Total</b>		<b>25.3</b>	<b>28.9</b>	<b>21.2</b>	<b>4.9</b>	<b>19.7</b>	<b>100.0</b>
non-Aboriginal	North Metro	48.7	36.9	10.8	1.1	2.5	100.0
	South Metro	55.0	29.3	8.8	1.3	5.6	100.0
	Kimberley	40.2	28.0	13.4	1.2	17.3	100.0
	Pilbara	34.1	32.4	12.0	3.3	18.2	100.0
	Midwest	42.9	18.5	6.8	8.7	23.0	100.0
	Wheatbelt	42.6	29.2	17.0	1.9	9.3	100.0
	Goldfields	14.9	4.7	8.0	6.7	65.6	100.0
	Southwest	59.4	10.9	3.1	2.1	24.5	100.0
	Great Southern	14.8	7.4	6.4	6.9	64.5	100.0
<b>non-Aboriginal Total</b>		<b>49.5</b>	<b>29.8</b>	<b>9.5</b>	<b>1.8</b>	<b>9.4</b>	<b>100.0</b>
<b>Grand Total</b>		<b>48.2</b>	<b>29.8</b>	<b>10.1</b>	<b>1.9</b>	<b>10.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Excludes 27 women (2 Aboriginal) where maternal residence was not within WA.

### 3.4. Previous pregnancies

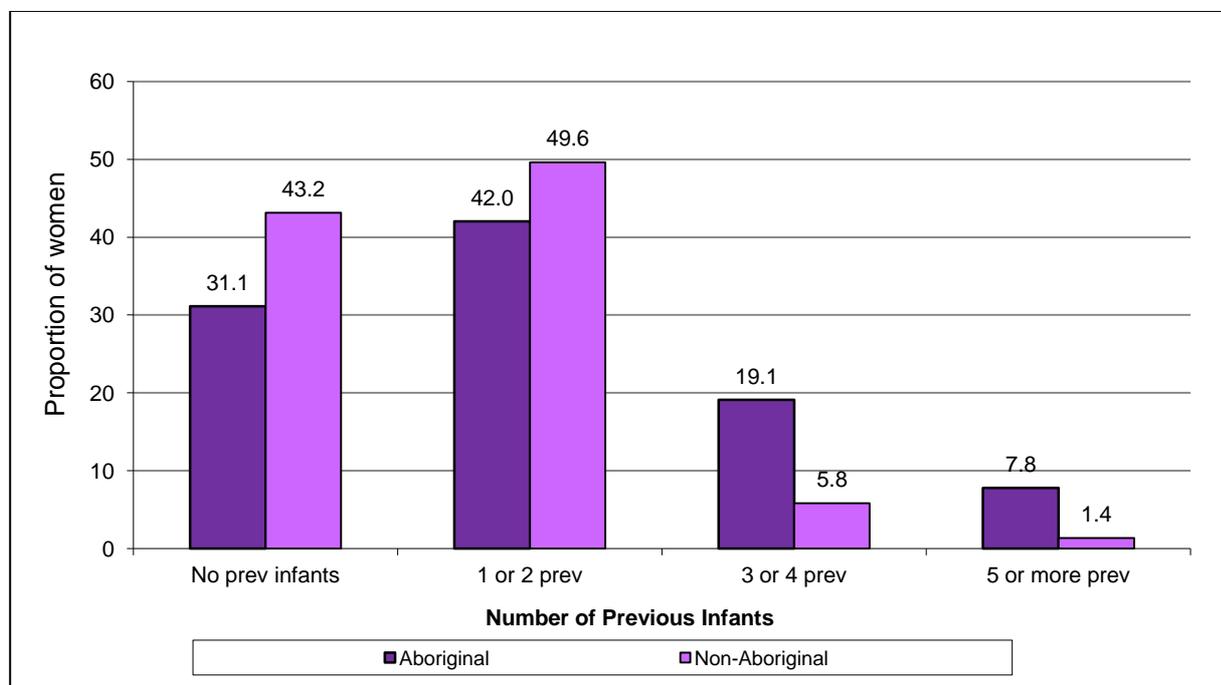
The proportion of Aboriginal women giving birth to their first infant (29.9 per cent) was lower than for non-Aboriginal women (43.1 per cent). Conversely, the proportion of Aboriginal women giving birth to their fifth or more child (9.4 per cent) was more than seven times higher than the proportion of non-Aboriginal women (1.3 per cent) (Table 49).

**Table 49: Infants born previously and Aboriginal Status in WA, 2011**

Number Previous Infants	Aboriginal Status of Mother				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
Nil	536	31.1	12951	43.2	13487	42.5
One or two	724	42.0	14898	49.6	15622	49.2
Three or four	329	19.1	1752	5.8	2081	6.6
Five or more	134	7.8	410	1.4	544	1.7
<b>Total</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

**Figure 16: Infants born previously and Aboriginal Status of Women giving Birth in WA, 2011**



The proportion of Aboriginal women who had a history of caesarean section and a vaginal birth in 2011 (2.8 per cent) was double that of non-Aboriginal women (0.9 per cent) (Table 50).

**Table 50: Prior Caesarean Section and Aboriginal Status in WA, 2011**

CS in Previous Deliveries	Aboriginal Status of Mother				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
No Previous CS	1435	83.3	24953	83.1	26388	83.1
Previous CS, CS Last Delivery	239	13.9	4802	16.0	5041	15.9
Previous CS, Vaginal Birth Last Delivery	49	2.8	256	0.9	305	1.0
<b>Total</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

The proportions of Aboriginal women who had given birth previously and had a history of an infant that was stillborn (4.9 per cent) or died following birth (2.9 per cent) or had either or both (7.5 per cent) were all twice that of non-Aboriginal women (2.3, 1.4 and 3.6 per cent respectively) (Table 51).

**Table 51: Prior Infants that Died and Aboriginal Status in WA, 2011**

Stillbirth or Death Previous Deliveries	Aboriginal Status of Mother				Total	
	Aboriginal		non-Aboriginal		No.	%
	No.	%	No.	%	No.	%
<b>Previous stillborn infants</b>						
None	1129	95.1	16667	97.7	17796	97.5
One or more	58	4.9	393	2.3	451	2.5
<b>Previous infants that died</b>						
None	1153	97.1	16822	98.6	17975	98.5
One or more	34	2.9	238	1.4	272	1.5
<b>Previous stillbirth or infant that died</b>						
None	1098	92.5	16444	96.4	17542	96.1
One or more	89	7.5	616	3.6	705	3.9
<b>Total with previous babies</b>	<b>1187</b>	<b>100.0</b>	<b>17060</b>	<b>100.0</b>	<b>18247</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

### 3.5. Smoking Tobacco during Pregnancy

Smoking tobacco during pregnancy is associated with low birth weight, premature birth, and perinatal death.

Almost half the Aboriginal women who gave birth in 2011 smoked tobacco during pregnancy (45.2 per cent). This was more than four times the rate of tobacco smoking in non-Aboriginal women (10.2 per cent) (Table 52).

**Table 52: Tobacco Smoking and Aboriginal Status in WA, 2011**

Aboriginal status	Smoking in pregnancy				Total	
	Smoking		Non-smoking		No.	%
	No.	%	No.	%	No.	%
Aboriginal	778	45.2	945	54.8	1723	100.0
Non-Aboriginal	3047	10.2	26964	89.8	30011	100.0
<b>Total</b>	<b>3825</b>	<b>12.1</b>	<b>27909</b>	<b>87.9</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification system on 17 December 2013.

Tobacco smoking for women who gave birth in 2011 varied across regions of residence and was highest in country areas. For all women that lived in the country areas, there was a variation in rate of tobacco smoking during pregnancy between 13.8 per cent for Southwest and 31.0 per cent in the Kimberley. Tobacco smoking during pregnancy by women residing in the metropolitan areas was 8.2 per cent in the north and 12.8 per cent in the south.

Aboriginal women were more likely to live in the country and were more likely to smoke tobacco during pregnancy. The highest rates of tobacco smoking for Aboriginal women were 60.8 per cent (Wheatbelt), 48.6 per cent (Southwest) and 47.5 per cent (Great Southern).

The highest tobacco smoking rate for non-Aboriginal women was 15.2 per cent in the Goldfields and 15.0 per cent in the Wheatbelt (Table 53).

Table 53: Tobacco Smoking, Health Region and Aboriginal Status in WA, 2011

Place of Residence	Maternal Aboriginal Status		Total
	Aboriginal	non-Aboriginal	
<b>Numbers</b>			
<b>Metro</b>	<b>298</b>	<b>2283</b>	<b>2581</b>
North Metro	113	919	1032
South Metro	185	1364	1549
<b>Country</b>	<b>478</b>	<b>760</b>	<b>1238</b>
Goldfields	52	117	169
Great Southern	28	89	117
Kimberley	178	24	202
Midwest	79	92	171
Pilbara	62	64	126
Southwest	34	249	283
Wheatbelt	45	125	170
<b>Total</b>	<b>776</b>	<b>3043</b>	<b>3819</b>
<b>Row Percentage</b>			
<b>Metro</b>	<b>48.7</b>	<b>9.5</b>	<b>10.5</b>
North Metro	46.5	7.5	8.2
South Metro	50.1	11.7	12.8
<b>Country</b>	<b>43.1</b>	<b>12.7</b>	<b>17.5</b>
Goldfields	40.6	15.2	18.8
Great Southern	47.5	12.4	15.1
Kimberley	44.8	9.4	31.0
Midwest	39.5	12.5	18.3
Pilbara	34.3	9.5	14.7
Southwest	48.6	12.6	13.8
Wheatbelt	60.8	15.0	18.7
<b>Total</b>	<b>45.1</b>	<b>10.1</b>	<b>12.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

27 women, including 2 who were Aboriginal, were excluded as their residence was not within Western Australia.

Denominators used to calculate Row Percentage in this table are those totals presented in Table 2.

Seven hundred and ninety-eight (46.3 per cent) Aboriginal women did not smoke at any time during pregnancy. The number of women not smoking increased after 20 weeks of pregnancy by 56 women. 63 women (3.7 per cent) stopped smoking during pregnancy. Of all Aboriginal women, 22.9 per cent were smoking the same amount of tobacco before and after 20 weeks gestation of pregnancy and 2.0 per cent increased the amount of tobacco smoked during pregnancy (Table 54).

Table 54: Tobacco Smoking change during Pregnancy for Aboriginal Women in WA, 2011

After 20 weeks of pregnancy	Average number of cigarettes smoked per day first 20 weeks of pregnancy							Total
	Not reported	Did not smoke	Occass	<10	10 to 19	20 to 29	≥ 30	
<b>Numbers</b>								
Not reported	142	1	8	5	1	2	1	<b>160</b>
Did not smoke	4	798	7	34	13	6	3	<b>865</b>
Occass	7	-	99	1	1	-	-	<b>108</b>
<10	2	9	1	284	24	9	-	<b>329</b>
10 to 19	1	1	1	11	144	16	3	<b>177</b>
20 to 29	1	-	1	4	5	56	4	<b>71</b>
30 or more	-	-	1	-	-	-	12	<b>13</b>
<b>Total</b>	<b>157</b>	<b>809</b>	<b>118</b>	<b>339</b>	<b>188</b>	<b>89</b>	<b>23</b>	<b>1723</b>

Extracted from Midwives' Notification System on 17 December 2013.

Green highlight indicates decreased or nil smoking during pregnancy.

Orange highlight indicates no change in smoking during pregnancy.

Red highlight indicates increased smoking during pregnancy.

### 3.6. Complications of Pregnancy

There were nine complications of pregnancy able to be reported for each birth. A tenth option was "Other" described with free text or ICD-10 Codes. One-third (33.3 per cent) of all women who gave birth in 2011, had one or more complications during pregnancy. For Aboriginal women, a higher proportion (43.5 per cent) had one or more complications during pregnancy (Table 55).

**Table 55: Complication of Pregnancy, Health Region and Aboriginal Status in WA, 2011**

One or more Complications of Pregnancy	Aboriginal Status				Total	
	Aboriginal		non-Aboriginal		No.	%
	No.	%	No.	%	No.	%
<b>Metro</b>	<b>207</b>	<b>12.0</b>	<b>7751</b>	<b>25.8</b>	<b>7958</b>	<b>25.1</b>
North Metro	75	4.4	4131	13.8	4206	13.3
South Metro	132	7.7	3620	12.1	3752	11.8
<b>Country</b>	<b>540</b>	<b>31.4</b>	<b>2073</b>	<b>6.9</b>	<b>2613</b>	<b>8.2</b>
Goldfields	75	4.4	312	1.0	387	1.2
Great Southern	38	2.2	351	1.2	389	1.2
Kimberley	193	11.2	85	0.3	278	0.9
Midwest	91	5.3	285	1.0	376	1.2
Pilbara	81	4.7	199	0.7	280	0.9
Southwest	32	1.9	583	1.9	615	1.9
Wheatbelt	30	1.7	258	0.9	288	0.9
<b>Women with one or more complications</b>	<b>747</b>	<b>43.4</b>	<b>9824</b>	<b>32.8</b>	<b>10571</b>	<b>33.3</b>
<b>Total Women</b>	<b>1721</b>	<b>100.0</b>	<b>29986</b>	<b>100.0</b>	<b>31707</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

27 women, including 2 who were Aboriginal, were excluded as their residence was not within Western Australia.

A higher proportion of Aboriginal women than non-Aboriginal women had threatened preterm labour, urinary tract infection, pre-eclampsia, prelabour rupture of membranes and other pregnancy complications. Aboriginal women were less likely to have antepartum haemorrhage and gestational diabetes (Table 56).

**Table 56: Selected Complications of Pregnancy and Aboriginal Status in WA, 2011**

Complications of Pregnancy <sup>1</sup>	Aboriginal Status				Total	
	Aboriginal		non-Aboriginal		No.	%
	No.	%	No.	%	No.	%
Threatened miscarriage	18	1.0	901	3.0	919	2.9
Threatened preterm labour	95	5.5	674	2.2	769	2.4
Urinary tract infection	145	8.4	906	3.0	1051	3.3
Pre-eclampsia	61	3.5	695	2.3	756	2.4
Antepartum haemorrhage						
— placenta praevia	5	0.3	139	0.5	144	0.5
— abruption	6	0.3	69	0.2	75	0.2
— other	34	2.0	809	2.7	843	2.7
Premature rupture of membranes	101	5.9	1077	3.6	1178	3.7
Gestational diabetes	111	6.4	2091	7.0	2202	6.9
Other	391	22.7	4679	15.6	5070	16.0
<b>One or more complications</b>	<b>749</b>	<b>43.5</b>	<b>9832</b>	<b>32.8</b>	<b>10581</b>	<b>33.3</b>
No complications of pregnancy	974	56.5	20179	67.2	21153	66.7
<b>Total Women</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> A woman may have more than one complication during pregnancy

### 3.7. Medical conditions before pregnancy

There were four pre-existing medical conditions able to be reported for each birth. A fifth option was "Other" described with text or ICD-10 Codes. More than one-third (36.3 per cent) of all women who gave birth in 2011, had one or more pre-existing medical conditions. For Aboriginal women, the proportion (36.5 per cent) was similar to non-Aboriginal women (36.3 per cent) (Table 57).

In 2011, the proportion of Aboriginal women with pre-existing diabetes (1.9 per cent) was three times the proportion of non-Aboriginal women with pre-existing diabetes (0.6 per cent). For all other specified conditions, a lower proportion of Aboriginal women than non-Aboriginal women were affected (Table 57).

**Table 57: Selected Pre-Existing Medical Conditions and Aboriginal Status in WA, 2011**

Medical Conditions before Pregnancy <sup>1</sup>	Aboriginal Status				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
Essential hypertension	19	1.1	346	1.2	365	1.2
Pre-existing diabetes	33	1.9	195	0.6	228	0.7
Asthma	145	8.4	3138	10.5	3283	10.3
Genital herpes	9	0.5	513	1.7	522	1.6
Other	519	30.1	8115	27.0	8634	27.2
<b>One or more conditions</b>	<b>629</b>	<b>36.5</b>	<b>10885</b>	<b>36.3</b>	<b>11514</b>	<b>36.3</b>
No medical conditions	1094	63.5	19126	63.7	20220	63.7
<b>Total Women</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

### 3.8. Procedures and treatments

There were seven procedures and treatments able to be reported for each birth. Ninety-seven per cent of all women who gave birth in 2011 had one or more of the listed procedures and treatments. For Aboriginal women, the proportion (96.0 per cent) was similar to non-Aboriginal women (97.1 per cent) (Table 58).

In 2011, the proportion of Aboriginal women that an antenatal cardiotocograph (38.2 per cent) or intrapartum (58.2 per cent) was higher than for non-Aboriginal women, 25.9 and 55.3 per cent respectively. For all other specified procedures and treatment, a lower proportion of Aboriginal women than non-Aboriginal women received the procedure or treatment (Table 58).

**Table 58: Selected Procedures and Treatment and Aboriginal Status in WA, 2011**

Procedures and Treatments <sup>2</sup>	Aboriginal Status				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
Fertility treatments	4	0.2	1086	3.6	1090	3.4
Cervical suture	6	0.3	97	0.3	103	0.3
CVS (placental biopsy)	1	0.1	139	0.5	140	0.4
Amniocentesis	16	0.9	799	2.7	815	2.6
Ultrasound	1605	93.2	28395	94.6	30000	94.5
CTG antepartum	658	38.2	7765	25.9	8423	26.5
CTG intrapartum	1003	58.2	16608	55.3	17611	55.5
<b>One or more procedures</b>	<b>1654</b>	<b>96.0</b>	<b>29134</b>	<b>97.1</b>	<b>30788</b>	<b>97.0</b>
No procedures	69	4.0	877	2.9	946	3.0
<b>Total Women</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> A woman may have more than one pre-existing medical condition

<sup>2</sup> A woman may have more than one treatment or procedure during the pregnancy

### 3.9. Labour and birth details

#### 3.9.1. Onset of labour

Labour established spontaneously for 63.8 per cent of Aboriginal women who gave birth in WA in 2011. This was a higher proportion than for non-Aboriginal women (50.5 per cent).

Labour was induced for 23.2 per cent of Aboriginal women who gave birth. Thirteen per cent did not experience labour, having a birth by caesarean section; these were lower proportions than for non-Aboriginal women (Table 59).

**Table 59: Onset of Labour and Aboriginal Status of Women Giving Birth in WA, 2011**

Onset of labour	Aboriginal Status				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
Spontaneous not Augmented	720	41.8	9191	30.6	9911	31.2
Spontaneous and Augmented	379	22.0	5970	19.9	6349	20.0
Induced	400	23.2	8668	28.9	9068	28.6
No labour	224	13.0	6182	20.6	6406	20.2
<b>Total</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

#### 3.9.2. Place of birth

The largest proportion of Aboriginal women gave birth at the teaching maternity hospital (26.3 per cent). Of the Aboriginal women, 19.6 per cent gave birth at hospitals in the Kimberley health region and 11.5 per cent gave birth in south metropolitan hospitals. Most Aboriginal women gave birth in public hospitals and did not give birth at home or in designated birth centres (Table 60).

**Table 60: Place of Giving Birth and Aboriginal Status of Women in WA, 2011**

Place of Birth	Aboriginal Status		Total
	Aboriginal	non-Aboriginal	
	Number		
Private Homebirth	0	54	54
Private Metro	12	8276	8288
Private Country	***	780-783	784
Private site with Public	45	3630	3675
Public Homebirth	0	186	186
Birth Centres	***	361-364	365
Teaching	453	4873	5326
North Metro	105	2801	2906
South Metro	198	5257	5455
Goldfields	115	717	832
Great Southern	47	589	636
Kimberley	338	198	536
Midwest	168	393	561
Pilbara	156	413	569
Southwest	63	1303	1366
Wheatbelt	19	175	194
<b>Total</b>	<b>1723</b>	<b>30010</b>	<b>31733</b>

Place of Birth	Aboriginal Status		Total
	Aboriginal	non-Aboriginal	
<b>Row Percentage</b>			
Private Homebirth	0.0	100.0	100.0
Private Metro	0.1	99.9	100.0
Private Country	0.4	99.6	100.0
Private site with Public	1.2	98.8	100.0
Public Homebirth	0.0	100.0	100.0
Birth Centres	0.3	99.7	100.0
Teaching	8.5	91.5	100.0
North Metro	3.6	96.4	100.0
South Metro	3.6	96.4	100.0
Goldfields	13.8	86.2	100.0
Great Southern	7.4	92.6	100.0
Kimberley	63.1	36.9	100.0
Midwest	29.9	70.1	100.0
Pilbara	27.4	72.6	100.0
Southwest	4.6	95.4	100.0
Wheatbelt	9.8	90.2	100.0
<b>Total</b>	<b>5.4</b>	<b>94.6</b>	<b>100.0</b>
<b>Column Percentage</b>			
Private Homebirth	0.0	0.2	0.2
Private Metro	0.7	27.6	26.1
Private Country	0.2	2.6	2.5
Private site with Public	2.6	12.1	11.6
Public Homebirth	0.0	0.6	0.6
Birth Centres	0.1	1.2	1.2
Teaching	26.3	16.2	16.8
North Metro	6.1	9.3	9.2
South Metro	11.5	17.5	17.2
Goldfields	6.7	2.4	2.6
Great Southern	2.7	2.0	2.0
Kimberley	19.6	0.7	1.7
Midwest	9.8	1.3	1.8
Pilbara	9.1	1.4	1.8
Southwest	3.7	4.3	4.3
Wheatbelt	1.1	0.6	0.6
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Excludes 1 homebirth without contracted midwife.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

### 3.9.3. Method of birth

A higher proportion of Aboriginal women had spontaneous vertex (64.9 per cent) and breech births (1.0 per cent) than did non-Aboriginal women (50.2 and 0.4 per cent respectively). Aboriginal women had a lower caesarean section rate (26.4 per cent) when compared to the rate for non-Aboriginal women (34.4 per cent) with elective caesarean proportion in non-Aboriginal women (17.7 per cent) almost twice that of Aboriginal women (9.5 per cent). Proportions of instrumental vaginal births in Aboriginal women (6.3 and 1.3 per cent) were half that of non-Aboriginal women (12.4 and 2.6 per cent) (Table 61).

**Table 61: Method of Birth and Aboriginal Status for Women Giving Birth in WA, 2011**

Method of Birth of First Infant	Aboriginal Status				Total	
	Aboriginal		non-Aboriginal		No.	%
	No.	%	No.	%	No.	%
Spontaneous	1119	64.9	15076	50.2	16195	51.0
Breech	18	1.0	109	0.4	127	0.4
Vacuum	108	6.3	3725	12.4	3833	12.1
Forceps	23	1.3	790	2.6	813	2.6
Elective Caesarean	163	9.5	5309	17.7	5472	17.2
Emergency Caesarean	292	16.9	5002	16.7	5294	16.7
<b>Total</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Method of birth reported is that for the only or first infant of the pregnancy.

### 3.9.4. Complications of labour or birth

The differences in proportion of complications of labour or birth (Table 62) between Aboriginal and non-Aboriginal women may be partly explained by the differences seen in method of birth in Table 61. There were a higher proportion of Aboriginal women having complications related to vaginal birth, precipitate delivery, cord tight around neck, manual removal of placenta and persistent occipito posterior position. Aboriginal women had a slightly higher primary postpartum haemorrhage rate (17.4 per cent) compared with non-Aboriginal women (16.4 per cent). However, Aboriginal women were less likely to have delayed progress in labour or cephalopelvic disproportion. Non-Aboriginal women were more likely to have other complications of labour. Overall, a higher proportion of Aboriginal women had complications (65.8 per cent) than did non-Aboriginal women (61.3 per cent).

**Table 62: Selected Complications of Labour or Birth and Aboriginal Status in WA, 2011**

Complications of Labour or Birth <sup>1</sup>	Aboriginal Status				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
Precipitate delivery	175	10.2	1007	3.4	1182	3.7
Fetal compromise	252	14.6	3142	10.5	3394	10.7
Prolapsed cord	6	0.3	41	0.1	47	0.1
Cord tight around neck	45	2.6	685	2.3	730	2.3
Cephalopelvic disproportion	9	0.5	347	1.2	356	1.1
Primary Postpartum Haemorrhage (PPH)	299	17.4	4932	16.4	5231	16.5
Retained placenta manual removal	41	2.4	296	1.0	337	1.1
Persistent occipito posterior	47	2.7	553	1.8	600	1.9
Shoulder dystocia	28	1.6	478	1.6	506	1.6
Failure to progress <=3cms	71	4.1	1837	6.1	1908	6.0
Failure to progress >3cms	63	3.7	1423	4.7	1486	4.7
Previous caesarean section	272	15.8	4926	16.4	5198	16.4
Other	553	32.1	10647	35.5	11200	35.3
<b>One or more complications</b>	<b>1134</b>	<b>65.8</b>	<b>18395</b>	<b>61.3</b>	<b>19529</b>	<b>61.5</b>
No complications	589	34.2	11616	38.7	12205	38.5
<b>Total Women</b>	<b>1723</b>	<b>100.0</b>	<b>30011</b>	<b>100.0</b>	<b>31734</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

These data include reasons for caesarean section of the first or only infant born from the pregnancy.

### 3.10. Repair of perineum and/or vagina

Among the 1,268 Aboriginal women who gave birth vaginally, a higher proportion than non-Aboriginal women had an intact perineum following birth, 59.9 per cent compared to 34.9 per cent.

Aboriginal women (9.0 per cent) had half the episiotomy rate of non-Aboriginal women (20.8 per cent) and half the second degree perineal trauma rate, 12.9 per cent compared to 24.6 per cent (Table 63).

**Table 63: Perineal Status Following Vaginal Birth and Aboriginal Status in WA, 2011**

Perineal Status	Aboriginal Status				Total	
	Aboriginal		Non-Aboriginal			
	No.	%	No.	%	No.	%
Intact	759	59.9	6876	34.9	7635	36.4
1 <sup>st</sup> degree tear/vaginal tear	175	13.8	3097	15.7	3272	15.6
2 <sup>nd</sup> degree tear	164	12.9	4852	24.6	5016	23.9
3 <sup>rd</sup> degree tear	21	1.7	398	2.0	419	2.0
Episiotomy	92	7.3	2854	14.5	2946	14.0
Episiotomy plus tear	22	1.7	1245	6.3	1267	6.0
4 <sup>th</sup> degree tear	***	***	16-19	0.1	20	0.1
Other	34	2.7	359	1.8	393	1.9
<b>Total Women</b>	<b>1268</b>	<b>100.0</b>	<b>19700</b>	<b>100.0</b>	<b>20968</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

<sup>1</sup> A woman may have had more than one pre-existing medical condition

### 3.11. Infants born to Aboriginal women

In 2011, there were 1,740 infants born to Aboriginal mothers, 34 of these infants were from twin pregnancies. 98.0 per cent of infants of Aboriginal women were liveborn. Proportion of stillborn infants by time of fetal death were similar in both Aboriginal and non-Aboriginal women. For more than half of the stillborn infants (60.2 per cent) death occurred before the onset of labour. The proportion of infants born to Aboriginal women that were stillborn (2.0 per cent) was double the rate for infants of non-Aboriginal women (0.8 per cent) (Table 64).

Reporting of whether the fetal death occurred before or during labour began for this 2011 birth cohort.

**Table 64: Birth Status of Infants by Maternal Aboriginal Status in WA, 2011**

Birth Status	Maternal Aboriginal Status				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
Liveborn	1706	98.0	30216	99.2	31922	99.2
Stillborn	34	2.0	235	0.8	269	0.8
<b>Total</b>	<b>1740</b>	<b>100.0</b>	<b>30451</b>	<b>100.0</b>	<b>32191</b>	<b>100.0</b>
<b>Time of death</b>						
Antenatal	21	61.8	141	60.0	162	60.2
Intrapartum	9	26.5	72	30.6	81	30.1
Unspecified time	***	11.8	22-25	9.4	26	9.7
<b>Total</b>	<b>34</b>	<b>100.0</b>	<b>30451</b>	<b>100.0</b>	<b>32191</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

Non-Aboriginal women living in the north metropolitan area had the highest proportion of infants of those born in WA (41.1 per cent), while Aboriginal women living in the Kimberley had the highest proportion of Aboriginal infants born (23.0 per cent). In 2011, infants born to Aboriginal mothers living in the Southwest had the highest proportion of stillbirths (5.6 per cent)<sup>1</sup> with the second highest proportion living in the Kimberley. Infants of non-Aboriginal women living in the Midwest had the highest proportion of stillbirths (1.1 per cent) (Table 65).

Most health regions of residence, excluding the Wheatbelt and Pilbara had a stillbirth proportion for infants of Aboriginal women at least twice that of non-Aboriginal women living in the same region. The Wheatbelt and Pilbara both had a lower stillbirth rate than the whole of WA.

<sup>1</sup> Interpret this with caution as this percentage is calculated from a denominator of less than 100 infants.

Table 65: Birth Status by Maternal Residence and Aboriginal Status in WA, 2011

Health Region maternal residence	Maternal Aboriginal Status						Total
	Aboriginal			non-Aboriginal			
	Livebirth	Stillbirth	Total	Livebirth	Stillbirth	Total	
<b>Number</b>							
North Metropolitan	241-244	***	245	12418	93	12511	<b>12756</b>
South Metropolitan	367	6	373	11773	98	11871	<b>12244</b>
Kimberley	389	12	401	255	-	255	<b>656</b>
Pilbara	179-182	***	183	679-682	***	683	<b>866</b>
Midwest	197-200	***	201	739	8	747	<b>948</b>
Wheatbelt	76	-	76	841-844	***	845	<b>921</b>
Goldfields	125-128	***	129	770	6	776	<b>905</b>
South West	67-70	***	71	2001	17	2018	<b>2089</b>
Great Southern	55-58	***	59	714	6	720	<b>779</b>
<b>Total</b>	<b>1704</b>	<b>34</b>	<b>1738</b>	<b>30191</b>	<b>235</b>	<b>30426</b>	<b>32164</b>
<b>Row Percentage</b>							
North Metropolitan	98.4	1.6	100.0	99.3	0.7	100.0	
South Metropolitan	98.4	1.6	100.0	99.2	0.8	100.0	
Kimberley	97.0	3.0	100.0	100.0	-	100.0	
Pilbara	99.5	0.5	100.0	99.6	0.4	100.0	
Midwest	98.5	1.5	100.0	98.9	1.1	100.0	
Wheatbelt	100.0	-	100.0	99.5	0.5	100.0	
Goldfields	97.7	2.3	100.0	99.2	0.8	100.0	
South West	94.4	5.6	100.0	99.2	0.8	100.0	
Great Southern	98.3	1.7	100.0	99.2	0.8	100.0	
<b>Total</b>	<b>98.0</b>	<b>2.0</b>	<b>100.0</b>	<b>99.2</b>	<b>0.8</b>	<b>100.0</b>	
<b>Column Percentage</b>							
North Metropolitan	14.1	11.8	14.1	41.1	39.6	41.1	<b>39.7</b>
South Metropolitan	21.5	17.6	21.4	39.0	41.7	39.0	<b>38.1</b>
Kimberley	22.8	35.3	23.0	0.8	-	0.8	<b>2.0</b>
Pilbara	10.7	2.9	10.5	2.3	1.3	2.2	<b>2.7</b>
Midwest	11.6	8.8	11.6	2.4	3.4	2.5	<b>2.9</b>
Wheatbelt	4.5	-	4.4	2.8	1.7	2.8	<b>2.9</b>
Goldfields	7.4	8.8	7.4	2.5	2.6	2.5	<b>2.8</b>
South West	3.9	11.8	4.1	6.6	7.2	6.6	<b>6.5</b>
Great Southern	3.4	2.9	3.4	2.4	2.6	2.4	<b>2.4</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Excludes 27 liveborn infants where mother was not resident in WA.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

### 3.11.1. Crude birth rate

The number of liveborn infants born per 1000 people in population of geographic area is presented by Aboriginal status and region of residence of mother.

Notification forms (sample on Page 98) were received for 1,740 infants born in 2011 to Aboriginal mothers. This was an increase of 40 (2.4 per cent) infants from the 1,700 infants born in 2010. Of the infants born in 2011, 98.0 per cent were born alive, the lowest proportion of livebirths since 1984 (Table 73).

For infants born to Aboriginal mothers, the crude birth rate in 2011 was 26.6 per 1000 Aboriginal population. This rate was similar to the rate for 2010 when the downward trend in the rate reversed.

**Table 66: Crude Birth Rate, Infants of Aboriginal Mothers in WA, 1983-2011**

Year	Birth Status				Total		Aboriginal Population <sup>1</sup>	Crude Birth Rate <sup>2</sup>
	Livebirth		Stillbirth		No.	%		
	No.	%	No.	%	No.	%		
1983	1135	98.6	16	1.4	1151	100.0	41,011	28.1
1984	1179	98.0	24	2.0	1203	100.0	42,259	28.5
1985	1235	98.4	20	1.6	1255	100.0	43,491	28.9
1986	1231	98.4	20	1.6	1251	100.0	44,760	27.9
1987	1329	98.6	19	1.4	1348	100.0	46,098	29.2
1988	1428	98.6	21	1.4	1449	100.0	47,461	31.0
1989	1431	98.4	23	1.6	1454	100.0	48,878	28.7
1990	1542	98.9	17	1.1	1559	100.0	50,306	26.9
1991	1464	98.5	22	1.5	1486	100.0	51,834	26.6
1992	1412	98.5	22	1.5	1434	100.0	53,263	25.9
1993	1436	98.6	20	1.4	1456	100.0	54,650	25.5
1994	1431	98.4	24	1.6	1455	100.0	56,072	24.5
1995	1444	98.6	20	1.4	1464	100.0	57,511	26.2
1996	1426	98.6	20	1.4	1446	100.0	59,001	24.6
1997	1549	97.9	33	2.1	1582	100.0	60,369	25.7
1998	1506	99.0	15	1.0	1521	100.0	61,712	25.0
1999	1603	98.6	22	1.4	1625	100.0	63,199	25.0
2000	1587	98.3	27	1.7	1614	100.0	64,557	25.1
2001	1632	98.9	18	1.1	1650	100.0	65,923	22.9
2002	1646	98.4	27	1.6	1673	100.0	66,781	23.0
2003	1525	98.4	25	1.6	1550	100.0	67,754	24.7
2004	1559	98.9	17	1.1	1576	100.0	68,635	25.5
2005	1697	98.6	24	1.4	1721	100.0	69,608	25.5
2006	1780	98.5	27	1.5	1807	100.0	70,813	23.8
2007	1810	99.0	19	1.0	1829	100.0	71,826	23.9
2008	1715	98.7	23	1.3	1738	100.0	72,885	22.7
2009	1740	98.7	23	1.3	1763	100.0	73,820	22.9
2010	1677	98.6	23	1.4	1700	100.0	75,037	26.9
2011	1706	98.0	34	2.0	1740	100.0	76,096	26.6

Data Extracted from Midwives' Notification System on 17 December 2013.

Trend table begins in 1983 as population data not available for 1980 to 1982.

<sup>1</sup> Source of population data: ABS Estimated Resident Populations for WA.

<sup>2</sup> Crude birth rate was determined by the calculation: 1000 times Total infants born alive divided by mid-year Total Population for the geographical area

### 3.11.2. Birthweight and gestational age

Preterm birth (less than 37 weeks gestation) is associated with significant morbidity and mortality in newborn infants. In 2011, preterm birth occurred for 14.4 per cent (251) of all infants born to Aboriginal women. Similarly low birthweight (less than 2500 grams) occurred in 14.1 per cent (245) of these infants (Table 67).

**Table 67: Gestational Age and Birthweight for Infants Born to Aboriginal Mothers in WA, 2011**

Birthweight (grams)	Gestation (weeks)								Total	
	20-27		28-32		33-36		37-44			
	No.	%	No.	%	No.	%	No.	%	No.	%
< 1000	32-35	88.9	4-7	15.0	-	-	-	-	38	2.2
1000-1499	***	***	12	30.0	***	***	-	-	19	1.1
1500-1999	-	-	18	45.0	23	13.2	6	0.4	47	2.7
2000-2499	-	-	***	***	72	41.4	67	4.5	141	8.1
<b>&lt; 2500</b>	<b>36</b>	<b>100.0</b>	<b>38</b>	<b>95.0</b>	<b>98</b>	<b>56.3</b>	<b>73</b>	<b>4.9</b>	<b>245</b>	<b>14.1</b>
2500-2999	-	-	***	***	57	32.8	357	24.0	416	23.9
3000-3499	-	-	-	-	13	7.5	549	36.9	562	32.3
3500-3999	-	-	-	-	***	2.3	371	24.9	375	21.6
4000-4499	-	-	-	-	***	1.1	121	8.1	123	7.1
>= 4500	-	-	-	-	-	-	18	1.2	18	1.0
<b>Total</b>	<b>36</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>	<b>174</b>	<b>100.0</b>	<b>1489</b>	<b>100.0</b>	<b>1739</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

1 case with gestational age of 22 weeks excluded as no birthweight reported.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

### 3.11.3. Birthweight

In infants that had mothers identified as Aboriginal, the proportion of infants with a birthweight less than 2,500 grams was higher (14.1 per cent) than infants born to mothers who were not identified as Aboriginal (6.2 per cent) (Table 68).

**Table 68: Birthweight Distribution of All Infants by Maternal Aboriginal Status in WA, 2011**

Birthweight (grams)	Aboriginal Status of Mother				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
<1000	38	2.2	247	0.8	285	0.9
1000-1499	19	1.1	167	0.5	186	0.6
1500-1999	47	2.7	329	1.1	376	1.2
2000-2499	141	8.1	1154	3.8	1295	4.0
<b>&lt; 2500</b>	<b>245</b>	<b>14.1</b>	<b>1897</b>	<b>6.2</b>	<b>2142</b>	<b>6.7</b>
2500-2999	416	23.9	4721	15.5	5137	16.0
3000-3499	562	32.3	11181	36.7	11743	36.5
3500-3999	375	21.6	9382	30.8	9757	30.3
4000-4499	123	7.1	2891	9.5	3014	9.4
≥ 4500	18	1.0	379	1.2	397	1.2
<b>Total</b>	<b>1739</b>	<b>100.0</b>	<b>30451</b>	<b>100.0</b>	<b>32190</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

All Infants: Mean = 3337.3 grams. Standard deviation = 603.6 grams. Median = 3385 grams.

1 case excluded as no birthweight reported

Trend data indicates that the annual proportion of infants born to Aboriginal mothers who had a birthweight less than 2,500 grams ranged between a low 11.0 per cent in 1987 to a high 16.5 per cent in 2005 (Table 69). In 2011 the proportion of 14.1 per cent continued a downward trend from 2008. The proportion of these infants born to non-Aboriginal women has not changed significantly over the same period.

Table 69: Birthweight by Maternal Aboriginal Status in WA 1980-2011

Year	Aboriginal Status of Mother											
	Aboriginal						non-Aboriginal					
	< 1500 grams		< 2500 grams		≥ 2500 grams		< 1500 grams		< 2500 grams		≥ 2500 grams	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
1980	15	1.4	133	12.8	905	87.2	265	1.3	1116	5.6	18651	94.4
1981	24	2.1	146	13.1	972	86.9	239	1.1	1175	5.6	19928	94.4
1982	35	3.1	150	13.3	982	86.7	251	1.2	1197	5.6	20062	94.4
1983	22	1.9	153	13.3	998	86.7	299	1.4	1355	6.2	20566	93.8
1984	43	3.6	166	13.8	1037	86.2	271	1.2	1264	5.8	20496	94.2
1985	47	3.7	176	14.0	1079	86.0	318	1.4	1351	6.1	20751	93.9
1986	32	2.6	151	12.1	1099	87.9	305	1.3	1329	5.9	21308	94.1
1987	31	2.3	148	11.0	1200	89.0	311	1.4	1405	6.1	21453	93.9
1988	44	3.0	197	13.6	1252	86.4	340	1.4	1420	6.0	22289	94.0
1989	40	2.8	163	11.2	1291	88.8	356	1.5	1573	6.5	22516	93.5
1990	34	2.2	177	11.4	1382	88.6	280	1.1	1457	6.0	23003	94.0
1991	48	3.2	220	14.8	1266	85.2	311	1.3	1405	6.0	22117	94.0
1992	33	2.3	169	11.8	1265	88.2	309	1.3	1481	6.2	22408	93.8
1993	62	4.3	191	13.1	1265	86.9	281	1.2	1456	6.1	22424	93.9
1994	47	3.2	206	14.2	1249	85.8	348	1.5	1441	6.0	22529	94.0
1995	41	2.8	176	12.0	1288	88.0	322	1.3	1496	6.2	22486	93.8
1996	39	2.7	198	13.7	1247	86.3	349	1.4	1542	6.4	22597	93.6
1997	45	2.8	217	13.7	1365	86.3	328	1.4	1467	6.2	22217	93.8
1998	44	2.9	192	12.6	1329	87.4	320	1.3	1538	6.4	22619	93.6
1999	63	3.9	233	14.3	1392	85.7	314	1.3	1488	6.2	22657	93.8
2000	62	3.8	232	14.4	1382	85.6	337	1.4	1521	6.4	22093	93.6
2001	59	3.6	259	15.7	1391	84.3	325	1.4	1498	6.4	21793	93.6
2002	55	3.3	238	14.2	1435	85.8	297	1.3	1431	6.2	21680	93.8
2003	57	3.7	235	15.2	1315	84.8	286	1.2	1477	6.4	21650	93.6
2004	54	3.4	235	14.9	1340	85.1	357	1.5	1586	6.6	22370	93.4
2005	64	3.7	284	16.5	1437	83.5	357	1.4	1631	6.5	23626	93.5
2006	71	3.9	269	14.9	1538	85.1	381	1.4	1726	6.4	25133	93.6
2007	50	2.7	300	16.4	1529	83.6	381	1.3	1757	6.2	26487	93.8
2008	60	3.5	278	16.0	1460	84.0	398	1.4	1775	6.1	27155	93.9
2009	62	3.5	256	14.5	1507	85.5	442	1.5	1853	6.3	27591	93.7
2010	56	3.3	238	14.0	1462	86.0	389	1.3	1825	6.2	27732	93.8
2011	57	3.3	245	14.1	1495	85.9	414	1.4	1897	6.2	28554	93.8

Extracted from Midwives' Notification System on 17 December 2013.

### 3.11.4. Low Birthweight

Since 1980, infants born to Aboriginal mothers had a higher risk of weighing less than 2500 grams at birth. Their risk was 2.3 times higher than infants that were not born to Aboriginal mothers (Table 70).

Table 70: Odds Ratio of Low Birthweight by Maternal Aboriginal Status in WA 1980-2011

Year	Proportion in Birthweight Group								
	Non-Aboriginal			Aboriginal			Aboriginal Ratio		
	<1500	<2500	>=2500	<1500	<2500	>=2500	<1500	<2500	>=2500
1980	1.3	5.6	94.4	1.4	12.8	87.2	1.1	2.3	0.9
1981	1.1	5.6	94.4	2.1	13.1	86.9	1.9	2.3	0.9
1982	1.2	5.6	94.4	3.1	13.3	86.7	2.6	2.4	0.9
1983	1.4	6.2	93.8	1.9	13.3	86.7	1.4	2.1	0.9
1984	1.2	5.8	94.2	3.6	13.8	86.2	3.0	2.4	0.9
1985	1.4	6.1	93.9	3.7	14.0	86.0	2.6	2.3	0.9
1986	1.3	5.9	94.1	2.6	12.1	87.9	2.0	2.1	0.9
1987	1.4	6.1	93.9	2.3	11.0	89.0	1.6	1.8	0.9
1988	1.4	6.0	94.0	3.0	13.6	86.4	2.1	2.3	0.9
1989	1.5	6.5	93.5	2.8	11.2	88.8	1.9	1.7	0.9
1990	1.1	6.0	94.0	2.2	11.4	88.6	2.0	1.9	0.9
1991	1.3	6.0	94.0	3.2	14.8	85.2	2.5	2.5	0.9
1992	1.3	6.2	93.8	2.3	11.8	88.2	1.8	1.9	0.9
1993	1.2	6.1	93.9	4.3	13.1	86.9	3.6	2.1	0.9
1994	1.5	6.0	94.0	3.2	14.2	85.8	2.1	2.4	0.9
1995	1.3	6.2	93.8	2.8	12.0	88.0	2.2	1.9	0.9
1996	1.4	6.4	93.6	2.7	13.7	86.3	1.9	2.1	0.9
1997	1.4	6.2	93.8	2.8	13.7	86.3	2.0	2.2	0.9
1998	1.3	6.4	93.6	2.9	12.6	87.4	2.2	2.0	0.9
1999	1.3	6.2	93.8	3.9	14.3	85.7	3.0	2.3	0.9
2000	1.4	6.4	93.6	3.8	14.4	85.6	2.7	2.3	0.9
2001	1.4	6.4	93.6	3.6	15.7	84.3	2.6	2.5	0.9
2002	1.3	6.2	93.8	3.3	14.2	85.8	2.5	2.3	0.9
2003	1.2	6.4	93.6	3.7	15.2	84.8	3.1	2.4	0.9
2004	1.5	6.6	93.4	3.4	14.9	85.1	2.3	2.3	0.9
2005	1.4	6.5	93.5	3.7	16.5	83.5	2.6	2.5	0.9
2006	1.4	6.4	93.6	3.9	14.9	85.1	2.8	2.3	0.9
2007	1.3	6.2	93.8	2.7	16.4	83.6	2.1	2.6	0.9
2008	1.4	6.1	93.9	3.5	16.0	84.0	2.5	2.6	0.9
2009	1.5	6.3	93.7	3.5	14.5	85.5	2.3	2.3	0.9
2010	1.3	6.2	93.8	3.3	14.0	86.0	2.5	2.3	0.9
2011	1.4	6.2	93.8	3.3	14.1	85.9	2.4	2.3	0.9

Extracted from Midwives' Notification System on 17 December 2013.

Infants born alive to Aboriginal mothers with a birthweight less than 2500 grams were a higher proportion (12.8 per cent) than infants born to mothers that were not Aboriginal (6.0 per cent) (Table 71).

**Table 71: Birthweight Distribution of Liveborn Infants by Maternal Aboriginal Status in WA 2011**

Birthweight (grams)	Aboriginal Status of Mother				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
<1000	15	0.9	110	0.4	125	0.4
1000-1499	17	1.0	148	0.5	165	0.5
1500-1999	47	2.8	316	1.0	363	1.1
2000-2499	140	8.2	1138	3.8	1278	4.0
<b>&lt; 2500</b>	<b>219</b>	<b>12.8</b>	<b>1712</b>	<b>5.7</b>	<b>1931</b>	<b>6.0</b>
2500-2999	415	24.3	4698	15.5	5113	16.0
3000-3499	559	32.8	11165	37.0	11724	36.7
3500-3999	373	21.9	9371	31.0	9744	30.5
4000-4499	123	7.2	2891	9.6	3014	9.4
≥ 4500	17	1.0	379	1.3	396	1.2
<b>Total</b>	<b>1706</b>	<b>100.0</b>	<b>30216</b>	<b>100.0</b>	<b>31922</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Liveborn Infants: Mean = 3354.8 grams. Standard deviation = 565 grams. Median = 3390 grams.

### 3.11.5. Low birthweight and place of residence

For infants born alive to Aboriginal women, the proportion of those living in metropolitan areas that were low birthweight (less than 2500 grams) was 13.5 per cent compared with 12.4 per cent living in country areas. Those proportions were at least double those occurring in infants born alive to non-Aboriginal women, 5.9 per cent and 4.7 per cent respectively. (Table 72).

**Table 72: Liveborn Infants with Low Birthweight by Maternal Residence and Aboriginal Status of Mother in WA, 2011**

Health Region of Maternal Residence	Aboriginal Status					
	Aboriginal			non-Aboriginal		
	Low Birthwt	Total	%	Low Birthwt	Total	%
<b>Metro</b>	<b>82</b>	<b>608</b>	<b>13.5</b>	<b>1428</b>	<b>24191</b>	<b>5.9</b>
North Metro	29	241	12.0	736	12418	5.9
South Metro	53	367	14.4	692	11773	5.9
<b>Country</b>	<b>136</b>	<b>1096</b>	<b>12.4</b>	<b>280</b>	<b>6000</b>	<b>4.7</b>
Goldfields	12	126	9.5	29	770	3.8
Great Southern	11	58	19.0	31	714	4.3
Kimberley	48	389	12.3	10	255	3.9
Midwest	25	198	12.6	34	739	4.6
Pilbara	19	182	10.4	34	680	5.0
Southwest	7	67	10.4	106	2001	5.3
Wheatbelt	14	76	18.4	36	841	4.3
<b>Total</b>	<b>218</b>	<b>1704</b>	<b>12.8</b>	<b>1708</b>	<b>30191</b>	<b>5.7</b>

Extracted from Midwives' Notification System on 17 December 2013.

Infants included in Low Birthweight Number had a birthweight less than 2500 grams.

27 liveborn infants, including 2 who had Aboriginal mothers, were excluded as their residence was not within Western Australia.

## 4. Infants

### 4.1. Metrics of infants born

Notification forms (sample on Page 98) were received for 32,191 infants born in 2011. This was an increase of 925 (3.0 per cent) infants from the 31,266 infants born in 2010. Of the infants born in 2011, 99.2 per cent were born alive, the lowest proportion of livebirths since 2000 (Table 69).

#### 4.1.1. Crude birth rate

Trend data indicates that the crude birth rate generally declined from a high of 17.0 per 1000 total population in 1981 to a low of 12.5 per 1000 total population in 2003. An increase to 14.2 per 1000 occurred in 2007 but trend has been downward to a rate in 2011 of 13.6 per 1000 (Table 73 and Figure 17).

**Table 73: Condition at Birth and Crude Birth Rate in WA, 1980-2011**

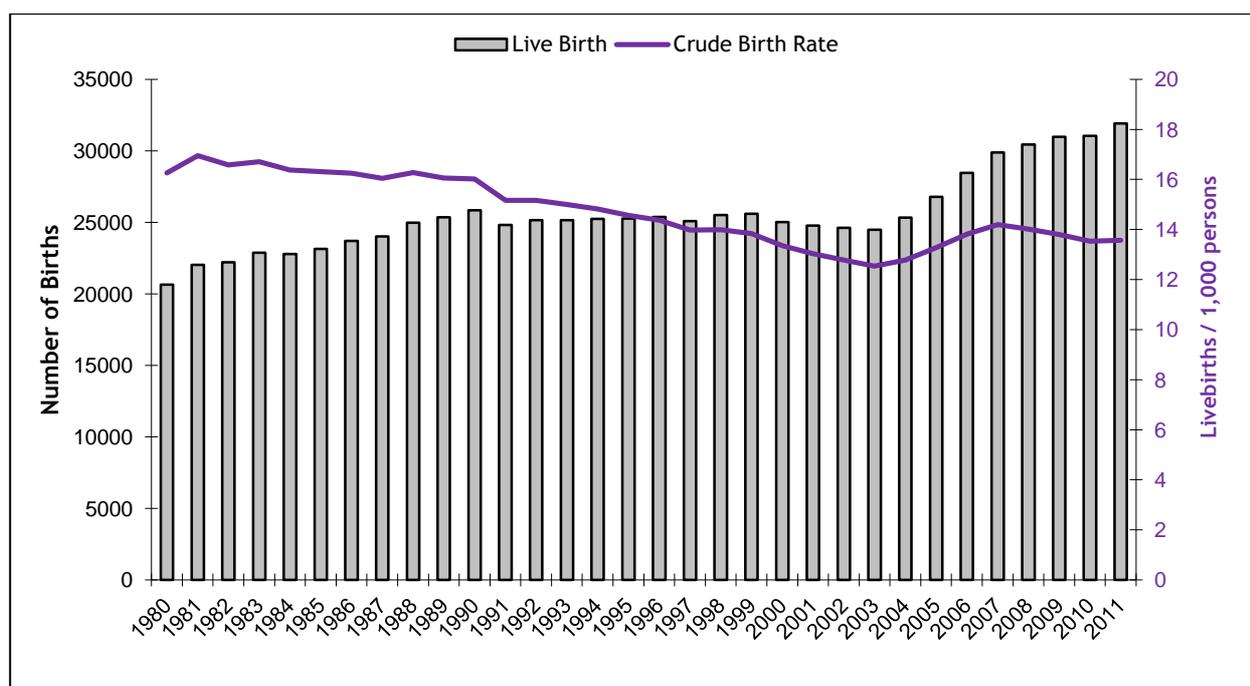
Year	Condition at Birth				Total		Total Population <sup>1</sup>	Crude Birth Rate <sup>2</sup>
	Live Birth		Stillbirth		No.	%		
	No.	%	No.	%	No.	%		
1980	20636	99.1	178	0.9	20814	100.0	1,269,068	16.3
1981	22039	99.2	182	0.8	22221	100.0	1,300,056	17.0
1982	22196	99.1	195	0.9	22391	100.0	1,338,899	16.6
1983	22875	99.1	197	0.9	23072	100.0	1,369,318	16.7
1984	22795	99.3	168	0.7	22963	100.0	1,391,539	16.4
1985	23153	99.1	204	0.9	23357	100.0	1,419,012	16.3
1986	23703	99.2	185	0.8	23888	100.0	1,459,247	16.2
1987	24015	99.2	191	0.8	24206	100.0	1,496,472	16.0
1988	24981	99.3	177	0.7	25158	100.0	1,535,449	16.3
1989	25359	99.3	184	0.7	25543	100.0	1,578,761	16.1
1990	25844	99.3	175	0.7	26019	100.0	1,613,447	16.0
1991	24814	99.2	194	0.8	25008	100.0	1,636,599	15.2
1992	25158	99.3	165	0.7	25323	100.0	1,658,609	15.2
1993	25160	99.3	176	0.7	25336	100.0	1,678,292	15.0
1994	25237	99.3	188	0.7	25425	100.0	1,703,503	14.8
1995	25255	99.2	191	0.8	25446	100.0	1,734,228	14.6
1996	25386	99.2	199	0.8	25585	100.0	1,765,635	14.4
1997	25095	99.3	171	0.7	25266	100.0	1,795,300	14.0
1998	25514	99.4	164	0.6	25678	100.0	1,822,891	14.0
1999	25591	99.3	179	0.7	25770	100.0	1,849,855	13.8
2000	25022	99.2	206	0.8	25228	100.0	1,874,518	13.3
2001	24774	99.3	167	0.7	24941	100.0	1,901,168	13.0
2002	24609	99.3	175	0.7	24784	100.0	1,926,111	12.8
2003	24493	99.3	184	0.7	24677	100.0	1,953,070	12.5
2004	25341	99.3	188	0.7	25529	100.0	1,982,637	12.8
2005	26778	99.3	200	0.7	26978	100.0	2,017,088	13.3
2006	28456	99.3	209	0.7	28665	100.0	2,059,614	13.8
2007	29884	99.4	189	0.6	30073	100.0	2,106,148	14.2
2008	30443	99.3	225	0.7	30668	100.0	2,171,197	14.0
2009	30973	99.3	234	0.7	31207	100.0	2,245,057	13.8
2010	31039	99.3	218	0.7	31257	100.0	2,293,510	13.5
2011	31922	99.2	269	0.8	32191	100.0	2,352,215	13.6

Data Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> Source of population data: ABS Estimated Resident Populations for WA. Data previously reported here has been updated from WA DoH Epidemiology Branch Downloads on 10 January 2014.

<sup>2</sup> Crude birth rate is determined by the calculation: 1000 times Total infants born alive divided by mid-year Total Population for the geographical area.

Figure 17: Number of Liveborn Infants and Crude Birth Rate in WA, 1980-2011



#### 4.1.2. Plurality

In 2011, there were 31,286 singleton infants born, representing 97.2 per cent of total infants born. 878 (2.7 per cent) infants were born as twins and 27 (0.1 per cent) born as triplets (Table 74).

Table 74: Plurality of Birth and Maternal Aboriginal Status in WA, 2011

Plurality	Maternal Aboriginal status				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
Single	1706	5.3	29580	91.9	31286	97.2
Twin	34	0.1	844	2.6	878	2.7
Triplet	-	-	27	0.1	27	0.1
<b>Total</b>	<b>1740</b>	<b>5.4</b>	<b>29565</b>	<b>94.6</b>	<b>32191</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

#### 4.1.3. Gender

During 2011, 51.5 per cent of all births were male with a male-female birth ratio of 1.04 which translates to 610 more male infants than females being born (Table 75).

Table 75: Condition at Birth and Gender of Infants Born in WA, 2011

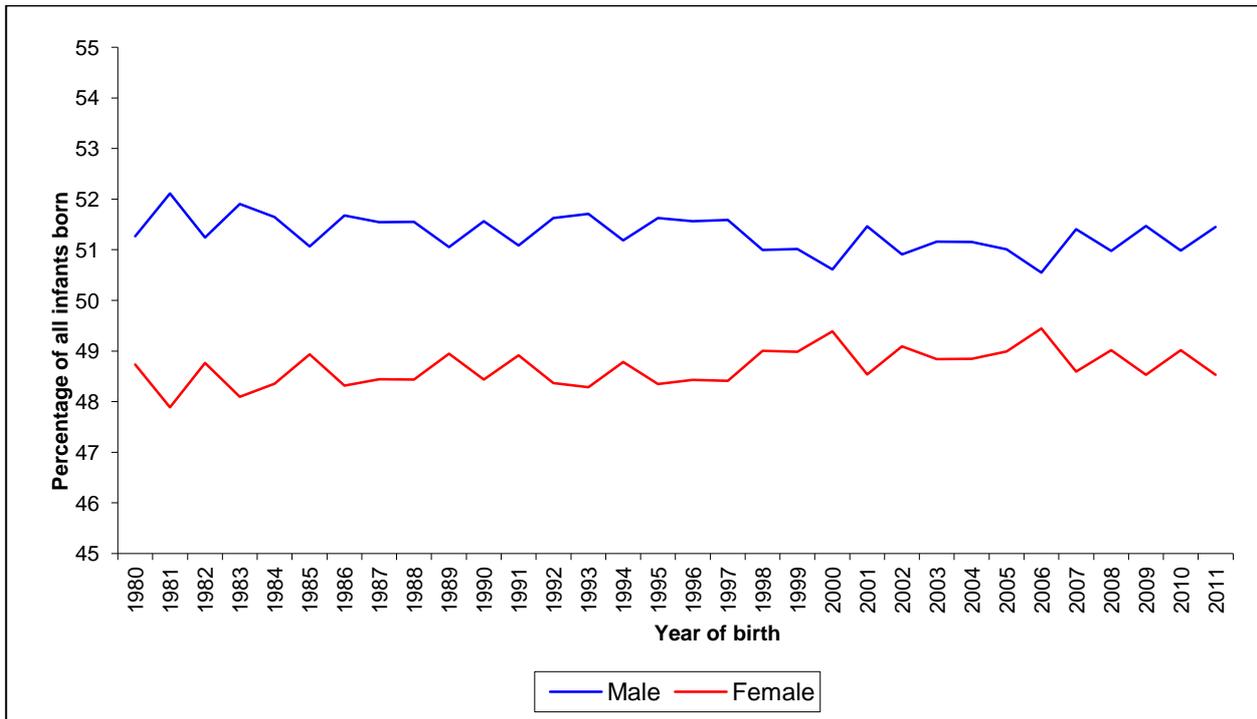
Gender	Condition at birth				Total	
	Live birth		Fetal death			
	No.	%	No.	%	No.	%
Male	16427	51.5	136	50.6	16563	51.5
Female	15494	48.5	129	48.0	15623	48.5
Indeterminate	***	***	***	***	5	0.0
<b>Total</b>	<b>31922</b>	<b>100.0</b>	<b>269</b>	<b>100.0</b>	<b>32191</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

The trend data for 30 years displays a fluctuation in the percentage of males or females born. For all years, more males than females were born reflecting national and world birth ratios (Figure 18).

**Figure 18: Gender of Infants Born in WA, 1980-2011**



#### 4.1.4. Gestational age

Preterm birth (less than 37 weeks gestation) is associated with significant morbidity and mortality in newborn infants. In 2011, preterm birth occurred for 8.6 per cent of all infants born. Preterm infants that were born alive comprised 92.3 per cent, 2.6 per cent were stillborn with death occurring during labour, the remaining stillbirths were reported as death occurring before onset of labour or unknown time of death.

For term infants, 99.8 per cent were born alive; a small proportion of stillbirths (9 of 58) had death occurring during labour (Table 76).

**Table 76: Gestational Age and Birth Status for Infants Born in WA, 2011**

Gestation (weeks)	Birth Status			Total
	Livebirth	Stillbirth (before labour)	Stillbirth (during labour)	
<b>Number</b>				
20 to 27	113	88	69	270
28 to 32	347	22-25	***	373
33 to 36	2084	24-27	***	2112
<b>&lt; 37</b>	<b>2544</b>	<b>139</b>	<b>72</b>	<b>2755</b>
37 to 44	29378	49	9	29436
<b>Total</b>	<b>31922</b>	<b>188</b>	<b>81</b>	<b>32191</b>
<b>Row Percentage</b>				
20 to 27	41.9	32.6	25.6	100.0
28 to 32	93.0	6.4	***	100.0
33 to 36	98.7	1.3	***	100.0
<b>&lt; 37</b>	<b>92.3</b>	<b>5.0</b>	<b>2.6</b>	<b>100.0</b>
37 to 44	99.8	0.2	0.0	100.0
<b>Total</b>	<b>99.2</b>	<b>0.6</b>	<b>0.2</b>	<b>100.0</b>
<b>Column Percentage</b>				
20 to 27	0.4	46.8	85.2	0.8
28 to 32	1.1	12.8	***	1.2
33 to 36	6.5	14.4	***	6.6
<b>&lt; 37</b>	<b>8.0</b>	<b>73.9</b>	<b>88.9</b>	<b>8.6</b>
37 to 44	92.0	26.1	11.1	91.4
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

#### 4.1.5. Gestational age, birthweight and plurality

As demonstrated below, plurality affected gestational age outcome. Among singleton births, 7.2 per cent of singleton births were born preterm. For births of multiple infants, the proportion born preterm was 62.6 per cent (Table 77 and Table 78).

Table 77: Gestational Age and Birthweight for Singleton Infants in WA, 2011

Birthweight (grams)	Gestation (weeks)								Total	
	20-27		28-32		33-36		37-44			
	No.	%	No.	%	No.	%	No.	%	No.	%
<1000	210	90.9	25	10.0	-	-	-	-	235	0.8
1000-1499	19	8.2	95	38.2	5-8	0.5	***	***	123	0.4
1500-1999	-	-	87	34.9	145	8.4	27	0.1	259	0.8
2000-2499	***	***	33-36	14.5	559	32.5	431	1.5	1027	3.3
<b>&lt; 2500</b>	<b>230</b>	<b>99.6</b>	<b>243</b>	<b>97.6</b>	<b>712</b>	<b>41.3</b>	<b>459</b>	<b>1.6</b>	<b>1644</b>	<b>5.3</b>
2500-2999	-	-	-	1.6	637	37.0	4190	14.4	4831	15.4
3000-3499	-	-	-	0.8	291	16.9	11359	39.1	11652	37.2
3500-3999	-	-	-	-	66	3.9	9682	33.3	9748	31.2
4000-4499	-	-	-	-	13	0.8	3000	10.3	3013	9.6
≥ 4500	-	-	-	-	***	***	394	1.4	397	1.3
Unknown	1	0.4	-	-	-	-	-	-	1	0.0
<b>Total</b>	<b>231</b>	<b>100.0</b>	<b>249</b>	<b>100.0</b>	<b>1722</b>	<b>100.0</b>	<b>29084</b>	<b>100.0</b>	<b>31286</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

1 case excluded as no birthweight reported.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

Table 78: Gestational Age and Birthweight for Infants of Multiple Births in WA, 2011

Birthweight (grams)	Gestation (weeks)								Total	
	20-27		28-32		33-36		37-44			
	No.	%	No.	%	No.	%	No.	%	No.	%
<1000	35-38	92.3	11	8.9	***	***	***	***	50	5.5
1000-1499	***	***	55	44.4	***	***	***	***	63	7.0
1500-1999	-	-	48	38.7	63	16.2	6	1.7	117	12.9
2000-2499	-	-	10	8.1	184	47.2	74	21.0	268	29.6
<b>&lt; 2500</b>	<b>39</b>	<b>100.0</b>	<b>124</b>	<b>100.0</b>	<b>251</b>	<b>64.4</b>	<b>84</b>	<b>23.9</b>	<b>498</b>	<b>55.0</b>
2500-2999	-	-	-	-	118	30.3	188	53.4	306	33.8
3000-3499	-	-	-	-	20	5.1	71	20.2	91	10.1
3500-3999	-	-	-	-	***	***	***	***	9	0.8
4000-4499	-	-	-	-	-	-	1	0.3	1	0.1
<b>Total</b>	<b>39</b>	<b>100.0</b>	<b>124</b>	<b>100.0</b>	<b>390</b>	<b>100.0</b>	<b>352</b>	<b>100.0</b>	<b>905</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

Table 79: Gestational Age and Birthweight for Infants Born in WA, 2011

Birthweight (grams)	Gestation (weeks)								Total	
	20-27		28-32		33-36		37-44			
	No.	%	No.	%	No.	%	No.	%	No.	%
< 1000	246	91.1	36	9.7	***	***	***	***	285	0.9
1000-1499	19-22	8.1	150	40.2	11	0.5	***	***	186	0.6
1500-1999	-	-	135	36.2	208	9.8	33	0.1	376	1.2
2000-2499	***	***	46	12.3	743	35.2	505	1.7	1295	4.0
<b>&lt; 2500</b>	<b>269</b>	<b>99.6</b>	<b>367</b>	<b>98.4</b>	<b>963</b>	<b>45.6</b>	<b>543</b>	<b>1.8</b>	<b>2142</b>	<b>6.7</b>
2500-2999	-	-	***	***	755	35.7	4378	14.9	5137	16.0
3000-3499	-	-	***	***	311	14.7	11430	38.8	11743	36.5
3500-3999	-	-	-	-	67	3.2	9690	32.9	9757	30.3
4000-4499	-	-	-	-	13	0.6	3001	10.2	3014	9.4
≥ 4500	-	-	-	-	***	***	394	1.3	397	1.2
Unknown	1	0.4	-	-	-	-	-	-	1	0.0
<b>Total</b>	<b>270</b>	<b>100.0</b>	<b>373</b>	<b>100.0</b>	<b>2112</b>	<b>100.0</b>	<b>29436</b>	<b>100.0</b>	<b>32191</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

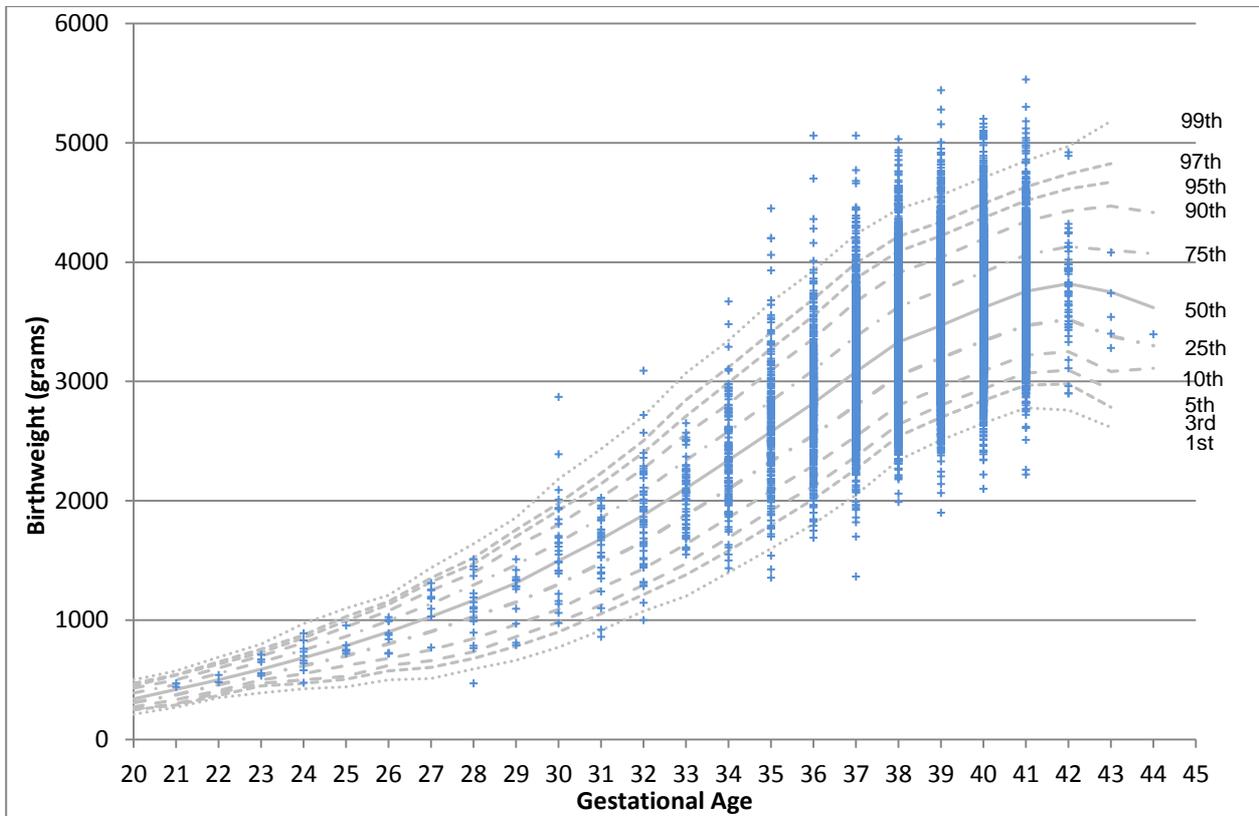
1 case with gestational age of 22 weeks excluded as no birthweight reported.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

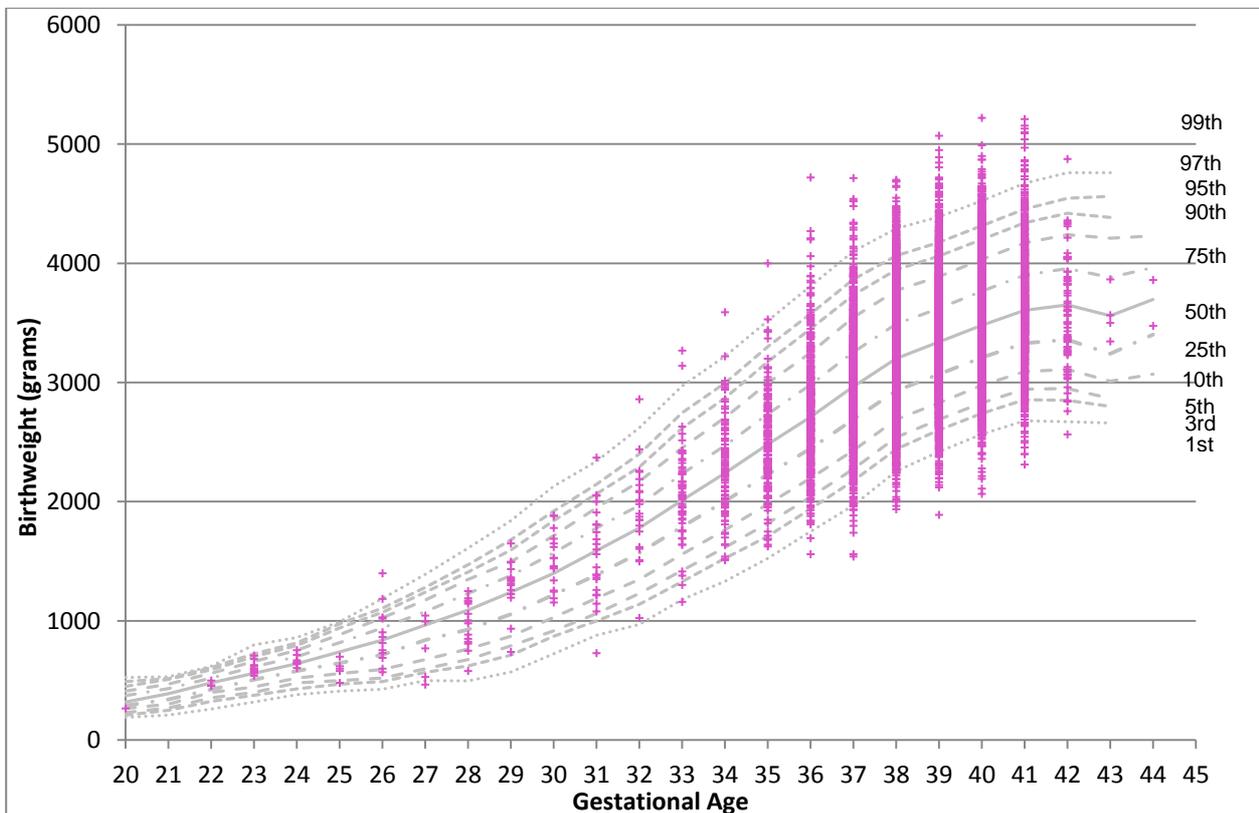
#### 4.1.6. Birthweight centiles

Birthweight centile charts have been compiled using information from a recent publication of data on Australian births held by AIHW (Dobbins, et al. 2012). The following figures display birthweight by gestational age in completed weeks for liveborn singleton infants of each gender.

**Figure 19: Birthweight Centile for Singleton Liveborn Males in WA, 2011**



**Figure 20: Birthweight Centile for Singleton Liveborn Females in WA, 2011**



#### 4.1.7. Birth status and place of birth of preterm infants

Among all preterm infants born alive at 23 to 31 weeks gestation, 88.3 per cent were born in a metropolitan teaching hospital, 4.3 per cent in private hospitals. The large proportion of preterm stillborn infants born at the teaching hospital reflects the statewide practice of in-utero transfer of compromised infants (Table 80).

**Table 80: Birth Status by Place of Birth for infants born 23-31 weeks in WA, 2011**

Place of birth	Live Birth					Still Birth					Total	
	Gestation (weeks)					Gestation (weeks)						
	23-25	26-28	29-31	Subtotal		23-25	26-28	29-31	Subtotal		No.	%
%	%	%	No.	%	%	%	%	No.	%	No.	%	
Teaching	94.2	92.3	92.6	307	92.7	82.5	63.6	33.3	46	66.7	353	88.3
Public Metro	3.8	2.9	2.9	10	3.0	2.5	9.1	22.2	6	8.7	16	4.0
Public Country	1.9	2.9	1.1	6	1.8	5.0	18.2	22.2	8	11.6	14	3.5
Private	-	1.9	3.4	8	2.4	10.0	9.1	22.2	9	13.0	17	4.3
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>331</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>69</b>	<b>100.0</b>	<b>400</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Includes infants that were "born before arrival" at birth site.

Trend data for the period 1986–2011 indicates that the proportion of live births among infants born at 23 to 31 weeks gestation has increased from a low of 74.3 per cent in 1987 to a high of 86.7 per cent in 2007. In 2011, the proportion of live births among these infants was 82.8 per cent (Table 81).

**Table 81: Trends for Birth Condition and Place of Birth Pre-Term Infants in WA 1986-2011**

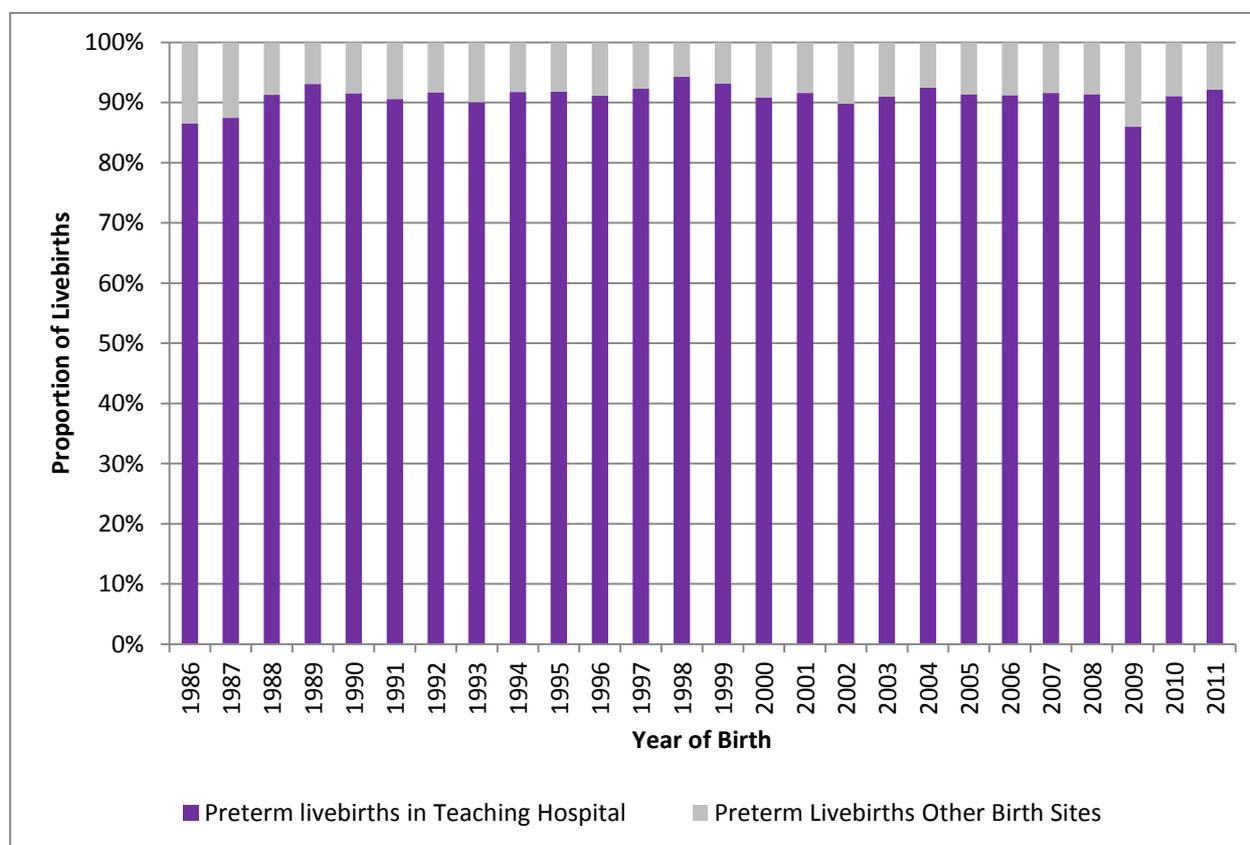
Year	Teaching				Other				Total			
	Live Birth		Fetal Death		Live Birth		Fetal Death		Live Birth		Fetal Death	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1986	212	67.1	46	14.6	33	10.4	25	7.9	245	77.5	71	22.5
1987	182	65.0	48	17.1	26	9.3	24	8.6	208	74.3	72	25.7
1988	250	73.1	48	14.0	24	7.0	20	5.8	274	80.1	68	19.9
1989	271	78.1	36	10.4	20	5.8	20	5.8	291	83.9	56	16.1
1990	206	72.3	41	14.4	19	6.7	19	6.7	225	78.9	60	21.1
1991	220	72.1	34	11.1	23	7.5	28	9.2	243	79.7	62	20.3
1992	231	77.5	32	10.7	21	7.0	14	4.7	252	84.6	46	15.4
1993	200	69.9	40	14.0	22	7.7	24	8.4	222	77.6	64	22.4
1994	244	74.4	32	9.8	22	6.7	30	9.1	266	81.1	62	18.9
1995	225	75.0	37	12.3	20	6.7	18	6.0	245	81.7	55	18.3
1996	226	71.7	45	14.3	22	7.0	22	7.0	248	78.7	67	21.3
1997	265	78.4	35	10.4	22	6.5	16	4.7	287	84.9	51	15.1
1998	264	78.1	37	10.9	16	4.7	21	6.2	280	82.8	58	17.2
1999	246	79.4	34	11.0	18	5.8	12	3.9	264	85.2	46	14.8
2000	268	76.6	44	12.6	27	7.7	11	3.1	295	84.3	55	15.7
2001	261	77.2	35	10.4	24	7.1	18	5.3	285	84.3	53	15.7
2002	219	73.7	40	13.5	25	8.4	13	4.4	244	82.2	53	17.8
2003	230	76.4	30	10.0	23	7.6	18	6.0	253	84.1	48	15.9
2004	283	78.8	36	10.0	23	6.4	17	4.7	306	85.2	53	14.8
2005	286	77.9	36	9.8	27	7.9	16	4.4	315	85.8	52	14.2
2006	302	77.8	43	11.1	29	7.5	14	3.6	331	85.3	57	14.7
2007	317	79.4	38	9.5	29	7.3	15	3.8	346	86.7	53	13.3
2008	328	77.5	44	10.4	31	7.3	20	4.7	359	84.9	64	15.1
2009	313	72.3	46	10.6	51	11.8	23	5.3	364	84.1	69	15.9
2010	297	75.4	49	12.4	29	7.4	19	4.8	326	82.7	68	17.3
2011	305	76.3	45	11.3	26	6.5	24	6.0	331	82.8	69	17.3

Extracted from Midwives' Notification System on 17 December 2013.

Denominator for all percentages in above table was total infants born in the year at a gestation 23 to 31 completed weeks.

A teaching maternity service is considered the best birth place for liveborn infants at these gestations. The proportion of infants born at the teaching hospital ranged between 86.5 per cent in 1986 and 94.3 per cent 1998. In 2011, the proportion of preterm liveborn infants born at a teaching maternity service was 92.7 per cent (Figure 21).

**Figure 21: Preterm (23-31 completed weeks) liveborn infants by Birth Place in WA 1986-2011**



#### 4.1.8. Birthweight

In 2011, an average birthweight of 3337.3 grams, with a standard deviation of 603.6 grams was recorded for all births. The median birthweight was 3385 grams.

Of all infants born, 36.5 per cent weighed between 3000 and 3499 grams and 30.3 per cent of babies weighed between 3500 and 3999 grams. Infants less than 2500 grams represented 6.7 per cent of all infants born.

For all infants born alive in 2011, there was an average birthweight of 3354.8 grams, with a standard deviation of 565.3 grams. The median birthweight was 3390 grams.

By all birthweight groups, more liveborn infants, 36.7 per cent, weighed between 3000 and 3499 grams than other weight groups. Infants less than 2500 grams represented 6.0 per cent of all liveborn infants.

Of all the infants stillborn in 2011, 78.7 per cent had a birthweight less than 2,500 grams. Of all infants with a birthweight less than 2,500 grams, 90.2 per cent were born alive (Table 82).

**Table 82: Birthweight and Condition at Birth for All Infants Born in WA, 2011**

Birthweight (grams)	Condition at Birth				Total	
	Live Birth		Fetal Death			
	No.	%	No.	%	No.	%
<1000	125	0.4	160	59.7	285	0.9
1000-1499	165	0.5	21	7.8	186	0.6
1500-1999	363	1.1	13	4.9	376	1.2
2000-2499	1278	4.0	17	6.3	1295	4.0
<b>&lt; 2500</b>	<b>1931</b>	<b>6.0</b>	<b>211</b>	<b>78.7</b>	<b>2142</b>	<b>6.7</b>
2500-2999	5113	16.0	24	9.0	5137	16.0
3000-3499	11724	36.7	19	7.1	11743	36.5
3500-3999	9744	30.5	13	4.9	9757	30.3
4000-4499	3014	9.4	-	-	3014	9.4
≥ 4500	396	1.2	***	***	396	1.2
<b>Total</b>	<b>31922</b>	<b>100.0</b>	<b>268</b>	<b>100.0</b>	<b>32190</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

1 case excluded as no birthweight reported.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

In 2011, 54 per cent (1,019) of infants with birthweight less than 2500 grams received resuscitation compared to 21.7 per cent (6,330) of infants with birthweight of 2500 grams or more (Table 83).

**Table 83: Birthweight and Resuscitation Methods for Babies Born Alive in WA, 2011**

Resuscitation methods	Birthweight (grams)				Total
	< 1500	1500-1999	2000-2499	≥ 2500	
1-None	24	138	765	23704	24631
2-Suction Only	***	8-11	70	1591	1673
3-Oxygen Therapy	7	30	103	1911	2051
4-Bag & Mask	31	78	170	1662	1941
5-Intubation	89	13	17	58	177
6-External cardiac massage	6-9	***	6	54	72
8-Other	129	90	147	1011	1377
Any resuscitation	266	225	513	6287	7291
% receiving any resus	91.7	62.0	32.3	21.0	22.8
<b>Total</b>	<b>290</b>	<b>363</b>	<b>1278</b>	<b>29991</b>	<b>31922</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

#### 4.1.9. Birth status and place of birth

There were 31,922 (99.2 per cent) infants liveborn and 269 (0.8 per cent) stillborn in 2011. These infants include those born from termination of pregnancy when gestation was 20 weeks or greater. Of the stillborn infants, most died before onset of labour or had time of death not specified (69.9 per cent).

The stillbirth rate in 2011 was 8.4 per 1000 births, while the intrapartum fetal death rate was 2.5 per 1000 births. The highest stillbirth rate was in the teaching maternity hospital (26.7 per 1000 births) reflecting the referral of mothers with extreme prematurity or other high-risk pregnancy. 88.9 per cent of infants that died during labour were born at the metropolitan teaching hospital (Table 84).

**Table 84: Birth Status and Place of Birth in WA, 2011**

Place of birth	Birth Status						Total		Stillbirth rate <sup>1</sup>
	Livebirths		Fetal Death Before Labour <sup>2</sup>		Fetal Death During Labour				
	No.	%	No.	%	No.	%	No.	%	
<b>Metropolitan</b>									
Teaching	5721	17.9	85	45.2	72	88.9	5878	18.3	26.7
Public	8334	26.1	25-28	13.8	***	***	8363	26.0	3.5
Private	12064	37.8	32-35	18.1	***	***	12100	37.6	3.0
BBA	90	0.3	***	***	***	***	92	0.3	21.7
<b>Country</b>									
Regional public	3220	10.1	30	16.0	-	-	3250	10.1	9.2
Other public	1437	4.5	7-10	5.3	***	***	1448	4.5	7.6
Private	790	2.5	***	***	***	***	792	2.5	2.5
BBA	25	0.1	***	***	***	***	26	0.1	38.5
<b>Non-hospital</b>									
Home births	230	0.7	***	***	***	***	231	0.7	4.3
BBA	11	0.0	-	-	-	-	11	0.0	-
<b>Total</b>	<b>31922</b>	<b>100.0</b>	<b>188</b>	<b>100.0</b>	<b>81</b>	<b>100.0</b>	<b>32191</b>	<b>100.0</b>	<b>8.4</b>

Extracted from Midwives' Notification System on 17 December 2013.

BBA are those infants born enroute to hospital or at home when not attended by a health professional.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

<sup>1</sup> Number of infants stillborn per 1000 infants born.

<sup>2</sup> There were 26 infants reported as stillborn with no indicator of when fetal death occurred, these infants are counted with those where death occurred before onset of labour.

#### 4.1.10. Plurality of infants born

In 2011, there were 31,286 singleton infants born, representing 97.2 per cent of total infants born. Twin infants comprised 2.7 per cent and triplets 0.1 per cent of all infants born (Table 85).

The occurrence of twins born in 2011 was 1.4% per singleton birth in WA. A natural rate of 1.1% is expected when applying Hellin's law<sup>1</sup>. The higher than naturally expected occurrence of twins born and the overall increasing trend in infants born from multiple pregnancies over the last three decades could be attributed to the increased use of assisted reproductive technology (Tough, et al. 2002).

2.8 per cent of infants arising from multiple pregnancies were stillborn while 0.8 per cent of singleton infants were stillborn (Table 85).

**Table 85: Plurality of Birth and Birth Status in WA, 2011**

Plurality	Birth Status		Total
	Livebirth	Stillbirth	
<b>Number</b>			
Single	31042	244	31286
Twin	853	25	878
Triplet	27	-	27
<b>Total</b>	<b>31922</b>	<b>269</b>	<b>32191</b>
<b>Column Per cent</b>			
Single	97.2	90.7	97.2
Twin	2.7	9.3	2.7
Triplet	0.1	-	0.1
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Row Per cent</b>			
Single	99.2	0.8	100.0
Twin	97.2	2.8	100.0
Triplet	100.0	-	100.0
<b>Total</b>	<b>99.2</b>	<b>0.8</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> **Hellin's Law** is the principle that one in about 89 pregnancies ends in the birth of twins, triplets once in 89<sup>2</sup> births, and quadruplets once in 89<sup>3</sup> births.

#### 4.1.11. Plurality, presentation and birth mode

In 2011, there were 1,165 singleton infants with a breech presentation at birth, of these 10.4 per cent were born vaginally. For infants from multiple pregnancies, 291 had a breech presentation and 23.0 per cent were born vaginally.

Of the vertex presenting singleton infants (29,714) 68.9 per cent were born vaginally, 53.5 per cent were spontaneous, 12.7 per cent were delivered with vacuum extraction and 2.7 per cent by forceps (Table 86).

**Table 86: Plurality of Birth, Fetal Presentation and Infant Birth Mode in WA, 2011**

Birth Mode	Fetal Presentation						Total
	Vertex		Breech		Other		
	Plurality of Birth						
	Single	Multiple	Single	Multiple	Single	Multiple	
<b>Number</b>							
Spontaneous	15886	168	-	-	195	2	<b>16251</b>
Breech	-	-	121	67	-	-	<b>188</b>
Vacuum	3781	35	-	-	31	2	<b>3849</b>
Forceps	794	24	-	-	7	-	<b>825</b>
Elective CS	4607	192	659	107	49	15	<b>5629</b>
Emergency CS	4646	165	385	117	125	11	<b>5449</b>
<b>Total</b>	<b>29714</b>	<b>584</b>	<b>1165</b>	<b>291</b>	<b>407</b>	<b>30</b>	<b>32191</b>
<b>Column Percentage</b>							
Spontaneous	53.5	28.8	-	-	47.9	6.7	<b>50.5</b>
Breech	-	-	10.4	23.0	-	-	<b>0.6</b>
Vacuum	12.7	6.0	-	-	7.6	6.7	<b>12.0</b>
Forceps	2.7	4.1	-	-	1.7	-	<b>2.6</b>
Elective CS	15.5	32.9	56.6	36.8	12.0	50.0	<b>17.5</b>
Emergency CS	15.6	28.3	33.0	40.2	30.7	36.7	<b>16.9</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Other presentations include face, brow, compound, transverse, other or unspecified.

Each infant born from a multiple pregnancy may have a different mode of birth.

Unsuccessful vacuum extraction, unsuccessful forceps and forceps lift out at CS are not specified in this table.

The percentages for CS presented here do not represent a "Caesarean Section rate" they are the percentage of infants born by CS; multiple babies may be born from one CS.

## 4.2. Infant extra-uterine adjustment

### 4.2.1. Apgar score at one minute and five minutes

Apgar score is a practical method of evaluating the physical condition of a newborn infant shortly after birth and their response to resuscitation should it be required. The Apgar score is calculated based on the infant's heart rate, respiratory effort, muscle tone, skin colour, and reflexes. Stillborn infants would have a score of 0 recorded.

In 2011, for infants with an Apgar score at one minute reported, there were 27,029 (84.7 per cent) with a score of 8 to 10 while 550 (1.7 per cent) infants had an Apgar score of less than four at one minute of age.

Among all infants born alive with Apgar score reported, 91.1 per cent established spontaneous respiration within the first minute of life (Table 87).

Seventeen liveborn infants had no Apgar score at one minute reported. Four of these infants were intubated and 13 had spontaneous respirations within one minute of birth.

**Table 87: Apgar Score at One Minute and Time to Spontaneous Respiration for Infants Born Alive in WA, 2011**

Time to Spontaneous Respiration (mins)	Apgar Score at 1 Minute						Total	
	0-3		4-7		8-10			
	No.	%	No.	%	No.	%	No.	%
≤ 1	41	7.5	2458	56.8	26563	98.3	29062	91.1
2-3	155	28.2	1297	30.0	392	1.5	1844	5.8
4-6	165	30.0	383	8.9	53	0.2	601	1.9
≥ 7	72	13.0	85	2.0	7	0.0	164	0.5
Intubation <sup>1</sup>	117	21.3	103	2.4	14	0.1	234	0.7
<b>Total</b>	<b>550</b>	<b>100.0</b>	<b>4326</b>	<b>100.0</b>	<b>27029</b>	<b>100.0</b>	<b>31905</b>	<b>100.0</b>
<b>Row Percentage</b>	<b>550</b>	<b>1.7</b>	<b>4326</b>	<b>13.6</b>	<b>27029</b>	<b>84.7</b>	<b>31905</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

17 infants with no Apgar score at 1 minute reported were excluded from the table above.

In 2011, for infants with an Apgar score at five minutes reported, there were 30,917 (96.9 per cent) with a score of 8 to 10 while 66 (0.2 per cent) infants had an Apgar score of less than four at five minutes of age (Table 88).

Eighteen liveborn infants had an unknown Apgar score at five minutes. Four of these infants were intubated and 14 had spontaneous respirations within one minute of birth.

**Table 88: Apgar Score at Five Minutes and Time to Spontaneous Respiration for Infants born Alive in WA, 2011**

Time to Spontaneous Respiration	Apgar Score at 5 Minutes						Total	
	0-3		4-7		8-10			
	No.	%	No.	%	No.	%	No.	%
≤ 1	6	9.1	226	24.5	28829	93.2	29061	91.1
2-3	2	3.0	200	21.7	1642	5.3	1844	5.8
4-6	4	6.1	243	26.4	354	1.1	601	1.9
≥ 7	20	20.3	127	13.7	17	0.1	164	0.4
Intubation <sup>2</sup>	34	51.5	125	13.6	75	0.2	234	0.7
<b>Total</b>	<b>66</b>	<b>100.0</b>	<b>921</b>	<b>100.0</b>	<b>30917</b>	<b>100.0</b>	<b>31904</b>	<b>100.0</b>
<b>Row Percentage</b>	<b>66</b>	<b>0.2</b>	<b>921</b>	<b>2.9</b>	<b>30917</b>	<b>96.9</b>	<b>31904</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

18 infants with an unknown Apgar score at 5 minutes were excluded from the table above.

<sup>1</sup> The time taken for infants intubated during resuscitation to establish spontaneous respiration is not reported to the collection.

<sup>2</sup> The time taken for infants intubated during resuscitation to establish spontaneous respiration is not reported to the collection.

#### 4.2.2. Infant resuscitation

Only one method of infant resuscitation is reported by midwives for each infant. Reporting is hierarchical with only the most intensive method reported. Hierarchy from 1 being the least intensive to 8 being the most intensive is indicated in the data table. In 2011, midwives may have reported medications like Adrenaline or Narcan or continuous positive airway pressure as "Other".

Of the infants born alive in 2011, 22.8 per cent received some form of resuscitation. A method of "Other" was reported for 4.3 per cent of these liveborn infants. 0.2 per cent received external cardiac massage and 0.6 per cent had endotracheal intubation without external cardiac massage. Assisted ventilation with bag and mask was provided to 6.1 per cent, 6.4 per cent received oxygen with or without suction and only suction was required by 5.2 per cent of infants (Table 89).

**Table 89: Resuscitation Methods for Liveborn Infants in WA, 2011**

Resuscitation method	No.	% of live births
1-None	24631	77.2
2-Suction Only	1673	5.2
3-Oxygen Therapy	2051	6.4
4-Bag & Mask	1941	6.1
5-Intubation	177	0.6
6-External Cardiac Massage	72	0.2
8-Other <sup>1</sup>	1377	4.3
<b>Total</b>	<b>31922</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Apgar score at 5 minutes often reflects the response to resuscitation required by an infant at time of birth. Of infants born alive in 2011 with an Apgar score at five minutes of 8 to 10, 79.5 per cent required no resuscitation, 6.3 per cent received oxygen therapy, 5.3 per cent received suction only and 5.1 per cent required assisted ventilation using a bag and mask (Table 90).

**Table 90: Resuscitation Methods for Liveborn Infants by Apgar Score at 5 Minutes in WA, 2011**

Resuscitation methods	Apgar Score at 5 Minutes						Total	
	0-3		4-7		8-10		No.	%
	No.	%	No.	%	No.	%	No.	%
1-None	12	18.2	30	3.3	24573	79.5	24615	77.2
2-Suction Only	-	-	24	2.6	1649	5.3	1673	5.2
3-Oxygen Therapy	-	-	91	9.9	1959	6.3	2050	6.4
4-Bag & Mask	9	13.6	362	39.3	1570	5.1	1941	6.1
5-Intubation	8	12.1	95	10.3	73	0.2	176	0.6
6-External Cardiac Massage	15	22.7	31	3.4	26	0.1	72	0.2
8-Other <sup>1</sup>	22	33.3	288	31.3	1067	3.5	1377	4.3
<b>Total</b>	<b>66</b>	<b>100.0</b>	<b>921</b>	<b>100.0</b>	<b>30917</b>	<b>100.0</b>	<b>31904</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

18 infants with no Apgar score at 5 minutes reported were excluded from the table above.

<sup>1</sup> Other Resuscitation Methods included medications. The "other" option is considered the highest value for resuscitation methods. Infants that have had the "Other" option reported may or may not have had any other methods employed.

### 4.3. Birth trauma

Infant birth trauma can occur because of duration of time the presenting part of fetus is well applied to the maternal cervix during labour. It can also be a result of application of vacuum cup or forceps to facilitate birth vaginally or by caesarean section. Manipulation of a fetus for delivery can be required for cases of shoulder dystocia, breech delivery or compound presentation.

In 2011, the most frequently reported birth trauma was chignon that affected 2.2 per cent of all infants or 3.2 per cent of infants born vaginally. The most frequently occurring trauma in infants born by caesarean section was bruising of the scalp (1.5 per cent). Trauma associated with a difficult extraction like Erb's Palsy or fracture of clavicle was reported for 13 infants, affecting 0.1 per cent of all infants born vaginally (Table 91).

**Table 91: Birth Trauma to Infants in WA, 2011**

Type of Birth Trauma	Birth Method				Total	
	Caesarean		Vaginal		No.	%
	No.	%	No.	%		
Cephalhaematoma	19	0.2	110	0.5	129	0.4
Chignon	26	0.2	672	3.2	698	2.2
Bruising of scalp	161	1.5	184	0.9	345	1.1
Other trauma to scalp	88	0.8	283	1.3	371	1.2
Birth trauma to face/facial nerve/eye	8-11	***	24-27	***	35	0.1
Birth trauma to skeleton, unspecified	***	***	9-12	***	13	0.0
Erb's Palsy/Fracture of clavicle	-	-	13	0.1	13	0.0
Other specified birth trauma	29	0.3	8	0.0	37	0.1
<b>Total infants by birth method</b>	<b>11078</b>		<b>21113</b>		<b>32191</b>	

Extracted from Midwives' Notification System on 17 December 2013.

Percentages are calculated as proportions of all infants with the same birth method.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

### 4.4. Birth defects

A birth defect was suspected in 1,197 (37.2 per 1000) infants born in 2011. Suspected conditions included genetic anomalies like trisomies, structural anomalies like extra digits or cardiac anomalies, birth marks and missing umbilical cord blood vessels.

Midwives who reported a birth defect enabled early advice of potential cases to the WA Register for Developmental Anomalies (WARDA). WARDA staff were able to seek reporting of birth defects by medical practitioners to WARDA. Ascertainment of birth defects for a birth cohort is not considered complete until reported by a medical practitioner and the child is 6 years of age. More detailed information including trends over birth years is available for births occurring 1980 to 2008 in the WARDA Annual Report at

[http://www.kemh.health.wa.gov.au/services/register\\_developmental\\_anomalies/documents/2012\\_Annual\\_Report\\_of\\_the\\_WA\\_Register\\_of\\_Developmental\\_Abnormalities.pdf](http://www.kemh.health.wa.gov.au/services/register_developmental_anomalies/documents/2012_Annual_Report_of_the_WA_Register_of_Developmental_Abnormalities.pdf) or by request to the Western Australian Register of Developmental Anomalies.

## 4.5. Infant outcome

### 4.5.1. Admission to Special Care Nursery

In 2011, there was one birth site in Western Australia with a Level 3 and Level 2 Special Care Nursery (SCN); eleven other birth sites had a Level 2 SCN. Sites with no SCN could have provided neonatal care for unstable infants for a short time, usually less than 1 day. Infant stays in SCN of less than one day are not reported in Table 92.

There were 3,337 (10.5 per cent of 31,922 liveborn infants) infants admitted to a Level 2 or 3 SCN at their birth site with a SCN length of stay of at least one day reported. Of these infants, 2,878 from singleton births and 459 infants were from multiple births.

A larger proportion of twin or triplet infants were admitted to SCN than singleton infants. In 2011, 9.3 per cent of singleton infants (2,878 of 31,042 liveborn) and 52.2 per cent of infants from multiple births (459 of 905 liveborn) were admitted to SCN.

The SCN length of stay exceeded 7 days for 24.0 per cent of singleton infants admitted and 62.3 per cent of multiple infants admitted to a SCN.

**Table 92: Length of Stay in Special Care by Plurality for Infants Liveborn in WA, 2011**

Length of Stay <sup>1</sup> (days)	Plurality				Total	
	Single		Multiple		No.	%
	No.	%	No.	%		
1	677	23.5	32	7.0	709	21.2
2	509	17.7	18	3.9	527	15.8
3	370	12.9	44	9.6	414	12.4
4	259	9.0	24	5.2	283	8.5
5	161	5.6	28	6.1	189	5.7
6	119	4.1	6	1.3	125	3.7
7	93	3.2	21	4.6	114	3.4
8-14	309	10.7	97	21.1	406	12.2
15-20	125	4.3	59	12.9	184	5.5
21-28	89	3.1	46	10.0	135	4.0
29-60	99	3.4	47	10.2	146	4.4
61-90	34	1.2	26	5.7	60	1.8
91-180	34	1.2	11	2.4	45	1.3
<b>More than 7</b>	<b>690</b>	<b>24.0</b>	<b>286</b>	<b>62.3</b>	<b>976</b>	<b>29.2</b>
<b>Total</b>	<b>2878</b>	<b>100.0</b>	<b>459</b>	<b>100.0</b>	<b>3337</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

<sup>1</sup> Excludes infants transferred from a birth site to another site for admission to SCN and excludes infants with a stay in SCN at the birth site of less than 24 hours.

#### 4.5.2. Transfer from birth place

Transfer of infants to another hospital following birth occurred for 1,506 (4.7 per cent) infants. Transfer may have been undertaken when a higher level of care was required than was available at the birth site or for provision of ongoing care in readiness for discharge (Table 93).

In the neonatal period, before 28 days of age, 43 infants died at birth site (Table 93) and a further 19 infants died after discharge or transfer from the birth site (see Table 97).

Information about infants that were stillborn or died within one year of birth was collected for review by the WA Perinatal Mortality Committee in a separate process.

**Table 93: Liveborn Infant and Transfer from Birth Place to Other Hospital in WA, 2011**

Place of Birth	Discharge Outcome						Total	
	Transferred		Died		Discharged Home		No.	%
	No.	%	No.	%	No.	%	No.	%
<b>Metropolitan</b>								
Teaching	951	16.5	38	0.7	4773	82.8	5762	100.0
Other Public	179-182	***	***	***	8187	97.8	8370	100.0
Private	129-132	***	***	***	11944	98.9	12077	100.0
<b>Country</b>								
Regional	176-180	***	***	***	3052	94.4	3232	100.0
Other Public	41-44	***	***	***	1404	96.9	1449	100.0
Private	16	2.0	-	-	775	98.0	791	100.0
<b>Homebirth</b>	<b>0-4</b>	<b>***</b>	<b>***</b>	<b>***</b>	<b>237</b>	<b>98.3</b>	<b>241</b>	<b>100.0</b>
<b>Total</b>	<b>1506</b>	<b>4.7</b>	<b>44</b>	<b>0.1</b>	<b>30372</b>	<b>95.1</b>	<b>31922</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

In 2011, 17.1 per cent (4,999) of infants with birthweight of 2500 grams or more stayed at birth site for one day or less. Infants with low birthweight spent more days at the birth site. Of the 364 infants that stayed at the birth site for more than two weeks, 84.9 per cent had a birthweight less than 2500 grams (Table 94).

Table 94: Length of Stay by Birthweight for Infants Discharged Home in WA, 2011

Birthweight (grams)	Length of Stay (days)				Total
	≤ 1	2-7	8-14	> 14	
<b>Number</b>					
<1000	-	-	-	44	44
1000-1499	-	-	-	41	41
1500-1999	***	23-26	27	97	151
2000-2499	23-26	625	196	127	972
<b>&lt; 2500</b>	<b>27</b>	<b>649</b>	<b>223</b>	<b>309</b>	<b>1208</b>
2500-2999	700	3939	197	32	4868
3000-3499	1972	9344	144	13	11473
3500-3999	1742	7690	85	6-9	9524
4000-4499	524	2375	17-20	***	2920
≥ 4500	61	304	12	-	377
<b>≥ 2500</b>	<b>4999</b>	<b>23652</b>	<b>456</b>	<b>55</b>	<b>29162</b>
<b>Total</b>	<b>5026</b>	<b>24301</b>	<b>679</b>	<b>364</b>	<b>30370</b>
<b>Row Percentage</b>					
<1000	-	-	-	100.0	100.0
1000-1499	-	-	-	100.0	100.0
1500-1999	2.0	15.9	17.9	64.2	100.0
2000-2499	2.5	64.3	20.2	13.0	100.0
<b>&lt; 2500</b>	<b>2.2</b>	<b>53.7</b>	<b>18.5</b>	<b>25.6</b>	<b>100.0</b>
2500-2999	14.4	80.9	4.0	0.7	100.0
3000-3499	17.2	81.4	1.3	0.1	100.0
3500-3999	18.3	80.7	0.9	0.1	100.0
4000-4499	17.9	81.3	0.6	0.1	100.0
≥ 4500	16.2	80.6	3.2	-	100.0
<b>≥ 2500</b>	<b>17.1</b>	<b>81.1</b>	<b>1.6</b>	<b>0.2</b>	<b>100.0</b>
<b>Total</b>	<b>16.5</b>	<b>80.0</b>	<b>2.2</b>	<b>1.2</b>	<b>100.0</b>
<b>Column Percentage</b>					
<1000	-	-	-	12.1	0.1
1000-1499	-	-	-	11.3	0.1
1500-1999	0.1	0.1	4.0	26.7	0.5
2000-2499	0.5	2.6	28.9	34.9	3.2
<b>&lt; 2500</b>	<b>0.5</b>	<b>2.7</b>	<b>32.8</b>	<b>84.9</b>	<b>4.0</b>
2500-2999	13.9	16.2	29.0	8.8	16.0
3000-3499	39.2	38.5	21.2	3.6	37.8
3500-3999	34.7	31.6	12.5	1.9	31.4
4000-4499	10.4	9.8	2.7	0.8	9.6
≥ 4500	1.2	1.3	1.8	-	1.2
<b>≥ 2500</b>	<b>99.5</b>	<b>97.3</b>	<b>67.2</b>	<b>15.1</b>	<b>96.0</b>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Includes homebirths in midwife's care where discharge date equals birth date.

Excludes infants that were stillborn or died or were transferred to another site.

Values <5 are suppressed and indicated with \*\*\*, values in the same row/column are provided as a range to prevent calculation of the suppressed value.

Gestational age is a better predictor of infant endurance than birthweight. Length of Stay at birth site of one day or less for preterm infants is explained by transfer to another health service or early neonatal death.

The proportion of liveborn infants of gestational age 33 to 36 weeks that stayed for two weeks or more at birth site and discharged home alive was 85.8 per cent (Table 95). Comparing the length of stay for these preterm infants with the proportion of infants with birthweight less than 2,500 grams (84.9 per cent in Table 93) that stayed two weeks suggests that infants of low gestation rather than low birthweight require a longer stay in health service.

**Table 95: Length of Stay at Birth Site by Gestational Age for Infants Discharged Home WA, 2011**

Gestation age	Length of Stay (days)				Total
	≤1	2-7	8-14	>14	
<b>Number</b>					
33-36 weeks	56	1002	327	200	1585
37-44 weeks	4969	23297	351	33	28650
<b>Total</b>	<b>5025</b>	<b>24299</b>	<b>678</b>	<b>233</b>	<b>30235</b>
<b>Row Percentage</b>					
33-36 weeks	3.5	63.2	20.6	12.6	100.0
37-44 weeks	17.3	81.3	1.2	0.1	100.0
<b>Total</b>	<b>16.6</b>	<b>80.4</b>	<b>2.2</b>	<b>0.8</b>	<b>100.0</b>
<b>Column Percentage</b>					
33-36 weeks	1.1	4.1	48.2	85.8	5.2
37-44 weeks	98.9	95.9	51.8	14.2	94.8
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from Midwives' Notification System on 17 December 2013.

Excludes 135 infants of gestational age less than 33 weeks. These infants contributed low values to most cells of the table and were excluded to suppress values less than 5.

Other infants born alive were transferred from the birth site or died before discharge. Of these 824 were preterm and 729 were 37 weeks gestation or more (Table 96).

**Table 96: Length of Stay at Birth Site by Gestational Age for Infants that Died or were Transferred WA, 2011**

Gestation age	Length of Stay (days)				Total
	≤1	2-7	8-14	>14	
<b>Number</b>					
20-27 weeks	23	5	5	36	69
28-32 weeks	27	5	39	185	256
33-36 weeks	134	204	122	39	499
<b>Less than 37 weeks</b>	<b>184</b>	<b>214</b>	<b>166</b>	<b>260</b>	<b>824</b>
37-44 weeks	451	252	15	10	729
<b>TOTAL</b>	<b>635</b>	<b>466</b>	<b>181</b>	<b>270</b>	<b>1552</b>

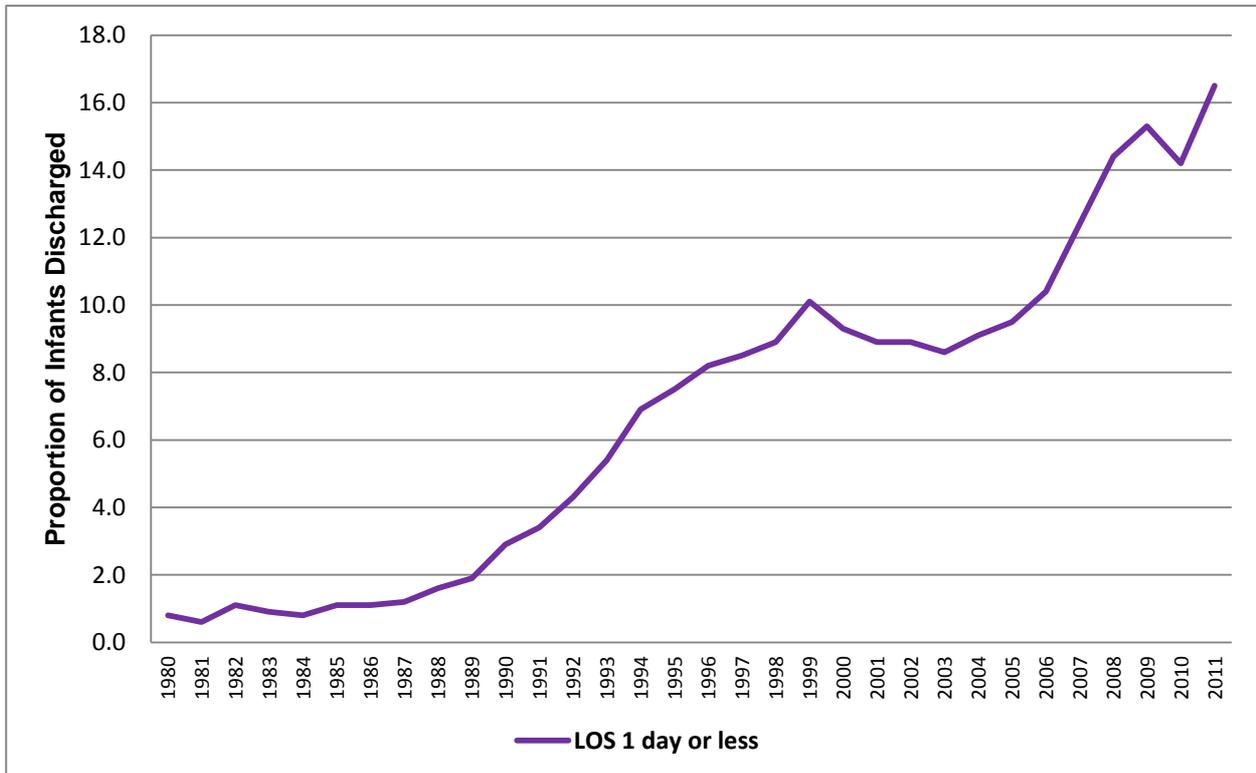
Extracted from Midwives' Notification System on 17 December 2013.

### 4.5.3. Liveborn infant length of stay at birthplace

Infant length of stay at birth place reported by midwives can be affected by infant birthweight, infant gestation, infant condition and maternal length of stay. At all maternity services a well infant will not usually be discharged from the birth site before an unwell mother.

Trend data in Figure 22 illustrate a change in the proportion of infants discharged home at or before 24 hours of age. From a low of 0.6 per cent in 1981, a proportion of 10.1 per cent was attained by 1999. In 2011, the proportion of infants discharged home on day of birth or the day after birth was 16.5 per cent.

Figure 22: Trend data for Infants Discharged Home within 1 day of birth in WA, 1980-2011



Proportion of all infants discharged alive from site of birth without transfer to another hospital.

Of the liveborn infants with an outcome of discharge from their birth site (30,370 infants), the majority (80.0 per cent) stayed at their place of birth for at least two and up to seven days, while 16.5 per cent stayed for one day or less. 2.2 per cent of infants stayed at their birth hospital for between one and two weeks and the remaining 1.2 per cent had a neonatal stay in the birth site of more than two weeks (Table 94).

## 5. Perinatal Mortality

Perinatal deaths include fetal deaths (stillbirths) where the infant died before the onset of labour or during labour, and neonatal deaths where the infant died in the neonatal period – between livebirth and the 28th day of life. The WA Midwives Notification System includes data for infants of 20 weeks gestation that were born as a result of termination of a pregnancy. As these infants cannot be distinguished from other infants they contribute to the perinatal mortality rate presented here.

There were 332 perinatal deaths occurring in 2011 for infants born from pregnancies of 20 weeks or more gestation. There were 269 stillborn infants and 63 born alive that died in the neonatal period. There was a perinatal mortality rate of 10.3 per 1000 infants born, a fetal mortality rate of 8.4 per 1000 infants born and a neonatal mortality rate of 2.0 per 1000 infants born alive (Table 97).

Mortality rates for infants of Aboriginal mothers were higher than for infants of non-Aboriginal mothers in all categories.

For more information about perinatal mortality in Western Australia go to the reports of the WA Perinatal Mortality Committee at:

[http://www.health.wa.gov.au/publications/subject\\_index/p.Perinatal\\_infant\\_maternal.cfm](http://www.health.wa.gov.au/publications/subject_index/p.Perinatal_infant_maternal.cfm).

**Table 97: Perinatal Mortality by Maternal Aboriginal Status in WA, 2011**

Mortality Type	Maternal Aboriginal Status				Total	
	Aboriginal Number	Aboriginal Rate <sup>1</sup>	non-Aboriginal Number	non-Aboriginal Rate <sup>2</sup>	Number	Rate <sup>3</sup>
Fetal deaths	34	19.5	235	7.7	269	8.4
Neonatal death	7	4.1	56	1.9	63	2.0
Perinatal deaths	41	23.6	291	9.6	332	10.3

Extracted from the Perinatal Mortality Database 17 January 2014.

<sup>1</sup> The Denominators used for infants of Aboriginal mothers were 1,740 total infants born and 1,706 infants born alive.

<sup>2</sup> The Denominators used for infants of non-Aboriginal mothers were 30, 451 total infants born and 30,216 infants born alive.

<sup>3</sup> The Denominators used were for Total infants born in WA 32,191 and 31, 922 infants born alive.

Since 1994, infants of Aboriginal mothers had a perinatal mortality rate ranging from a high of 25.8 per 1000 total births in 1999 to a low of 14.8 in 2007. The perinatal mortality rate for 2011 was very similar to that in 2009 (Table 98).

**Table 98: Trend Data for Perinatal Mortality by Aboriginal Status in WA, 1994-2011**

Year of birth	Maternal Aboriginal Status		Total rate
	Aboriginal rate	Non-Aboriginal rate	
1994	22.7	10.2	10.9
1995	21.9	10.0	10.7
1996	21.4	11.1	11.7
1997	25.9	8.6	9.7
1998	17.8	8.6	9.1
1999	25.8	9.0	10.1
2000	24.2	9.9	10.8
2001	17.6	9.2	9.7
2002	25.1	8.0	9.2
2003	23.9	8.6	9.6
2004	16.5	9.3	9.8
2005	19.8	9.5	10.2
2006	24.3	8.5	9.5
2007	14.8	7.8	8.2
2008	19.6	8.6	9.3
2009	20.4	9.4	10.0
2010	21.2	8.5	9.2
2011	23.6	9.6	10.3

Extracted from the Perinatal Mortality Database 17 January 2014.

#### 5.1.1. Perinatal mortality by gestational age in WA

Early gestational age had an influence on perinatal mortality rates. Lower gestational ages corresponded with a higher perinatal death rate (Table 99).

**Table 99: Perinatal Mortality by Gestational Age in WA, 2011**

Gestation	Fetal death rate	Neonatal death rate	Perinatal death rate
≥ 20 weeks	8.4	2.0	10.3
≥ 22 weeks	6.4	1.8	8.2

Extracted from the Perinatal Mortality Database 17 January 2014.

Includes infants of at least 20 weeks gestation that may have had severe congenital abnormalities.

#### 5.1.2. Perinatal mortality by birthweight in WA

Low birthweight influences perinatal mortality rates. Lower birthweight corresponds with a higher perinatal death rate (Table 100).

**Table 100: Perinatal Mortality by Birthweight Split in WA, 2011**

Birthweight (grams)	Fetal death rate	Neonatal death rate	Perinatal death rate
≥ 400 grams	6.0	1.9	7.9
≥ 500 grams	5.0	1.6	6.6

Extracted from the Perinatal Mortality Database 17 January 2014.

Includes infants of at least 20 weeks gestation that may have had lethal congenital abnormalities.

Infants with a birthweight less than 500 grams comprised 39.6 per cent of the perinatal deaths in 2011, and 76.5 per cent of perinatal deaths were babies in a low birthweight category (less than 2500 grams) (Table 101).

**Table 101: Birthweight for Perinatal Deaths in WA, 2011**

Birthweight (grams)	Mortality type		
	Fetal deaths	Neonatal deaths	Perinatal deaths
Number			
<b>Total Number</b>	<b>269</b>	<b>63</b>	<b>332</b>
Column Percentage			
< 1000	59.7	47.6	57.5
1000–1499	7.8	4.8	7.2
1500–1999	4.8	3.2	4.5
2000–2499	6.3	9.5	6.9
<b>&lt; 2500</b>	<b>78.8</b>	<b>65.1</b>	<b>76.2</b>
2500–2999	8.9	11.1	9.3
3000–3499	7.1	14.3	8.4
≥ 3500	5.2	9.5	6.0
<b>Total Percentage</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Extracted from the Perinatal Mortality Database 17 January 2014.

Infants of multiple births are subject to increased mortality possibly due to complications associated with low birthweight and lower gestational age. The perinatal mortality rate of 34.4 per 1000 infants of multiple births was more than four times the rate of 8.4 per 1000 singleton infants in 2011 (Table 102).

**Table 102: Perinatal Mortality by Plurality of Birth in WA, 2011**

Plurality	Mortality type					
	Fetal death		Neonatal death		Perinatal death	
	No.	Rate	No.	Rate	No.	Rate
Single	244	7.8	56	1.8	300	9.6
Multiple	25	27.6	7	8.0	32	35.4
<b>Total</b>	<b>269</b>	<b>8.4</b>	<b>63</b>	<b>2.0</b>	<b>332</b>	<b>10.3</b>

Extracted from the Perinatal Mortality Database 17 January 2014.

A neonatal death (the death of a liveborn baby during the first 28 days of life) is more likely to occur in the first day of life. In 2011, 30.2 per cent of neonatal deaths occurred in infants aged less than one day (Table 103).

**Table 103: Age at Neonatal Death for Infants born in WA, 2011**

Age at neonatal death	No.	% of neonatal deaths
< Day 1	19	30.2
Day 1	10	15.9
Day 2	7	11.1
Day 3-7	10	15.9
Day 8-21	10	15.9
Day 22-28	7	11.1
<b>Total</b>	<b>63</b>	<b>100.0</b>

Extracted from the Perinatal Mortality Database 17 January 2014.

Autopsy occurred for 56.5 per cent of infants that were stillborn (fetal death) and 30.2 per cent of infants that died in the neonatal period. There were 26 perinatal deaths where it was not known if an autopsy had been requested (Table 104).

**Table 104: Autopsy Requests for Perinatal Deaths in WA, 2011**

Autopsy request	Mortality Type					
	Fetal deaths		Neonatal deaths		Perinatal deaths	
	No.	%	No.	%	No.	%
Yes	152	56.5	19	30.2	171	51.5
No/Unknown	117	43.5	44	69.8	161	48.5
<b>Total</b>	<b>269</b>	<b>100.0</b>	<b>63</b>	<b>100.0</b>	<b>332</b>	<b>100.0</b>

Extracted from the Perinatal Mortality Database 17 January 2014.

The principal known causes for fetal death were lethal birth defect (30.1 per cent) and extremely low birthweight of less than 1000 grams (31.6 per cent). Among infants that died neonatally, extremely low birthweight was the cause of death determined for 36.5 per cent and lethal birth defect in 30.2 per cent (Table 105).

**Table 105: Causes of Perinatal Death in WA, 2011**

Cause of Perinatal death	Mortality Type			
	Fetal deaths		Neonatal deaths	
	No.	%	No.	%
Lethal birth defect	81	30.1	19	30.2
Extremely low birthweight (< 1000 grams) <sup>1</sup>	85	31.6	23	36.5
Asphyxia	-	-	11	17.5
Placenta and cord	12	4.5	-	-
Maternal condition	5	1.9	-	-
Sudden Infant Death Syndrome	-	-	-	-
Unknown or Other	86	32.0	10	15.9
<b>Total</b>	<b>269</b>	<b>100.0</b>	<b>63</b>	<b>100.0</b>

Extracted from the Perinatal Mortality Database 17 January 2014.

<sup>1</sup> Any infant without malformation that died and had birthweight less than 1000 grams is reported in the "extremely low birthweight" category

## 6. ACHS Obstetric Clinical Indicators (V6) by region of maternal residence

The Australian Council on Healthcare Standards (ACHS) has been involved in the development of clinical indicators in conjunction with medical colleges, associations and societies since 1989. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists has produced the Obstetric Clinical Indicators for ACHS for many years. These clinical indicators are increasingly being used to assess and improve the quality of healthcare. Further information about ACHS and their clinical indicator programs can be found at:

<http://www.achs.org.au/clinicalindicators>

This report of Western Australian 2011 births does not present data for Clinical Indicators. The data for 2011 will be provided with Trend data for the report of Western Australian 2012 births which is to be published almost immediately following this report.

## 7. References

AIHW. *Metadata Online Registry (METeOR) for the Perinatal National Minimum Data Set 2010-2011*. 2 December 2009. <http://meteor.aihw.gov.au/content/index.phtml/itemId/363256> (accessed March 28, 2014).

Carolan, M. "The graying of the obstetric population: implications for the older mother." *Journal of Obstetric, Gynaecologic and Neonatal Nursing* 32 (2003): 19-27.

Dobbins, TA, EA Sullivan, CL Roberts, and JM Simpson. "Australian national birthweight percentiles by sex and gestation age, 1998-2007." *MJA* 197, no. 5 (2012): 291-294.

Downey, F. *A validation study of the Western Australian Midwives' Notification System, 2005 data*. Statistical Series Number 78, Health Information Centre, Department of Health, WA, Perth: Department of Health, 2007.

O'Leary, C, et al. "Trends in mode of delivery during 1984-2003: can they be explained by pregnancy and delivery complications?" *BJOG: An International Journal of Obstetrics & Gynaecology* 114, no. 7 (2007): 855-864.

Tekes, A, PS Pinto, AGM Thierry, and MD Huisman. "Birth-related Injury to the Head and Cervical Spine in Neonates." *Magnetic Resonance Imaging Clinics of North America* 19, no. 4 (November 2011): 777-790.

Tough, SC, C Newburn-Cook, DW Johnston, LW Svenson, S Rose, and Belik. "Delayed childbearing and its impact on population rate changes in lower birth weight, multiple birth, and preterm delivery." *Pediatrics*, 109, 2002: 399-403.

"University Medical School, Teaching Hospitals, Act 1955." *Western Australian Legislation, State Law Publisher*. [http://www.slp.wa.gov.au/legislation/statutes.nsf/main\\_mrtile\\_1018\\_homepage.html](http://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtile_1018_homepage.html) (accessed February 11, 2014).

Young, M. *Assessing the Quality of Identification of Aboriginal and Torres Strait Islander People in Western Australia Hospital Data, 2000*. Occasional Paper 13, ISSN 13297252, Health Information Centre, Department of Health, WA, Perth: Department of Health, 2001.

## Appendix A: Glossary

<b>Age-specific birth rate</b>	The total births (live births and still births) per 1000 born to women aged between 15–44 years.
<b>Anaesthesia</b>	Often administered immediately before delivery and differs from analgesia in that it causes a loss of all sensation. It includes loss of touch, loss of certain reflexes and loss of ability to move. With general anaesthesia there is also a loss of consciousness.
<b>Analgesia</b>	Often administered during labour to reduce the feeling of pain while allowing sensations of touch, pressure and the ability to move to generally remain intact.
<b>Apgar score</b>	A numerical scoring system applied after birth to evaluate the condition of the infant. It is based on heart rate, respiration, muscle tone, reflexes and colour. A low score indicates poor condition of the infant.
<b>Augmentation of labour</b>	Refers to the use of medication or other intervention to 'speed up' the process of labour that has already commenced spontaneously. Augmentation may be required to assist with an abnormal or difficult labour (dystocia), or to speed up normal labour if the health of the mother or baby is at risk.
<b>Born before arrival (BBA)</b>	A birth that occurs prior to arrival of the mother at the health service reporting the birth. It usually indicates a planned hospital or birth centre birth occurring unexpectedly before arrival at service. A planned homebirth is reported as BBA if birth occurs before midwife arrives at the home. BBA is an indication of a birth occurring in an uncontrolled environment.
<b>Birth defects</b>	Any defect present in the infant at the time of birth, probably of developmental origin.
<b>Birthweight</b>	The first weight, measured of the infant, to the nearest five grams. Usually obtained within the first hour of birth.
<b>Caesarean section</b>	Infant is born through an incision in the maternal uterus via the abdomen.  <u>Elective caesarean section:</u> a scheduled procedure that occurs prior to onset of labour and rupture of membranes and without any labour induction procedure.  <u>Emergency caesarean section:</u> a procedure performed at a time determined by an arising complication. May be performed before or after the onset of labour.
<b>Crude birth rate</b>	The number of liveborn infants occurring per 1000 of the total population.
<b>Epidural</b>	Injection of analgesic agent outside the dura mater encasing the maternal spinal canal.
<b>Episiotomy</b>	An incision of the perineum and vagina to enlarge the opening of the vagina.

<b>Gestational age</b>	The duration of pregnancy from the first day of the last normal menstrual period. If unable to be determined in this way, ultrasound estimations of gestational age during pregnancy or assessment of the newborn infant may be used to determine this age. Data presented here is in completed weeks e.g. a gestational age of 40 days would be presented as 5 weeks and not 5 weeks and 5 days or 6 weeks.
<b>Health Service Area</b>	Within WA, there are three Health Service Areas created by grouping of the Statistical Local Areas (SLA) devised by the Australian Bureau of Statistics (ABS) into North Metro, South Metro and Country.
<b>Statistical Local Area</b>	<b>(SLA)</b> An Australian Standard Geographical Classification (ASGC) defined area that comprises a suburb or groups of suburb. Describes geographical locations for the whole of Australia without gaps or overlays. It is described with a 9 digit number made up of values representing state, statistical division (SD), statistical subdivision (SSD) and SLA, for example, the SLA of Armadale (City) has an SLA value of 505250210 which can be broken down to 5/05/25/0210 to represent values for WA/SD/SSD/SLA.
<b>Health Region</b>	SLAs also determine division of the Country Area into the seven Regions of Kimberley, Pilbara, Midwest, Wheatbelt, Goldfields, Southwest, and Great Southern. With the two undivided Metropolitan Areas of North and South, these comprise the nine Health Regions in WA.
<b>Homebirth</b>	Homebirths reported in the annual report only include women attended by midwives for a planned homebirth. Other homebirths may include "freebirths", a homebirth planned to occur without a health professional in attendance, or an unplanned or unexpected homebirth where the birth may be reported as "born before arrival" to the health service.
<b>Induction of labour</b>	The process of using medications or procedures to artificially initiate labour. Induction is performed when birth in next 24 hours was believed to best serve the welfare of mother and/or infant.
<b>Length of stay</b>	The total number of days spent in hospital. A stay of less than one day (admission, birth and discharge occur on the same day) is counted as one day, in the total days of care. For women or infants admitted and discharged on different days, the number of days is computed by subtracting the date of admission/birth from the day of separation. For planned home births length of stay is reported as 0 days from date of birth.
<b>Livebirth</b>	The complete expulsion or extraction from its mother of an infant irrespective of duration of pregnancy, which after birth shows signs of life.
<b>Mortality rates</b>	<p><u>Fetal death rate</u>: the number of fetal deaths per 1000 total births in a year.</p> <p><u>Neonatal mortality</u>: the number of neonatal deaths per 1000 live births in a year.</p> <p><u>Perinatal mortality</u>: the number of stillbirths and neonatal deaths per 1000 total births in a year.</p>

<b>Neonatal death</b>	The death of a liveborn infant within 28 days of birth.
<b>Obstetrician</b>	Medical Practitioner who has achieved consultant status in Obstetrics and Gynaecology.
<b>Other medical officer</b>	Medical Practitioner who is not a consultant of Obstetrics and Gynaecology.
<b>Parity</b>	The total number of infants born alive or stillborn to the mother prior to the index pregnancy.  <u>Nulliparous:</u> Never having completed a pregnancy beyond 20 weeks gestation prior to the index pregnancy.  <u>Multiparous:</u> having completed one or more pregnancies beyond 20 weeks gestation.
<b>Perinatal death</b>	A stillbirth (fetal death) or neonatal death.
<b>Perineal status</b>	<u>First degree tear:</u> a perineal graze, laceration, or tear involving the fourchette, hymen, labia, skin, vagina or vulva.  <u>Second degree tear:</u> a perineal laceration or tear involving the pelvic floor or perineal muscles or vagina muscles.  <u>Third degree tear:</u> a perineal laceration or tear involving the anal sphincter or rectovaginal septum.  <u>Fourth degree tear:</u> a third degree perineal laceration or tear which also involves the anal or rectal mucosa.
<b>Plurality</b>	The number of infants resulting from a pregnancy of 20 weeks gestation or more. On this basis a birth may be classified as single or multiple.
<b>Relative Risk</b>	The likelihood of having an adverse event following exposure to some factor. Determines association rather than causation. Calculation used to describe Relative Risk (RR) in this report, was the Rate Ratio (rate of occurrence in exposed) / (rate of occurrence in non-exposed). For example (number of infants of Aboriginal mothers with low birthweight) / (number of infants of non-Aboriginal mothers with low birthweight)
<b>SEIFA Disadvantage Index</b>	Using 2011 census data, Statistical Area 2 (SA2) values were allocated to five groups based on the socio-economic-index-for-areas (SEIFA 2011) disadvantage index. Group I is considered as having the highest disadvantage and group V has the lowest disadvantage. <a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2033.0.55.001Main+Features12011?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/2033.0.55.001Main+Features12011?OpenDocument</a> .
<b>Stillbirth or Fetal death</b>	The complete expulsion or extraction from its mother of an infant which did not show any sign of life from the time of birth. Where the pregnancy was at least 20 weeks gestation or the infant's birthweight is at least 400 grams.
<b>Term Infants</b>	Infants born from pregnancy with gestational age of 37 weeks or greater.
<b>Vertex Presentation</b>	The most common presentation of the fetus immediately prior to birth. The fetal chin is tucked in and the smallest and roundest circumference of the fetal head (just above the ears) is applied to the maternal cervix.

## Appendix B: Supplementary Tables

Table 106: Age-Specific Birth Rates by Aboriginal Status of Women in WA, 1983-2011

Year of birth	Aboriginal Status of mother						Total		
	Aboriginal			Non-Aboriginal			15-19	20-34	35-44
	15-19	20-34	35-44	15-19	20-34	35-44			
1983	161.4	134.4	15.5	21.6	112.8	14.5	27.6	113.4	14.5
1984	164.0	130.3	20.0	20.3	111.1	14.4	26.7	111.7	14.5
1985	158.4	137.6	13.7	18.3	110.7	16.0	24.7	111.6	16.0
1986	145.8	135.9	15.2	19.4	109.5	16.8	25.1	110.3	16.7
1987	144.9	144.4	19.6	18.0	108.3	16.6	23.6	109.5	16.7
1988	164.6	146.8	15.8	19.0	108.7	18.3	25.5	110.0	18.3
1989	149.1	148.0	17.5	18.8	107.4	18.4	24.5	108.8	18.4
1990	149.6	157.6	19.3	20.1	106.7	19.4	25.7	108.4	19.4
1991	162.1	138.3	17.1	19.6	101.4	19.0	25.9	102.7	18.9
1992	145.5	135.4	15.4	20.0	101.5	20.3	25.6	102.7	20.2
1993	150.4	132.9	17.0	18.8	101.3	21.3	24.5	102.4	21.2
1994	151.4	129.8	14.5	20.3	100.2	22.3	26.0	101.3	22.1
1995	133.6	133.7	18.3	19.8	98.7	23.3	24.7	100.1	23.2
1996	125.9	130.1	18.1	19.6	97.9	24.3	24.4	99.1	24.1
1997	135.4	140.7	18.8	17.8	95.0	24.8	23.1	96.8	24.7
1998	130.6	130.9	23.3	18.8	95.6	26.6	24.0	97.0	26.5
1999	125.2	140.0	25.2	18.4	95.9	26.5	23.4	97.6	26.5
2000	122.6	136.9	24.8	17.2	93.3	26.9	22.2	95.1	26.8
2001	112.9	142.4	21.0	16.2	91.2	27.5	20.9	93.2	27.3
2002	110.5	142.6	26.2	16.3	90.4	27.4	20.9	92.5	27.3
2003	111.2	127.9	22.2	14.5	88.9	29.4	19.2	90.5	29.2
2004	109.7	129.8	24.7	15.1	91.1	30.9	19.9	92.6	30.7
2005	121.2	138.9	27.7	15.7	93.5	34.4	21.0	95.3	34.2
2006	118.0	150.4	26.6	16.1	97.0	37.9	21.3	99.1	37.5
2007	105.0	150.0	33.6	16.3	99.9	39.9	20.9	101.8	39.8
2008	104.0	138.8	29.5	16.2	98.2	41.2	20.7	99.7	40.9
2009	98.2	140.2	30.0	15.2	95.5	39.7	19.4	97.2	39.4
2010	91.0	133.1	28.1	13.8	93.5	39.9	17.8	95.0	39.5
2011	93.5	133.9	25.9	13.9	91.5	39.7	18.1	93.0	39.3

Data extracted from Midwives' Notification System on 17 December 2013.

The 15-19 year age group includes births to mothers younger than 15 years of age. The 40-45 year age group includes births to mothers aged 45 years or more.

Age-Specific Birth Rate was from the total number of births in one year per 1000 women of the same age group.

No population data available for years 1980 to 1982.

Table 107: Maternal Aboriginal Status in WA 1980-2011

Year	Maternal Aboriginal Status				Total	
	Aboriginal		non-Aboriginal			
	No.	%	No.	%	No.	%
1980	1030	5.0	19580	95.0	20610	100.0
1981	1110	5.0	20871	95.0	21981	100.0
1982	1123	5.1	21029	94.9	22152	100.0
1983	1142	5.0	21684	95.0	22826	100.0
1984	1185	5.2	21518	94.8	22703	100.0
1985	1247	5.4	21829	94.6	23076	100.0
1986	1239	5.2	22364	94.8	23603	100.0
1987	1336	5.6	22559	94.4	23895	100.0
1988	1436	5.8	23366	94.2	24802	100.0
1989	1439	5.7	23718	94.3	25157	100.0
1990	1548	6.0	24154	94.0	25702	100.0
1991	1468	5.9	23211	94.1	24679	100.0
1992	1422	5.7	23548	94.3	24970	100.0
1993	1442	5.8	23531	94.2	24973	100.0
1994	1439	5.7	23632	94.3	25071	100.0
1995	1455	5.8	23633	94.2	25088	100.0
1996	1431	5.7	23761	94.3	25192	100.0
1997	1564	6.3	23304	93.7	24868	100.0
1998	1508	6.0	23784	94.0	25292	100.0
1999	1600	6.3	23777	93.7	25377	100.0
2000	1597	6.4	23220	93.6	24817	100.0
2001	1627	6.6	22868	93.4	24495	100.0
2002	1652	6.8	22745	93.2	24397	100.0
2003	1527	6.3	22748	93.7	24275	100.0
2004	1556	6.2	23557	93.8	25113	100.0
2005	1698	6.4	24828	93.6	26526	100.0
2006	1788	6.3	26466	93.7	28254	100.0
2007	1805	6.1	27826	93.9	29631	100.0
2008	1722	5.7	28515	94.3	30237	100.0
2009	1749	5.7	29011	94.3	30760	100.0
2010	1683	5.5	29160	94.5	30843	100.0
2011	1723	5.4	30011	94.6	31734	100.0

Extracted from Midwives' Notification System on 17 December 2013.

Table 108: Place of Birth of Women Giving Birth in WA, 1980-2011

Year	Place of Birth										Total	
	Teaching		Public		Private		Home Birth		BBA			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1980	5126	24.9	10935	53.1	4436	21.5	62	0.3	50	0.2	20609	100.0
1981	5332	24.3	11994	54.6	4521	20.6	59	0.3	75	0.3	21981	100.0
1982	5249	23.7	11362	51.3	5374	24.3	94	0.4	73	0.3	22152	100.0
1983	4731	20.7	11872	52.0	6065	26.6	99	0.4	59	0.3	22826	100.0
1984	4894	21.6	11236	49.5	6411	28.2	96	0.4	66	0.3	22703	100.0
1985	4666	20.2	11296	49.0	6900	29.9	143	0.6	71	0.3	23076	100.0
1986	4921	20.8	11977	50.7	6483	27.5	174	0.7	48	0.2	23603	100.0
1987	4625	19.4	12008	50.3	7053	29.5	144	0.6	65	0.3	23895	100.0
1988	4768	19.2	12360	49.8	7420	29.9	175	0.7	79	0.3	24802	100.0
1989	4675	18.6	12751	50.7	7478	29.7	176	0.7	77	0.3	25157	100.0
1990	4677	18.2	13346	51.9	7436	28.9	151	0.6	92	0.4	25702	100.0
1991	4200	17.0	13052	52.9	7204	29.2	145	0.6	77	0.3	24678	100.0
1992	4301	17.2	13267	53.1	7216	28.9	107	0.4	78	0.3	24969	100.0
1993	4695	18.8	12934	51.8	7161	28.7	102	0.4	81	0.3	24973	100.0
1994	4917	19.6	12841	51.2	7111	28.4	109	0.4	93	0.4	25071	100.0
1995	4930	19.7	12912	51.5	7055	28.1	96	0.4	95	0.4	25088	100.0
1996	5074	20.1	12332	49.0	7583	30.1	120	0.5	84	0.3	25193	100.0
1997	5025	20.2	11925	48.0	7741	31.1	112	0.5	65	0.3	24868	100.0
1998	4912	19.4	11979	47.4	8200	32.4	101	0.4	100	0.4	25292	100.0
1999	5150	20.3	11634	45.8	8397	33.1	123	0.5	73	0.3	25377	100.0
2000	4671	18.8	11312	45.6	8633	34.8	120	0.5	81	0.3	24817	100.0
2001	4168	17.0	10787	44.0	9316	38.0	137	0.6	87	0.4	24495	100.0
2002	4267	17.5	10279	42.1	9645	39.5	120	0.5	85	0.3	24396	100.0
2003	4335	17.9	9971	41.1	9726	40.1	163	0.7	80	0.3	24275	100.0
2004	4425	17.6	10325	41.1	10131	40.3	149	0.6	82	0.3	25112	100.0
2005	4811	18.1	10949	41.3	10517	39.6	150	0.6	98	0.4	26525	100.0
2006	5792	20.5	11164	39.5	10997	38.9	194	0.7	107	0.4	28254	100.0
2007	6008	20.3	11363	38.4	11928	40.3	203	0.7	127	0.4	29629	100.0
2008	6051	20.0	11633	38.5	12186	40.3	232	0.8	129	0.4	30231	100.0
2009	5653	18.4	12231	39.8	12493	40.6	245	0.8	126	0.4	30748	100.0
2010	5744	18.6	12168	39.5	12539	40.7	255	0.8	129	0.4	30835	100.0
2011	5650	17.8	12993	40.9	12733	40.1	232	0.7	126	0.4	31734	100.0

Extracted from Midwives' Notification System on 17 December 2013.

Table 109: Trend in Smoking Tobacco in Pregnancy, WA 1999-2011

Year	Smoking in pregnancy				Total No.
	Smoking		Non-smoking		
	No.	%	No.	%	
1999	5737	22.6	19640	77.4	25377
2000	5260	21.2	19557	78.8	24817
2001	5255	21.5	19240	78.5	24495
2002	4932	20.2	19464	79.8	24396
2003	4584	18.9	19691	81.1	24275
2004	4307	17.2	20805	82.8	25112
2005	4523	17.1	22002	82.9	26525
2006	4941	17.5	23313	82.5	28254
2007	4885	16.5	24744	83.5	29629
2008	4660	15.4	25571	84.6	30231
2009	4453	14.5	26295	85.5	30748
2010	3710	12.0	27125	88.0	30835
2011	3826	12.1	27908	87.9	31734

Extracted from Midwives' Notification System on 17 December 2013.

Data collection commenced 1999.

Table 110: Number of Previous Infants for Women Giving Birth in WA, 1980-2011

Year	Number of Previous Infants				Total Women
	0 %	1-2 %	3-4 %	≥ 5 %	
1980	39.1	50.8	8.4	1.7	18786
1981	39.2	51.0	8.4	1.3	21981
1982	39.6	50.7	8.5	1.2	22152
1983	39.3	51.2	8.2	1.3	22826
1984	38.7	51.7	8.3	1.3	22703
1985	38.1	52.2	8.4	1.2	23076
1986	38.9	51.4	8.5	1.2	23603
1987	38.9	51.3	8.5	1.3	23895
1988	38.6	51.4	8.7	1.3	24802
1989	39.5	50.2	8.9	1.4	25157
1990	39.0	50.5	9.2	1.3	25702
1991	39.7	49.8	9.1	1.3	24678
1992	38.7	50.8	9.0	1.5	24969
1993	38.7	50.9	8.9	1.6	24973
1994	40.0	49.7	8.8	1.5	25071
1995	40.6	49.2	8.6	1.6	25088
1996	40.0	49.9	8.5	1.5	25193
1997	40.3	49.6	8.6	1.6	24868
1998	40.0	49.7	8.7	1.6	25292
1999	40.4	49.6	8.4	1.6	25377
2000	41.2	48.5	8.5	1.9	24817
2001	40.7	49.4	8.2	1.8	24495
2002	40.6	49.3	8.4	1.8	24396
2003	41.3	49.0	7.8	1.9	24275
2004	41.9	48.6	7.8	1.8	25112
2005	41.9	48.4	7.8	1.9	26525
2006	41.8	48.2	8.0	2.0	28254
2007	42.0	48.5	7.6	2.0	29629
2008	41.3	49.0	7.9	1.8	30231
2009	41.9	48.8	7.5	1.7	30748
2010	42.4	48.5	7.4	1.8	30835
2011	42.5	49.2	6.6	1.7	31734

Extracted from Midwives' Notification System on 17 December 2013.

Table 111: Onset of Labour 1986-2011

Year	Onset of Labour						Total	
	Spontaneous		Induction		No Labour			
	No.	%	No.	%	No.	%	No.	%
1986	14956	63.4	6363	27.0	2284	9.7	23603	100.0
1987	15092	63.2	6277	26.3	2526	10.6	23895	100.0
1988	15826	63.8	6428	25.9	2548	10.3	24802	100.0
1989	15923	63.3	6487	25.8	2747	10.9	25157	100.0
1990	16638	64.7	6180	24.0	2884	11.2	25702	100.0
1991	15815	64.1	6135	24.9	2728	11.1	24678	100.0
1992	15537	62.2	6544	26.2	2888	11.6	24969	100.0
1993	14997	60.1	6872	27.5	3104	12.4	24973	100.0
1994	15092	60.2	6876	27.4	3103	12.4	25071	100.0
1995	15024	59.9	6988	27.9	3076	12.3	25088	100.0
1996	14985	59.5	7036	27.9	3172	12.6	25193	100.0
1997	14428	58.0	7046	28.3	3394	13.6	24868	100.0
1998	14186	56.1	7394	29.2	3712	14.7	25292	100.0
1999	14181	55.9	7552	29.8	3644	14.4	25377	100.0
2000	13745	55.4	7266	29.3	3806	15.3	24817	100.0
2001	12830	52.4	7449	30.4	4216	17.2	24495	100.0
2002	12535	51.4	7314	30.0	4547	18.6	24396	100.0
2003	12266	50.5	7090	29.2	4919	20.3	24275	100.0
2004	12680	50.5	7210	28.7	5222	20.8	25112	100.0
2005	13091	49.4	7617	28.7	5817	21.9	26525	100.0
2006	14424	51.1	7873	27.9	5957	21.1	28254	100.0
2007	15497	52.3	8157	27.5	5975	20.2	29629	100.0
2008	15909	52.6	8058	26.7	6264	20.7	30231	100.0
2009	16020	52.1	8606	28.0	6122	19.9	30748	100.0
2010	15811	51.3	8788	28.5	6236	20.2	30835	100.0
2011	16260	51.2	9068	28.6	6406	20.2	31734	100.0

Extracted from Midwives' Notification System on 17 December 2013.

Data collection commenced 1986.

Table 112: Method of Birth for Women giving birth in WA, 1980-2011

Year	Method of Birth										Total	
	Spontaneous Vertex		Assisted Vaginal		Breech		Elective Caesarean		Emergency Caesarean			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1980	13572	65.9	4373	21.2	358	1.7	1096	5.3	1205	5.8	20609	100.0
1981	14471	65.8	4642	21.1	286	1.3	1250	5.7	1332	6.1	21981	100.0
1982	14191	64.1	4820	21.8	370	1.7	1406	6.3	1365	6.2	22152	100.0
1983	14453	63.3	4972	21.8	376	1.6	1488	6.5	1537	6.7	22826	100.0
1984	14315	63.1	4923	21.7	324	1.4	1560	6.9	1581	7.0	22703	100.0
1985	14452	62.6	4813	20.9	317	1.4	1804	7.8	1690	7.3	23076	100.0
1986	14944	63.3	4675	19.8	298	1.3	1851	7.8	1835	7.8	23603	100.0
1987	15135	63.3	4466	18.7	264	1.1	2063	8.6	1967	8.2	23895	100.0
1988	16161	65.2	4201	16.9	246	1.0	2198	8.9	1996	8.0	24802	100.0
1989	16133	64.1	4231	16.8	252	1.0	2357	9.4	2184	8.7	25157	100.0
1990	16444	64.0	4216	16.4	208	0.8	2493	9.7	2338	9.1	25702	100.0
1991	15963	64.7	3974	16.1	193	0.8	2361	9.6	2187	8.9	24678	100.0
1992	16027	64.2	3943	15.8	186	0.7	2559	10.2	2254	9.0	24969	100.0
1993	15873	63.6	3728	14.9	150	0.6	2763	11.1	2459	9.8	24973	100.0
1994	15935	63.6	3738	14.9	175	0.7	2729	10.9	2494	9.9	25071	100.0
1995	16207	64.6	3672	14.6	151	0.6	2740	10.9	2318	9.2	25088	100.0
1996	16120	64.0	3781	15.0	144	0.6	2865	11.4	2283	9.1	25193	100.0
1997	15755	63.4	3535	14.2	122	0.5	3042	12.2	2414	9.7	24868	100.0
1998	15792	62.4	3449	13.6	145	0.6	3270	12.9	2636	10.4	25292	100.0
1999	15772	62.2	3529	13.9	148	0.6	3310	13.0	2618	10.3	25377	100.0
2000	15095	60.8	3300	13.3	142	0.6	3520	14.2	2760	11.1	24817	100.0
2001	14618	59.7	2998	12.2	113	0.5	3744	15.3	3022	12.3	24495	100.0
2002	14137	57.9	2999	12.3	94	0.4	4004	16.4	3162	13.0	24396	100.0
2003	13832	57.0	2830	11.7	109	0.4	4326	17.8	3178	13.1	24275	100.0
2004	13751	54.8	3143	12.5	90	0.4	4537	18.1	3591	14.3	25112	100.0
2005	14177	53.4	3260	12.3	100	0.4	5067	19.1	3921	14.8	26525	100.0
2006	15373	54.4	3548	12.6	97	0.3	5276	18.7	3960	14.0	28254	100.0
2007	15918	53.7	3907	13.2	111	0.4	5289	17.9	4404	14.9	29629	100.0
2008	15895	52.6	4135	13.7	136	0.4	5485	18.1	4580	15.2	30231	100.0
2009	16032	52.1	4353	14.2	127	0.4	5299	17.2	4937	16.1	30748	100.0
2010	15961	51.8	4410	14.3	107	0.3	5375	17.4	4982	16.2	30835	100.0
2011	16195	51.0	4646	14.6	127	0.4	5472	17.2	5294	16.7	31734	100.0

Extracted from Midwives' Notification System on 17 December 2013.

Table 113: Gender of Infants Born in WA, 1980-2011

Year	Gender of birth			
	Male		Female	
	No.	%	No.	%
1980	10671	51.3	10143	48.7
1981	11580	52.1	10641	47.9
1982	11473	51.2	10918	48.8
1983	11975	51.9	11097	48.1
1984	11860	51.6	11103	48.4
1985	11928	51.1	11429	48.9
1986*	12345	51.7	11541	48.3
1987*	12477	51.5	11726	48.4
1988*	12970	51.6	12185	48.4
1989	13041	51.1	12502	48.9
1990*	13416	51.6	12602	48.4
1991	12775	51.1	12233	48.9
1992*	13073	51.6	12248	48.4
1993*	13101	51.7	12233	48.3
1994*	13014	51.2	12403	48.8
1995*	13137	51.6	12302	48.3
1996*	13192	51.6	12390	48.4
1997*	13034	51.6	12231	48.4
1998	13095	51.0	12583	49.0
1999	13147	51.0	12623	49.0
2000	12768	50.6	12460	49.4
2001	12836	51.5	12105	48.5
2002	12617	50.9	12167	49.1
2003	12625	51.2	12052	48.8
2004	13059	51.2	12470	48.8
2005	13761	51.0	13217	49.0
2006*	14490	50.5	14173	49.4
2007	15459	51.4	14614	48.6
2008*	15634	51.0	15032	49.0
2009*	16062	51.5	15144	48.5
2010*	15935	51.0	15320	49.0
2011*	16563	51.5	15623	48.5

Extracted from Midwives' Notification System on 17 December 2013.

Values <5 are suppressed by not displaying infants of indeterminate gender nor totals of infants born each year.

\* indicate years where there were infants of indeterminate gender born.

## Appendix C: Notification of case attended form

Health Act (Notification by Midwife) Regulations Form 2

NOTIFICATION OF CASE ATTENDED

MR15

Surname _____ Unit _____ Record No. _____		Establishment _____ Ward _____	
Forenames _____ Birth date (Mother) _____		Marital status 1=never married 2=widowed 3=divorced 4=separated 5=married (incl. de facto) 6=unknown	
Address of usual residence Number and street _____ State _____ Post code _____		Ethnic status 1=Caucasian 2=Aboriginal/TSI Other _____	
Town or suburb _____ Height (whole cm) _____			
Maiden name _____ Telephone _____			
<b>PREGNANCY DETAILS</b>		<b>LABOUR DETAILS</b>	
<b>PREVIOUS PREGNANCIES:</b> Total number (excluding this pregnancy): _____ Previous pregnancy outcomes: - liveborn, now living _____ - liveborn, now dead _____ - stillborn _____ Previous caesarean section 1=yes 2=no _____ Caesarean last delivery 1=yes 2=no _____ Previous multiple births 1=yes 2=no _____		Onset of labour: _____ 1=spontaneous 2=induced 3=no labour Augmentation (labour has begun): 1 <input type="checkbox"/> none 2 <input type="checkbox"/> oxytocin 3 <input type="checkbox"/> prostaglandins 4 <input type="checkbox"/> artificial rupture of membranes 8 <input type="checkbox"/> other Induction (before labour began): 1 <input type="checkbox"/> none 2 <input type="checkbox"/> oxytocin 3 <input type="checkbox"/> prostaglandins 4 <input type="checkbox"/> artificial rupture of membranes 8 <input type="checkbox"/> other	
<b>THIS PREGNANCY:</b> Antenatal: _____ Estimated gestation weeks at first antenatal visit (excludes contact to test for pregnancy. None, use '98'; undetermined, use '99'; in 1 <sup>st</sup> incomplete week, use '00') Date of LMP: _____ This date certain 1=yes 2=no _____ Expected due date: _____ based on 1=clinical signs/dates 2=ultrasound <20 wks Smoking: Number of tobacco cigarettes usually smoked each day during first 20 weeks of pregnancy (none, use '000'; occasional or smoked <1, use '998'; undetermined, use '999') Number of tobacco cigarettes usually smoked each day after 20 weeks of pregnancy. (none, use '000'; occasional or smoked <1, use '998'; undetermined, use '999')		Analgesia (during labour): 1 <input type="checkbox"/> none 2 <input type="checkbox"/> nitrous oxide 3 <input type="checkbox"/> intra-muscular narcotics 4 <input type="checkbox"/> epidural/caudal 5 <input type="checkbox"/> spinal 7 <input type="checkbox"/> combined spinal/epidural 8 <input type="checkbox"/> other Duration of labour: 1 <sup>st</sup> stage (hour & min): _____ 2 <sup>nd</sup> stage (hour & min): _____	
Complications of pregnancy: 1 <input type="checkbox"/> threatened abortion (<20wks) 2 <input type="checkbox"/> threatened preterm labour (<37 wks) 3 <input type="checkbox"/> urinary tract infection 4 <input type="checkbox"/> pre-eclampsia 5 <input type="checkbox"/> Antepartum haemorrhage (APH) – placenta praevia 6 <input type="checkbox"/> APH – placental abruption 7 <input type="checkbox"/> APH – other 8 <input type="checkbox"/> pre-labour rupture of membranes 9 <input type="checkbox"/> gestational diabetes 10 <input type="checkbox"/> other (specify) _____		<b>DELIVERY DETAILS</b> Anaesthesia (during delivery): 1 <input type="checkbox"/> none 2 <input type="checkbox"/> local anaesthesia to perineum 3 <input type="checkbox"/> pudendal 4 <input type="checkbox"/> epidural/caudal 5 <input type="checkbox"/> spinal 6 <input type="checkbox"/> general 7 <input type="checkbox"/> combined spinal/epidural 8 <input type="checkbox"/> other Complications of labour and delivery (includes the reason for operative delivery): 1 <input type="checkbox"/> precipitate delivery 2 <input type="checkbox"/> fetal distress 3 <input type="checkbox"/> prolapsed cord 4 <input type="checkbox"/> cord tight around neck 5 <input type="checkbox"/> cephalopelvic disproportion 6 <input type="checkbox"/> PPH (≥500mls) 7 <input type="checkbox"/> retained placenta - manual removal 8 <input type="checkbox"/> persistent occipito posterior 9 <input type="checkbox"/> shoulder dystocia 10 <input type="checkbox"/> failure to progress ≤3cm 11 <input type="checkbox"/> failure to progress >3cm 12 <input type="checkbox"/> previous caesarean section 13 <input type="checkbox"/> other (specify) _____	
Medical conditions: 1 <input type="checkbox"/> essential hypertension 2 <input type="checkbox"/> pre-existing diabetes mellitus 3 <input type="checkbox"/> asthma 4 <input type="checkbox"/> genital herpes 8 <input type="checkbox"/> other (specify) _____		Perineal status: _____ 1=intact 2=1 <sup>st</sup> degree tear/vaginal tear 3=2 <sup>nd</sup> degree tear 4=3 <sup>rd</sup> degree tear 5=episiotomy 6=episiotomy plus tear 7= 4 <sup>th</sup> degree tear 8=other	
Procedure/treatments: 1 <input type="checkbox"/> fertility treatments (include drugs) 2 <input type="checkbox"/> cervical suture 3 <input type="checkbox"/> CVS/placental biopsy 4 <input type="checkbox"/> amniocentesis 5 <input type="checkbox"/> ultrasound 6 <input type="checkbox"/> CTG antepartum 7 <input type="checkbox"/> CTG intrapartum		<b>FORWARD FORM TO</b> Maternal & Child Health Unit Department of Health, Western Australia Reply Paid 70042 (Delivery to Locked Bag 52) Perth BC WA 6849 NB: Guidelines for completion of this form are available from the above address or the following email address BirthData@health.wa.gov.au or website www.health.wa.gov.au/publications/su/bjed_in dex/pl Perinatal_infant_maternal.cfm	
Intended place of birth at onset of labour: _____ 1=hospital 2=birth centre attached to hospital 3=birth centre free standing 4=home 8=other		<b>BABY DETAILS</b> (Please use a separate form for each baby) Adoption: 1=yes 2=no _____ Born before arrival: 1=yes 2=no _____ Birth date: _____ Birth time (24hr clock): _____ Plurality (number of babies this birth): _____ Birth order (specify this baby, eg, 1=1 <sup>st</sup> baby born, 2=2 <sup>nd</sup> baby born, etc): _____ Presentation: 1=vertex 2=breech 3=face 4=brow 8=other Method of birth: 1 <input type="checkbox"/> spontaneous 2 <input type="checkbox"/> vacuum successful 3 <input type="checkbox"/> vacuum unsuccessful 4 <input type="checkbox"/> forceps successful 5 <input type="checkbox"/> forceps unsuccessful 6 <input type="checkbox"/> breech (vaginal) 7 <input type="checkbox"/> elective caesarean 8 <input type="checkbox"/> emergency caesarean Accoucher(s): 1 <input type="checkbox"/> obstetrician 2 <input type="checkbox"/> other medical officer 3 <input type="checkbox"/> midwife 4 <input type="checkbox"/> student 5 <input type="checkbox"/> self/no attendant 8 <input type="checkbox"/> other Gender: 1=male 2=female 3=indeterminate _____ Status of baby at birth: 1=liveborn 2=stillborn (unspecified) 3= antepartum stillborn 4=intrapartum stillborn Infant weight (whole gram): _____ Length (whole cm): _____ Head circumference (whole cm): _____ Time to establish unassisted regular breathing (whole min): _____ Resuscitation: 1 <input type="checkbox"/> none 2 <input type="checkbox"/> suction only 3 <input type="checkbox"/> oxygen therapy only 4 <input type="checkbox"/> bag and mask (IPPR) 5 <input type="checkbox"/> endotracheal intubation 6 <input type="checkbox"/> ext. cardiac massage and ventilation 8 <input type="checkbox"/> other Apgar score: 1 minute _____ 5 minutes _____ Estimated gestation (whole weeks): _____ Birth defects (specify): _____ Birth trauma (specify): _____	
Midwife Name _____ Signature _____ Date _____ Reg. No. _____		<b>BABY SEPARATION DETAILS</b> Separation date: _____ Mode of separation: 1=transferred 8=died 9=discharged home Transferred to: (specify establishment code) _____ Special care: (includes Level 1; whole days only) _____ Coder ID: _____	



Delivering a **Healthy WA**