Council of Obstetric & Paediatric Mortality & Morbidity

Annual Report 2011

Department of Health and Human Services

Tasmania
Explore the possibilities

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Executive Summary

The members of the *Council of Obstetric & Paediatric Mortality & Morbidity* are pleased to present the Annual Report for the calendar year 2011.

A key aim of the Council's Annual Report is to provide epidemiological information on the women who gave birth to liveborn or stillborn babies in 2011, and on their children. Data are derived from the Perinatal Data System with the source of data being the Perinatal Data Collection Form that is completed by all maternity service providers in Tasmania.

The Annual Report includes the reports submitted by each subcommittee detailing relevant key trends arising during this year and recommendations based upon committee investigations and findings. Trends in reported perinatal and maternal statistics have been reported in Tasmania and compared with latest available national findings.

Key findings in the Annual Report for 2011 include:

Babies in 2011

- The number of livebirths recorded on the Perinatal Data System in 2011 was **6 289**, an increase of 193 (3.2 per cent) since 2010 (6 095). The total number of births including stillbirths was **6 323**.
- Males accounted for 51.7 per cent of births and females 48.3 per cent.
- There were 103 episodes of multiple births, including 103 sets of twins and no sets of triplets.
- The proportion of low birth weight babies (less than 2 500 grams) in Tasmania was 8.1 per cent**,** which is higher than national figures reported in 2010 (i.e., 6.2 per cent).
- 10.1 per cent of deliveries were preterm (less than 37 weeks gestation) compared to national figures reported in 2010 of 8.3 per cent.

Mothers in 2011

- 71.8 per cent of mothers were public patients and 27.7 per cent were private patients.
- 46.1 per cent of mothers were aged over 30 years; 6.1 per cent of mothers were under the age of 20 years, a higher proportion than the national average of 3.9 per cent in 2010.
- 40.4 per cent of mothers had their first baby and 33.6 per cent had their second baby.
- 4.7 per cent of mothers were identified as Aboriginal, Torres Strait Islands or Aboriginal & Torres Strait Islanders in Tasmania compared to 3.9 per cent nationally in 2010.
- 58.0 per cent of mothers had an unassisted vaginal delivery and 10.3 per cent had an instrumental delivery.
- 31.8 per cent of mothers gave birth by caesarean section (compared to 22.1 per cent in 2000).
- Of all women who gave birth and had caesarean section, 49.1 per cent were elective and 50.9 per cent were emergencies.
- 75.0 per cent of mothers were breastfeeding at maternal discharge.
- 17.1 per cent of mothers reported smoking during pregnancy with the rate for teenage mothers having reduced from previous years to 35.7 per cent.

- 9.5 per cent of mothers reported that they had consumed alcohol during pregnancy with the rate being greatest for older mothers aged between 35-39 years and older (10.8 per cent) while there was a significant reduction in proportion of pregnant women aged 40 years and over who reported to have consumed alcohol during their pregnancy in this year (8.4 per cent) compared to the previous year (16.5 per cent). For 2011, the proportion of mothers reporting consumption of alcohol during pregnancy was significantly higher for mothers who were reported as public patients (10.9 per cent) compared with private patients (5.9 per cent) with both groups showing a significantly reduced level of reported alcohol consumption during pregnancy in this year.

Perinatal and paediatric deaths at a glance

Table 1: Perinatal and paediatric deaths at a glance

Classification	Total number for 2011 (6 323)	Rate per 1 000 all births
Perinatal mortality	54	8.5
Stillbirths	34	5.4
Neonatal deaths	20	3.2
Total infant mortality (from 20 weeks gestation to 1 year)	29	4.6
Non-neonatal infant mortality (>28 days post delivery to 1 year)	9	1.4
Paediatric mortality	18	0.16*

** ABS figure for total no. of children <18 yrs for 2011 in Tasmania is estimated at 116 127 (ABS Cat no. 3101.0 Australian Demographic Statistics, Table 56, Estimated Resident Population by Single Year of Age, Tasmania, June 2011). Thus Paediatric Mortality is calculated by total deaths (>28 days and <18 years) divided by estimated total no. of children in Tasmania under 18 years of age.*

Perinatal deaths

The *Perinatal Mortality and Morbidity Sub-Committee* reviewed **54** deaths in 2011. Council recommends that only senior obstetric staff complete the National Perinatal Death Clinical Audit (NPDCA) tool when detailing circumstances around reported perinatal deaths and that all practitioner investigating the aetiology of perinatal deaths refer to the Perinatal Society of Australia and New Zealand (PSANZ) guidelines.

The perinatal autopsy rate could not be meaningfully provided this year due to the significant number of cases for which this status had not been recorded. As noted in recent reports, Council believes that a post mortem examination would be beneficial despite the process of giving consent for an autopsy being recognised as challenging for parents who have lost a baby in pregnancy. Council recommends that a senior member of the obstetric team counsel parents and encourage post-mortem examination of a perinatal death. The Council expects that all perinatal deaths will be reviewed by an obstetric and paediatric (where appropriate) audit in the relevant unit once all investigations have been completed.

As discussed in previous reports, Foetal Growth Restriction (FGR) is the largest factor involved in foetal deaths and its contribution has increased steadily since 2006. Council recommends that identification of antepartum haemorrhage and foetal growth restriction mandate a high level of antenatal care under a Specialist Obstetrician for the duration of the pregnancy and that all maternity care providers have well-established protocols in place and remain vigilant in the early detection and identification of growth restricted foetuses.

Almost sixty per cent of all foetal deaths occurred in the 20-24 week gestational age group with forty-five per cent having been a result of second trimester inductions of labour for major foetal abnormality. As has been noted previously, the performance of Level 2 ultrasound scanning occurs at about 20 weeks gestation. This timing result in induction of labour for major foetal anomalies detected at this scan due to the gestation being over 20 weeks.

As noted in previous years, maternal obesity can present challenges for pregnant women and is associated with multiple complications in pregnancy such as congenital anomalies (including spina bifida), pre-existing and gestational hypertension, diabetes, preterm birth, foetal death and an increased rate of caesarean section with a resulting risk of complications. As such, it is recommended that the community is informed of the risks associated with pregnancy and maternal obesity and that obese women take 5 mg rather than 400 micrograms of folic acid from preconception to 12 weeks gestation. It has also been recommended that for pregnant obese women, a repeat morphology scan be performed at 24 weeks gestation when the initial morphology scan is incomplete or suboptimal. Consideration should also be given to ultrasound assessment/monitoring of foetal size and growth when maternal habitus limits clinical assessment of foetal size and growth.

It was also recommended that surveillance of monochorionic twins be undertaken with reference to the RANZCOG guideline recommending 2-3 weekly scanning until 18 weeks gestation and then two weekly scans. The availability of tertiary units interstate such as Victoria, NSW and QLD which offer laser therapy for management of some complications of monochorionic twin pregnancies were also noted.

Tasmania's neonatal mortality rate in 2011 was 3.2 per 1 000, a figure on par with the national average. It was noted that in 2011 the survival for infants born prematurely at a gestation above 24 weeks remains on par with, or above, national averages and survival for babies at 23 and 24 weeks gestation in Tasmania remains relatively low, with an acknowledged high risk of long term disability in survivors at these gestations. It was further highlighted that these factors need to be taken into consideration in dealing with infants (*in* or *ex utero*) at 23-24 weeks, as outlined in the Tasmanian Neonatal Care Guidelines. The option of not offering resuscitation, particularly at 23 weeks gestation, should be carefully considered and discussed with families.

Other points of interest noted with regards to the reported neonatal deaths in 2011 included: (i) at gestations < 30 weeks, outcome for inborn infants is potentially better than those outborn, with a lesser rate of severe intraventricular haemorrhage; (ii) three deaths in the preterm group were related to the development of necrotizing enterocolitis (NEC), a serious bowel condition in premature infants that continues to occur, on occasions in clusters, even in exclusively breast fed preterm infants; (iii) a temporal association with blood transfusion and NEC has been noted in some cases; (iv) two deaths in term infants were related to hypoxic-ischaemic encephalopathy; vigilance for foetal compromise is paramount in prevention of this perinatal event.

Recommendations arising from the reviewed neonatal deaths in 2011 include the following:

- For infants less than 30 weeks, early *in utero* transfer of women threatening to deliver prematurely is much preferred over delivery in a regional centre. The opportunity to expedite transfer as soon as possible should not be missed. Birth at a tertiary centre without the need to post-natal transfer may improve the chance of survival, and reduce the risk of severe intraventricular haemorrhage.
- Preventative strategies should be put in place to avoid NEC in the most preterm infants. Given the latest evidence, the routine use of probiotics is warranted in preterm infants <32 weeks gestation. Additionally, infants receiving blood transfusions should undergo a period of fasting through the course of their transfusion. Both these measures have been put in place in the RHH NPICU in 2012-13.
- Vigilance for the onset of foetal compromise must be maintained in every pregnancy.

Maternal deaths

There were no maternal deaths (including any late maternal deaths) reported in Tasmania in 2011.

The *Maternal Mortality & Morbidity Subcommittee* continues to believe that cases of "near misses" are important to consider especially in terms of maternal morbidity issues and the need to manage such cases appropriately. The *Australian Maternity Outcomes Surveillance System (AMOSS): Improving the Safety and Quality of Maternity Care in Australia* continues to monitor serious maternal morbidity events. In view of the NH&MRC supporting this project for the first five years only, it is hoped that hospitals/states will, in the future, continue to support this system as part of their normal risk management framework.

In view of the current status of Perinatal Mental Health Services in Tasmania, Council recommends that there is increased funding allocated to this area to improve the currently deficient services in view of its importance in relation to morbidity issues and the need for COPMM to promote psychiatric/psychological morbidity.

Paediatric deaths

The *Paediatric Mortality and Morbidity Sub-Committee* noted that the number of paediatric deaths in Tasmania in 2011 was **18** (with an estimated paediatric mortality rate of 0.16 per 1 000 persons aged 0-17 years). This rate was statistically significantly lower ($p<0.001$) than the 2011 national paediatric mortality rate (estimated to be 0.38 per 1,000 persons aged 0-17 years).

The number of paediatric deaths in Tasmania reported in 2011 was significantly lower than figures reported in recent years. Paediatric death associated with road trauma continues to be highlighted however, even though only one paediatric death case was reported which involved the use of inadequate child car restraints. In particular, the use of a lap seat belt in this case again highlights that inherent risks associated with this form of car restraint. The Council firmly recommends that lap only seat belts not be used and that appropriate restraints are installed.

The reporting of a decreased number of sudden unexplained infant deaths in 2011 is heartening although the two cases that were found to be associated with clear risk factors including co-sleeping with parents again highlights the continued need to ensure that there is a consistent message about safe sleeping practices being conveyed to parents and the community. Again Council recommends the dangers of co-

sleeping particularly bed-sharing with adults and inclusion of unsafe bedding such as pillows in the infant's sleeping environment should continue to be clearly highlighted. One case was found to have had a viral upper respiratory tract infection and nasal obstruction prior to death which again was considered as presenting a contributory risk factor. The remaining two cases represented cases of true SIDS with no known risk factors having been identified.

Smoking and pregnancy

The overall proportion of mothers smoking during pregnancy in 2011 in Tasmania was 17.1 per cent which is significantly lower ($p<0.001$) than reported in Tasmania in previous years and becoming more comparable to rates in other States reported in 2010. While maternal smoking continues to be more prevalent among younger women; particularly those aged less than 20 years (35.7 per cent) and between 20-24 years (30.8 per cent), it is extremely encouraging to find that there is a statistically significant reduction ($p<0.016$) in mothers smoking during pregnancy in both of these age groups. In fact a reduction in smoking rates during pregnancy was noted across all reported age groups in this year. It is also encouraging to find that the percentage reported in 2011, for public patients, who smoked during pregnancy is significantly lower than that reported in the previous year ($p<0.001$).

The data have also confirmed the statistically significant ($p<0.001$) association between birth weight and smoking status during pregnancy, with a higher proportion of low birth weight babies born to mothers who smoked (12.9 per cent) compared to non-smoking mothers (5.0 per cent). Given the association between intrauterine growth restriction and stillbirth, methods to reduce maternal smoking need to particularly target our youngest mothers, if effective, may reduce the stillbirth rate.

Alcohol consumption and pregnancy

The electronic perinatal data collection system (*ObstetrixTas*) collects data regarding alcohol consumption during pregnancy. From the data available in 2011, the overall proportion of mothers consuming alcohol during pregnancy in Tasmania was 9.5 per cent, which was comparable to proportions reported in 2010 (9.2 per cent). Maternal alcohol consumption continues to appear to be more prevalent among older women, particularly those aged between 35-39 years (10.8 per cent), but significantly reduced in the 40 years and over group (8.4 per cent) in this year compared to 2010 (16.5 per cent). It also appeared that alcohol consumption during pregnancy was reported by a significantly reduced proportion of mothers who were private patients (5.9 per cent) compared with public patients (10.9 per cent). Alcohol consumption amongst private patients was significantly reduced compared to 2010 ($p<0.001$).

The data showed that 7.2 per cent of babies born to mothers who consumed alcohol during pregnancy were of low birth weight, compared to 6.3 per cent for mothers who did not consume alcohol during pregnancy. This difference was not statistically significant (p=0.398). NH&MRC has recently recommended that women should not consume alcohol during pregnancy, as there has been no safe level of alcohol consumption identified. Alcohol has been associated with intrauterine growth restriction, stillbirth and the foetus is susceptible to Foetal Alcohol Spectrum Disorders (FASD)[1]. In particular, Foetal Alcohol Syndrome (FAS) is known to produce deleterious effects during foetal development resulting in characteristic facial abnormalities, impaired growth and abnormal function or structure of the central nervous system. High level and/or frequent intake of alcohol in pregnancy increases the risk of miscarriage, stillbirth and premature birth.

Data Collection and Reporting

The statewide Electronic Perinatal Database known as *ObstetrixTas* was implemented in all public maternity hospitals throughout Tasmania in 2010 with the aim to provide users with a more streamlined process of data entry and extraction. Since the discovery of clear deficiencies in the system including missing separate stillbirth, neonatal death and congenital abnormality forms, Council has endeavoured to seek assistance from the Department to address these deficiencies. Council has also previously recommended the implementation of a Statewide Coordinator to improve the system by assisting in the process of troubleshooting and report generation as well as recommending that the necessary resources are made available to allow the perinatal data collection form to be completed electronically. The emergence of the National Perinatal Death Clinical Audit Tool and its ability to be completed electronically has provided a useful form to allow clinicians to complete comprehensive details for respective cases online. The Data Management Subcommittee of COPMM has sought advice as to whether this form could be incorporated into ObstetrixTas system to capture the necessary perinatal details as required under legislation. The Subcommittee also continues to discuss key issues regarding the preparation and structure of this and future Annual Reports as well as progressing the development of a more comprehensive Congenital Abnormality Register. Membership on this subcommittee includes representatives from the areas of obstetrics, paediatrics, midwifery, Chair of COPMM and representatives from the Health Statistics Unit, DHHS and Epidemiology Unit, Population Health DHHS.

Dr Michelle Williams

Chairperson – Council of Obstetric and Paediatric Mortality and Morbidity

[1] National Health and Medical Research Council (NHMRC) (2009), *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*, Canberra.

Disclaimer:

During the production of this report data anomalies may have arisen, however processes such as the undertaking of regular data audits have been established to minimise these anomalies.

Feedback:

A Feedback Form is provided at the end of this report inviting comments from readers on information presented. Please forward to the Executive, Services Quality and Improvement Unit, System Purchasing and Performance Division, 5th Floor, 24 Davey St. Hobart 7000. (Phone: 6233 4828).

Acknowledgments

The production of this Report relies on the assistance, willing co-operation and on-going support of numerous individuals and professional groups, which include:

- Members of the *Council of Obstetric and Paediatric Mortality and Morbidity*, and its sub-committees (*Paediatric Mortality & Morbidity, Maternal Mortality & Morbidity, Perinatal Mortality & Morbidity and Data Management*);
- System Purchasing and Performance, Service Quality and Improvement Unit, Department of Health and Human Services
- Department of Health & Human Services, Tasmania Epidemiology Unit, Population Health;
- Obstetricians, Paediatricians and Midwives working in all parts of Tasmania;
- The Department of Health and Human Services Tasmania (DHHS) for its commitment to and funding of COPMM and its activities;
- The State Coroner's Office and Staff;
- Statewide Forensic Medical Services;
- The Australian Bureau of Statistics;
- Births, Deaths and Marriages;
- Health Statistics, Service Purchasing and Performance Unit;
- Medical Record Departments and staff in all Tasmanian hospitals;
- Launceston General Hospital;
- North West Private Hospital;
- Mersey Community Hospital;
- North Eastern Soldiers Memorial Hospital (Scottsdale);
- Smithton District Hospital;
- Calvary Healthcare - Lenah Valley Campus;
- Royal Hobart Hospital; and
- The Hobart Private Hospital.

Obstetric and Paediatric Mortality and Morbidity Act 1994

The *Obstetric and Paediatric Mortality and Morbidity Act 1994* (the Act) establishes the Council of Obstetric and Paediatric Mortality and Morbidity (the Council). The functions of the Council include the maintenance of a perinatal data collection system, investigating the circumstances surrounding maternal deaths, perinatal deaths and the deaths of children up to 17 years; and investigating and reporting on matters relating to obstetric and paediatric mortality and morbidity referred to it by the Minister or Secretary.

The *Act* contains very strict confidentiality provisions such that the Council and its members are precluded from providing information to other persons except in very limited circumstances. Following its recent Amendment, the Act also enables the Council to:

- communicate to a coroner information relevant to a coronial inquiry or possible coronial inquiry into the death of a child or woman, of its own motion or at the request of the coroner;
- investigate and report to the Secretary or Minister (or any other relevant Minister) on any matter relating to obstetric and paediatric mortality and morbidity of its own motion without a reference from the Secretary or Minister;
- communicate information regarding identified deaths or morbidities to the Secretary, a relevant Minister or a prescribed body;
- have the power to place a restriction upon the subsequent use of any information or reports provided by the Council to a coroner, the Secretary, a Minister or a prescribed body;
- communicate information that comes into its possession to the Secretary where there is a belief or suspicion, on reasonable grounds, that a child has been or is being abused or neglected or is at risk of being abused or neglected;
- allow the Council to report information about possible criminal offences to the Commissioner of Police; and
- clarify the annual reporting requirements of the Council.

Definitions used by the Council

Abortion / Miscarriage: Spontaneous or medically induced termination of pregnancy before the foetus is viable (before 20 weeks gestation)

Low birthweight: An infant born weighing less than 2 500 grams

Very low birthweight: An infant born weighing less than 1 500 grams

Extremely low birthweight: An infant born weighing less than 1 000 grams

Infant death: A death, occurring within 1 year of birth in a liveborn infant whose birthweight was at least 400 grams, or at least of 20 weeks gestation if the birthweight was not known.

Paediatric death: A death, occurring in the age group from 29 days to 17 years (inclusive).

Late maternal death: means the death of a woman more than 42 days but less than one year after the cessation of pregnancy:

(a) resulting from an obstetric cause or another cause aggravated by an obstetric cause; and

(b) Irrespective of the duration of the pregnancy and the location of the foetus within the woman's body.

Maternal death: means the death of a woman while pregnant, or within 42 days after the cessation of pregnancy:

(a) from any cause related to, or aggravated by, the pregnancy or its management; and

(b) Irrespective of the duration of the pregnancy and the location of the foetus within the woman's body.

Neonatal death: A death occurring within 28 days of birth in an infant whose birthweight was at least 400 grams, or if the weight was not known, an infant born after at least 20 weeks of gestation.

Preterm: An infant with a gestational age of less than 37 completed weeks.

Sudden Infant Death Syndrome (SIDS): Sudden death of an infant under 1 year of age, which remains unexplained after a thorough case investigation including performance of a complete autopsy, examination of the death scene, and a review of the clinical history.[2] The term *Sudden Unexplained Death of an Infant* (SUDI) is now often used instead of *Sudden Infant Death Syndrome* (SIDS) because some coroners prefer to use the term 'undetermined' for a death previously considered to be SIDS.

[2] Willinger, M., James, L.S. & Catz, C (1991), Defining the Sudden Infant death Syndrome (SIDS): Deliberations of an Expert Panel convened by the National Institute of Child Health & Human Development. Paediatric Pathology 11:667-684, 1991

Stillbirth: A foetal death prior to the complete expulsion or extraction from its mother of a product of conception of 20 or more completed weeks of gestation or 400 grams or more birthweight; the death is indicated by the fact that after such separation the foetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles.[3]

Perinatal death: A death fulfilling the definition of either a stillbirth or neonatal death.

Supplementary Definitions[4]

Direct maternal death: This includes death of the mother resulting from obstetrical complications of pregnancy, labour, or the puerperium, and from interventions, omissions, incorrect treatment, or a chain of events resulting from any of these factors. An example is maternal death from exsanguination resulting from rupture of the uterus.

Indirect maternal death: This includes a maternal death not directly due to obstetrical causes, but resulting from previously existing disease, or a disease that developed during pregnancy, labour, or the puerperium, but which was aggravated by maternal physiological adaptation to pregnancy. An example is maternal death from complications of mitral stenosis.

Non maternal (incidental) death: Death of the mother resulting from accidental or incidental causes in no way related to the pregnancy may be classified as a non maternal death. An example is death from an automobile accident.

Maternal hypertension: Maternal blood pressure of > 140/90 mmHg.

Postpartum haemorrhage (PPH): Estimated blood loss of ≥ 500 ml after vaginal birth or ≥1 000 ml after caesarean delivery.

Antepartum haemorrhage (APH): Refers to uterine bleeding after 20 weeks of gestation unrelated to labour and delivery.

[3] Australian Institute of Health and Welfare (2005), Stillbirth (fetal death), Canberra, viewed August 2008, <http://meteor.aihw.gov.au/content/index.phtml/itemId/327266>.

[4] Definitions derived from 'Williams Obstetrics – 20th edition' by Cunningham MacDonald Gant Leveno Gilstrap Hankins Clark; Copyright 1997 & www.uptodate.com, viewed August 2008.

Members of the Council of Obstetric & Paediatric Mortality & Morbidity

Organisation	Membership 2011	Current membership as of June 2013*
Person nominated by the Secretary employed in delivery of Neonatal Services	Associate Professor Peter Dargaville (Chair)	Associate Prof Peter Dargaville
Nominee of the Paediatrics and Child Health Division of the Royal Australasian College of Physicians nominated by the Tasmanian State Committee of that College	Dr Michelle Williams	Dr Michelle Williams (Chair)
Nominees of the University of Tasmania (2)	Professor Allan Carmichael* Associate Professor Amanda Dennis	Associate Professor Amanda Dennis Dr Anagha Jayakar
Nominee of the Tasmanian Regional Committee of the Royal Australian & NZ College of Obstetricians and Gynaecologists	Dr James Brodribb	Dr James Brodribb
Person nominated by the Secretary employed in the Department of Health & Human Services	Ms Gina Butler	Dr Roscoe Taylor
Nominee of the Tasmanian Branch of the Royal Australian College of General Practitioners	Dr Thomas (Geoff) Shannon	Dr Jillian Camier
Nominee of the Tasmanian Branch of the Australian College of Midwives Inc.	Ms Elaine (Flo) Jensen	Ms Sue McBeath
Additional member nominated by Council to represent community interests	Ms Ros Escott Commissioner for Children- Ms Aileen Ashford	Ms Kate Cuthbertson Commissioner for Children- tba

* **Please note that the new 3-year term (2012-2015) commenced on 22 November 2012 with new membership reflected under "current membership". COPMM also wishes to again pay tribute to the significant contributions of Professor Allan Carmichael to Council since 1995 (noted Chair from 1995-2002) until his untimely death in January 2012.**

Members of Sub-Committees & support services

Name of Subcommittee	Membership in 2011	Current Membership as of June 2013
Maternal Mortality & Morbidity Subcommittee	Associate Professor Amanda Dennis (Chair) Dr James Brodribb Ms Elaine (Flo) Jensen Dr Jo Jordan (Manager, COPMM)	Associate Prof. Amanda Dennis (Chair) Dr James Brodribb Ms Sue McBeath Dr Jill Camier Dr Jo Jordan (Manager, COPMM)
Paediatric Mortality & Morbidity Subcommittee	Dr Michelle Williams (Chair) Dr Chris Lawrence Dr Thomas (Geoff) Shannon Dr Chris Williams Ms Liz O'Malley Ms Aileen Ashford (CfC) Dr Bert Shugg Mr Paul Mason Dr Jo Jordan (Manager, COPMM)	Dr Michelle Williams (Chair) Dr Chris Lawrence Dr Jillian Camier Dr Chris Williams CfC- (Interim) Mrs Elizabeth Daly Dr Jo Jordan (Manager, COPMM)
Perinatal Mortality & Morbidity Subcommittee	Assoc/Prof Peter Dargaville (Chair) Dr Tony DePaoli Dr James Brodribb Assoc/Prof Amanda Dennis Ms Elaine (Flo) Jensen Dr Jo Jordan (Manager, COPMM)	Assoc/Prof Peter Dargaville (Chair) Dr Tony De Paoli Dr James Brodribb Assoc/Prof Amanda Dennis Ms Sue McBeath Dr Jillian Camier Dr Jo Jordan (Manager, COPMM)
Data Management Subcommittee	Assoc/Prof Peter Dargaville (Chair) Dr Jamie Brodribb (RANZCOG rep) Dr Michelle Williams (RACP-Paediatric Rep) Mr Peter Mansfield (Health Statistics) Mr Michael Long (Epidemiology Unit, Population Health) Ms Peggy Tsang (Health Statistics) Dr Jo Jordan (Manager, COPMM)	Assoc/Prof Peter Dargaville (Chair) Dr Jamie Brodribb (RANZCOG rep) Dr Michelle Williams (RACP-Paediatric Rep) Mr Michael Long (Epidemiology Unit, Population Health) Dr Kelly Shaw (Specialist Medical Advisor-Public & Environmental Health Services) Mr Peter Mansfield (Health Statistics) Ms Peggy Tsang (Health Statistics) Dr Jo Jordan (Manager, COPMM)
National Perinatal Data Development Committee-Tasmanian representative	Mr Peter Mansfield	Mr Peter Mansfield
Executive	Dr Jo Jordan	Dr Jo Jordan
Support staff	Mr Peter Mansfield (SPP) Ms Peggy Tsang (SPP) Ms Diane Hickie (SPP) Ms Cynthia Rogers (SPP)	Mr Peter Mansfield (SPP) Ms Peggy Tsang (SPP) Ms Diane Hickie (SPP) Ms Cynthia Rogers (SPP)

Compilation of this 2011 Annual Report by:

Executive:	**Dr Jo Jordan (Service Quality and Improvement, DHHS)**
Support staff:	**Mr Peter Mansfield (System Purchasing and Performance Division)**
	Ms Peggy Tsang (System Purchasing and Performance Division)
	Ms Cynthia Rogers (System Purchasing and Performance Division)
	Mrs Diane Hickie (System Purchasing and Performance Division)

Committee reports

Perinatal Mortality & Morbidity Sub-Committee

The ABS definition of perinatal deaths includes all infants (both live and stillborn) who had a birth weight of at least 400 grams or where birth weight is unknown, a gestational age of at least 20 weeks.

There were **54** perinatal deaths in Tasmania who died in 2011. **Twenty** of these deaths were neonatal deaths (live born infants who did not live beyond 28 days of age) and **thirty-four** were stillbirths. The overall perinatal mortality rate was 8.5 per 1 000 births. The neonatal mortality rate was 3.2 per 1 000 births, with a stillbirth rate of 5.4 per 1 000 births.

The Australia and New Zealand Perinatal Mortality Classification was used to classify the perinatal deaths.

Table 2: Perinatal deaths for 2011

Cause of death	Number of deaths									
	2002	2003	2004	2005	2006*	2007*	2008*	2009*	2010	2011
Congenital anomalies	12	15	8	6	5+8	15+6	17+3	12+3	6+4	**9+5**
Perinatal infection	0	2	3	1	2	2+1	1+1	1+ 2	3+3	**1+0**
Hypertension	2	0	0	0	0+2	0	2+3	3	6+1	**0+0**
Antepartum haemorrhage	6	8	8	4	1+5	1+2	3+2	6+4	5+3	**4+6**
Maternal conditions	2	4	5	1	0+1	2	1	2	1+0	**1+0**
Specific perinatal conditions	7	4	3	9	1+6	6	4	7	1+0	**5+2**
Hypoxic peripartum death	5	1	4	3	0+4	2+2	3+2	1	1+0	**4+3**
Foetal Growth Restriction (FGR)	1	3	9	9	0+4	6	12	8	9+0	**5+1**
Spontaneous pre-term	19	19	10	10	4+6	3+6	6+3	2+6	5+13	**3+2**
Unexplained antepartum deaths	16	15	1	5	6	3	11	10	5+0	**2+0**
No obstetric antecedent	2	2	0	0	0	4	0	0	0+0	**0+1**
Birth trauma	1	0	0	0	0	0	1	0	0+0	**0+0**
Overlying	-	-	-	-	-	1	-	-	-	**0+0**
Total	**73**	**73**	**51**	**48**	**55**	**62**	**75**	**67**	**66**	**54**

** The + symbol indicates stillbirths plus neonatal deaths*

Basic information on stillbirths for 2011

There were **34** stillbirths for 2011 which remains at the second lowest number since 1997. The tables below show the breakdown by 1) gestation, 2) the Perinatal Society of Australia and New Zealand (PSANZ) classification used nationally, and 3) by gestation and PSANZ classification together.

Table 3: Gestation of stillbirth (number = 42)

Gestation (weeks)	2005 %	2006 %	2007 %	2008 %	2009 %	2010 %	2011	
							%	Number
20-24	48.8	38.1	63.7	45.8	46.2	31.0	**58.8**	**20**
25-29	7.7	11.9	6.8	16.3	5.8	23.8	**8.8**	**3**
30-34	17.9	23.8	6.8	11.5	13.5	21.4	**11.8**	**4**
35-39	17.9	21.4	15.9	21.6	34.6	19.0	**17.6**	**6**
40+	7.7	4.8	6.8	3.2	1.9	4.8	**2.9**	**1**

** Stillbirth rate is per 1 000 births at that gestation*

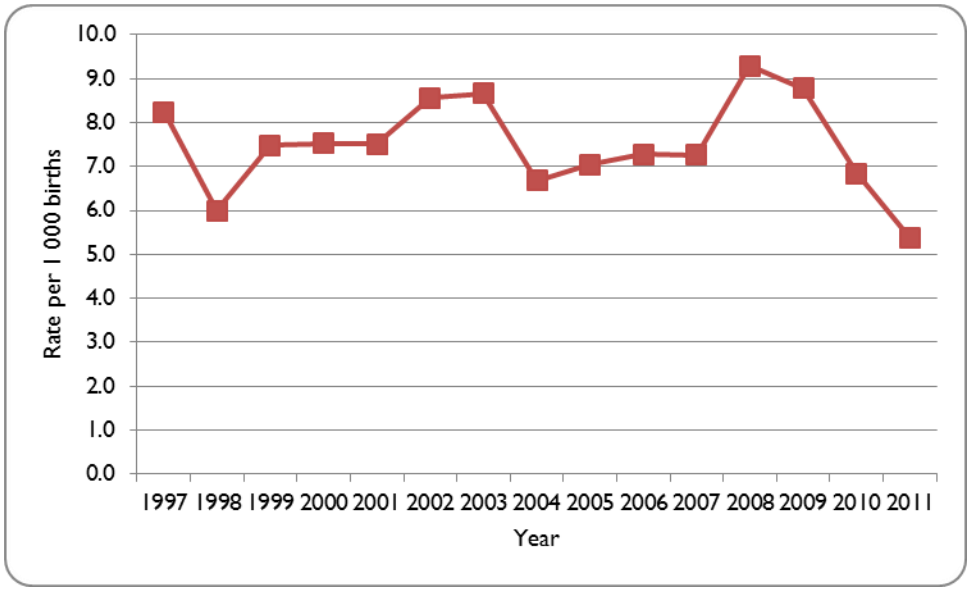
Table 4: Stillbirths by classification according to the Perinatal Society of Australia & New Zealand

Category	2005 %	2006 %	2007 %	2008 %	2009 %	2010 %	2011	
							%	Number
1 Congenital anomalies	12.8	19	31.8	27.8	23.1	**14.3**	**26.5**	**9**
2 Perinatal infection	0.0	0.0	0.6	1.6	1.9	**7.1**	**2.9**	**1**
3 Hypertension	0.0	4.7	0.0	3.2	5.8	**14.3**	**0**	**0**
4 Antepartum haemorrhage	10.3	11.9	2.3	4.9	11.5	**11.9**	**11.8**	**4**
5 Maternal conditions	2.3	2.4	6.8	1.6	3.8	**2.4**	**2.9**	**1**
6 Specific perinatal conditions	21.5	14.4	13.6	6.5	13.5	**2.4**	**11.8**	**5**
7 Hypoxic peripartum death	2.3	9.4	6.8	4.9	1.9	**2.4**	**11.8**	**4**
8 Foetal growth restriction (FGR)	23.1	9.4	13.6	19.6	15.4	**21.4**	**14.7**	**5**
9 Spontaneous preterm labour	13.4	14.4	6.8	9.8	3.8	**11.9**	**8.8**	**3**
10 Unexplained antepartum deaths	12.8	14.4	6.8	18.0	19.2	**11.9**	**5.9**	**2**
11 No obstetric antecedent	0.0	0.0	0.0	0.0	0.0	**0.0**	**0**	**0**
12 Birth trauma	0.0	0.0	6.8	1.6	0.0	**14.3**	**0**	**0**

Table 5: Number of Stillbirths by year and stillbirth rate (per 1000 births) 1997 to 2011

Year	No.	Births	Rate
1997	52	6 309	8.24
1998	37	6 171	5.99
1999	46	6 145	7.48
2000	45	5 975	7.53
2001	43	5 726	7.51
2002	49	5 714	8.56
2003	48	5 545	8.66
2004	37	5 540	6.68
2005	42	5 965	7.04
2006	45	6 184	7.28
2007	46	6 337	7.26
2008	60	6 461	9.29
2009	56	6 381	8.78
2010	42	6 137	6.84
2011	**34**	**6 323**	**5.38**

Figure 1: Stillbirth rate per 1 000 births for Tasmania 1997-2011



Classification by gestation period and PSANZ (2011) classification with brief description of essential details for each foetal death

20 to 24 weeks gestation (20 cases)

Category	Causes of stillbirth
1	Two foetal deaths with Neural Tube Defect; two foetal deaths with Trisomy 18; one foetal death with hypoplastic left heart; one foetal death with Trisomy 13; one foetal death with thanatophoric dwarfism; one foetal death with major CNS malformation; one foetal death with cystic hygroma with hydrops.
4	One foetal death due to placental abruption
6	Two foetal deaths of MC/DA twins with sudden acute polyhydramnios; one foetal death due to PPROM from possible cervical incompetence, then chorioamnionitis
7	One foetal death due to cord prolapse in preterm labour
8	Two foetal deaths due to unexplained foetal growth restriction; one foetal case due to foetal growth restriction with a cord stricture
9	Three foetal deaths due to APH with PPROM (and two cases had chorioamnionitis)

25 to 29 weeks gestation (3 cases)

Category	Causes of stillbirth
2	One foetal death from parvovirus infection
4	One foetal death from APH probably due to amphetamine use
8	One foetal death from foetal growth restriction with multiple congenital anomalies

30 to 34 weeks gestation (4 cases)

Category	Causes of stillbirth
6	One foetal death from a cord accident
4	One foetal death from an abruption
10	Two foetal deaths were unexplained in normally grown babies

35 to 39 weeks gestation (6 cases)

Category	Causes of stillbirth
5	One perinatal death in a poorly controlled diabetic with macrosomia and anti-M antibodies (likely IgM), mother had a sagittal sinus thrombosis and was on clexane with poor compliance
7	Two hypoxic foetal deaths,
8	One case with foetal growth restriction in DC/DA twin pregnancy in patient with Parry-Romberg syndrome
10	Two unexplained foetal deaths in normally grown babies

40+ weeks gestation (1 case)

Category	Causes of stillbirth
7	One unexplained hypoxic death in surviving twin where one twin was lost at 8 weeks

Discussion

1 This year has seen a significant drop in the number of unexplained foetal deaths. To a large extent this can probably be attributed to better provision of information to the reviewers by way of the National Perinatal Death Clinical Audit (NPDCA) tool. It has allowed a more detailed examination of the circumstances surrounding each individual death.

There appear to be four key factors that improve assessment:

a) The quality of information is greatly improved when provided by senior departmental staff. It has been found that in some cases the NPDCA tool had been completed by very junior medical staff or by midwives. It is apparent from requests for further information that senior obstetric staff members are better able to ascertain the relevance of certain important information much more readily.

b) Reviews at Perinatal Mortality and Morbidity meetings that result in the completion of the assessment component of the NPDCA tool also allow for greater insights by the reviewers, in regards to the causes for foetal demise.

c) Placental pathology has enabled a reclassification of cause of death in a number of cases. Council encourages all who deal with perinatal deaths and who investigate the aetiology to be aware of the Perinatal Society of Australia and New Zealand (PSANZ) guidelines for investigation of perinatal loss.[15] Placental pathology can often be a key factor in establishing the cause for a foetal death, and as such its inclusion is important.

d) Post-mortem examination. The Lancet Stillbirth Series[6] provides a very good overview of investigation and emphasises the inclusion of post-mortem information as part of the workup for a perinatal death. Post-mortem MRI can also be utilised, subject to its availability and access, and often helps to alleviate parental concerns about post-mortem examination. A senior member of the obstetric team should undertake counselling of parents regarding the need for post-mortem examination.

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[5] PSANZ Clinical Practice Guideline for Perinatal Mortality

http://www.psanz.com.au/special-interest/perinatal-mortality-group/psanzcpg

[6] Flenady V, Middleton P, Smith GC, Duke W, Erwich JJ, Khong TY, Neilson J, Ezzati M, Koopmans L, Ellwood D, Fretts R, Froen JF (2011) Stillbirths: the way forward in high-income countries, *The Lancet,* **377**(9778):1703-1717

2 Almost 60 per cent of all losses occurred in the 20-24 week gestational age group. Of these 45 per cent were second trimester inductions of labour for foetal abnormality. As has been noted before, the performance of Level 2 ultrasound scanning is now at about 20 weeks gestation. This has seen second trimester induction of labour for major foetal abnormality, by necessity, being performed after 20 weeks. Hence their inclusion in the perinatal data.

3 Antepartum haemorrhage and foetal growth restriction (FGR) remain the next most important causes for foetal loss. As such the identification of either of these clinical circumstances should mandate high level antenatal care under a Specialist Obstetrician for the duration of the pregnancy.

4 FGR has been shown[7] to be increased in association with smoking and a number of diseases. Unrecognised FGR markedly increases the risk of stillbirth. As such a concerted effort by maternity care givers to identify the growth restricted foetus is of paramount importance.

Recommendations on Stillbirths

a) That identification of antepartum haemorrhage and foetal growth restriction mandate a high level of antenatal care under a Specialist Obstetrician for the duration of the pregnancy.

b) That all maternity care providers have well-established protocols in place and remain vigilant in the early detection and identification of growth restricted foetuses.

c) That a senior member of the obstetric team counsel parents and encourage post-mortem examination of a perinatal death.

d) That only senior obstetric staff complete the National Perinatal Death Clinical Audit (NPDCA) tool when detailing circumstances around reported perinatal deaths.

e) That all practitioners investigating the aetiology of perinatal deaths refer to the Perinatal Society of Australia and New Zealand (PSANZ) guidelines.

f) That the community is informed of the risks associated with pregnancy and maternal obesity with maternal weight at conception having been found to contribute to multiple complications during pregnancy including spina bifida, pre-existing and gestational hypertension, diabetes both pre-gestational and gestational, preterm birth and foetal death etc.

g) That in obese mothers, a repeat morphology scan at 24 weeks gestation be performed when the initial morphology scan is incomplete or suboptimal to improve the opportunity to gain enhanced views of the foetus including foetal spine and heart.

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[7] Maternal and fetal risk factors for stillbirth: population based study. *BMJ 2013;* ***346****:f108* Jason Gardosi, director, professor of maternal and perinatal health, Vichithranie Madurasinghe, epidemiologist, Mandy Williams, research midwife, Asad Malik, data analysis, André Francis, statistician

h) That consideration should be given to ultrasound assessment/monitoring of foetal size and growth when maternal habitus limits clinical assessment of foetal size and growth.

i) That obese women take 5 mg rather than 400 micrograms of folic acid from preconception to 12 weeks gestation.

j) That surveillance of monochorionic twins be undertaken with reference to the RANZCOG guideline recommending 2-3 weekly scanning until 18 weeks and then 2 weekly where tertiary units interstate (i.e., Vic/NSW/QLD) which offer laser can be accessed as required.

Basic information on neonatal deaths for 2011

There were a total of **20** neonatal deaths.

Table 6: Neonatal deaths by classification according to the Perinatal Society of Australia & New Zealand

Category	2007 %	2008 %	2009 %	2010 %	2011	
					%	Number
1. Congenital anomalies	33.3	21.4	20.0	16.7	**25**	**5**
2. Perinatal infection	5.6	7.1	13.3	12.5	**0**	**0**
3. Hypertension	0.0	21.4	0.0	4.2	**0**	**0**
4. Antepartum haemorrhage	11.1	14.3	26.7	12.5	**30**	**6**
5. Maternal conditions	0.0	0.0	0.0	0.0	**0**	**0**
6. Specific perinatal conditions	0.0	0.0	0.0	0.0	**10**	**2**
7. Hypoxic peripartum death	11.1	14.3	0.0	0.0	**15**	**3**
8. Foetal growth restriction	0.0	0.0	0.0	0.0	**5**	**1**
9. Spontaneous preterm labour	33.3	21.4	40.0	54.2	**10**	**2**
10. Unexplained antepartum deaths	0.0	0.0	0.0	0.0	**0**	**0**
11. No obstetric antecedent	0.0	0.0	0.0	0.0	**5**	**1**
12. Birth trauma	0.0	0.0	0.0	0.0	**0**	**0**

CONGENITAL ABNORMALITIES

There were 5 neonatal deaths in Tasmania associated with a congenital abnormality. These included:

- Diaphragmatic hernia;
- Thanatophoric dysplasia;
- OEIS syndrome (omphalocoele exstrophy imperforate anus and spina bifida);
- Undiagnosed syndrome with foetal hydrops, short limbs and talipes; and
- Undiagnosed neuromuscular disorder.

PERINATAL INFECTION

There were no deaths related to peri-partum infection.

HYPERTENSION

There were no deaths related to pre-eclampsia or maternal hypertension.

ANTEPARTUM HAEMORRHAGE

There were 6 neonatal deaths preceded by antepartum haemorrhage. These included:

- One infant born at 23 weeks after antepartum haemorrhage due to placental abruption, not resuscitated;
- One infant born at 24 weeks after unexplained antepartum haemorrhage, not resuscitated;
- Twins at 25 weeks born after unexplained antepartum haemorrhage, both of whom developed fulminant necrotizing enterocolitis and died;
- Singleton at 25 weeks, born after placental abruption, died with hypoxic-ischaemic encephalopathy; and
- One infant born at 28 weeks after antepartum haemorrhage due to placenta praevia, and developed severe intraventricular haemorrhage.

UTERINE ABNORMALITIES

There were 2 neonatal deaths related to uterine abnormalities. These included:

- One infant born at 21 weeks after cervical incompetence;
- One infant born at 25 weeks in the setting of bicornuate uterus and spontaneous preterm labour.

HYPOXIC PERIPARTUM DEATH

There were 3 neonatal deaths related to hypoxic-ischaemic encephalopathy. These included:

- One infant born at 25 weeks gestation with evidence of hypoxia-ischaemia;
- One infant born at 39 weeks gestation with probable hypoxic-ischaemic encephalopathy; and
- One infant born at 41 weeks gestation with hypoxic-ischaemic encephalopathy and meconium aspiration syndrome.

SPONTANEOUS PRE-TERM

There were 2 neonatal deaths associated with spontaneous preterm labour. These included:

- One infant born at 25 weeks gestation, who developed respiratory failure; and
- The second of twins at 25 weeks gestation, who died with necrotizing enterocolitis and intracranial haemorrhage.

NO OBSTETRIC ANTECEDENT

There was one sudden unexplained infant death at 25 days in a previously well infant. Co-sleeping was a recognised contributing factor.

Issues:

The review of neonatal mortality identified the following issues:

- Tasmania's neonatal mortality rate in 2011 was 3.2 per 1 000, a figure on par with the national average. Survival for infants born prematurely at a gestation above 24 weeks remains on par with, or above, national averages.
- Survival for babies at 23 and 24 weeks gestation in Tasmania remains relatively low, and there is an acknowledged high risk of long term disability in survivors at these gestations. These factors need to be taken into consideration in dealing with infants (*in* or *ex utero*) at 23-24 weeks, as outlined in the Tasmanian Neonatal Care Guidelines. The option of not offering resuscitation, particularly at 23 weeks, should be carefully considered and discussed.
- At gestations < 30 weeks, outcome for inborn infants is potentially better than those outborn, with a lesser rate of severe intraventricular haemorrhage.
- Three deaths in the preterm group were related to the development of necrotizing enterocolitis (NEC), a serious bowel condition in premature infants that continues to occur, on occasions in clusters, even in exclusively breast fed preterm infants. A temporal association with blood transfusion has been noted in some cases.
- Two deaths in term infants were related to hypoxic-ischaemic encephalopathy. Vigilance for foetal compromise is paramount in prevention of this perinatal event.

Recommendations on neonatal deaths:

1. For infants less than 30 weeks, early *in utero* transfer of women threatening to deliver prematurely is much preferred over delivery in a regional centre. The opportunity to expedite transfer as soon as possible should not be missed. Birth at a tertiary centre without the need to post-natal transfer may improve the chance of survival, and reduce the risk of severe intraventricular haemorrhage.
2. Preventative strategies should be put in place to avoid NEC in the most preterm infants. Given the latest evidence, the routine use of probiotics is warranted in preterm infants <32 weeks gestation. Additionally, infants receiving blood transfusions should undergo a period of fasting through the course of their transfusion. Both these measures have been put in place in the RHH NPICU in 2012-13.
3. Vigilance for the onset of foetal compromise must be maintained in every pregnancy.

Paediatric Mortality & Morbidity Sub-Committee

Paediatric Deaths for 2011

The Council's Terms of Reference in relation to paediatric mortality and as specified under the updated *Obstetric and Paediatric Mortality and Morbidity Act, 1994* are:

> *To investigate the circumstances surrounding, and the conditions that may have caused deaths of children in Tasmania in the age group from 29 days to 17 years.*

The total number of paediatric deaths in Tasmania during 2011 was **18**, with an estimated paediatric mortality rate of 0.16 per 1 000 persons aged 0-17 years. Due to the relatively small number of paediatric deaths, paediatric mortality is classified using a broad four category classification system. Deaths are classified as being due to a condition determined at birth, an acquired condition, a sudden unexplained infant death (SUDI) or due to an injury.

A decrease in the total number of deaths due to sudden unexplained infant deaths was noted in 2011. Child protection status reflects the following factors: whether a notification to child protection services had been made; whether the notification had been substantiated in the last 3 years and/or whether the case had been placed on orders prior to death. This more comprehensive information is now tracked for paediatric death cases reported for Tasmania. The total number of children who had been notified to child protection services prior to the death of the reported child in 2011 for all categories was two. Noting the child protection status in this report does not necessarily imply that protective concerns were implicated in the cause of death. None of the two cases had been substantiated in the last 3 years. Paediatric deaths for the years 2001 to 2011 have been classified below.

Table 7: Paediatric Deaths for 2011

Cause of Death	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Conditions determined at birth	3	3	7	1	5	4	7	8	11	7	5
Acquired conditions	8	8	5	3	7	5	6	3	8	10	4
Unexplained Infant Deaths	8	2	2	4	4	5	3	5	3	7	5
Injuries	4	12	4	10	8	20	7	7	14	12	3
Unknown/Indeterminate	2	1	1	0	1	1	0	1	0	0	1
Still under investigation	-	-	-	-	-	-	-	-	-	1	-
TOTAL	26	27	21	18	25	35	25	24	36	37	**18**

Table 8: Type of Injury leading to Paediatric Death in year 2011

Type of Injury	Total No.
Motor Vehicle Accident (MVA)	1
Drowning	1
Hanging	1

1. CONDITIONS DETERMINED AT BIRTH

In 2011, there were 5 reported paediatric death cases in this category, the causes of which were:

- Epilepsy, intractable seizure; congenital neonatal epileptic encephalopathy (age 7 months).
- Cerebral palsy with spastic tetraplegia; intellectual disability; epilepsy; translocation chromosomes 8 & 9 (age 15 years).
- Cardiac arrest; hypoxia; seizures; generalised seizure disorder; congenital abnormality with brain development abnormality and seizures that were poorly controlled (age 14 years).
- Twin cases with Spinal Muscular Atrophy Type 1 (age 2.5 months).

2. ACQUIRED CONDITIONS

In 2011 there were 4 deaths in children ranging from 1 month to 10 years. These included:

- One case due to aspiration; spastic cerebral palsy; hydranencephaly (age 10 years).
- One case due to respiratory failure due to pulmonary infection; aspiration pneumonia; severe neurological dysfunction and severe spastic quadriparesis (age 5 years).
- One case due to extreme prematurity and necrotising enterocolitis (age 1 month).
- One case due to Pilocytic Astrocytoma (age 6 years).

3. UNEXPLAINED INFANT DEATH

In 2011, five paediatric 'unexplained infant deaths' were reported in infants aged from 1 month to 5 months. Two of these cases were found to be associated with clear risk factors which had been primarily attributed to risk factors such as an unsafe sleeping environment, especially co-sleeping (bed sharing) with a parent or unsafe bedding and in one instance evidence of alcohol use by parents. Another case was found to have had a viral infection that was considered to place the infant at risk. The remaining two cases represented cases of true SIDS particularly in view of no clear risk factors having been involved.

Investigation of these cases found that a:

- 5 month old female and a 1.5 month old female died as a result of sudden unexplained infant death in infancy where no risk factors had been identified.
- 1 month old male and a 1.5 month old female died of SUDI where co-sleeping with parents had been identified as a risk factor. Alcohol was also found to be present in sleeping environment in the latter case.
- 3 month old male died of SUDI where this baby had been born prematurely and was found to have had a viral upper respiratory tract infection and nasal obstruction in days prior to death. This viral infection was identified as a risk factor.

- In the *2010 Annual Report: Deaths of Children and Young People, Queensland, 2010-11* where an interstate comparison of national child death statistics was undertaken including jurisdictions QLD, NSW, SA, VIC, NZ and Tas, it was found that Tasmania recorded the highest rate of unexplained

infant deaths (113.1 per 100 000 infants) followed by South Australia (71.9 per 100 000) in this 2010 calendar year[8]. It has been noted however that caution must be exercised when comparing these jurisdictional rates since although the rates are based on a population rather than a sample, common practice is to consider death a random event, and hence have an associated sampling error. This is particularly important when comparing rates from low numbers. Current methodology calculates the crude rates for 2010, and should not be used to infer the general probability of death for specific cohorts.

- Overall, the number of infant (less than 1 year old) deaths in Australia in 2011 where the cause of death was ill-defined or unknown was 125 or a rate of 0.4 deaths per 1 000 livebirths where this number/rate includes deaths due to Sudden Infant Death Syndrome[9].

4. INJURY

A significant decrease in the reported number of children dying as a result of injury was reported in 2011 compared to 2010 figures with a total of two paediatric death cases having been reviewed.

Only one of the cases was as a result of injuries sustained in road trauma where the toddler was a rear seat passenger who was wearing only a lap seat belt and subsequently partially thrown upon impact. This case clearly demonstrates the risks involved with poor use of car restraints for young children.

One adolescent male died as a result of accidental drowning as a result of jumping off a bridge following consumption of alcohol.

One adolescent female died as a result of injury caused by hanging.

The first two cases listed in this category had been known to child protection services.

5. CASES STILL UNDER INVESTIGATION

Nil.

6. UNKNOWN/INDETERMINATE

There was one paediatric death case reported in 2011 where it was agreed that the adolescent had drowned in a bath but with possible cardiac arrhythmia. Following the review of this case with suspected cardiac arrhythmia, it was recommended that the relevant GP be contacted to alert the family of this paediatric case to seek follow-up of members with a cardiologist.

Summary:

The number of paediatric deaths in Tasmania reported in 2011 was the lowest since figures reported in 2004.

Paediatric death associated with road trauma is a modifiable risk factor particularly with regards to appropriate use of restraints for young children. The issue of risks of using lap seat belts rather than

8 **Annual Report: Deaths of children and young people, Queensland, 2011-12, Part VII: National child death statistics: An interstate comparison, 2010 calendar year, Chapter 10,**

9 **Australian Bureau of Statistics; 3303.0 Causes of Death, Australia, 2011**

harnesses for young children was particularly highlighted by the paediatric death case reported in this year. It is encouraging to note the recent work of NHMRC in collaboration with *Neuroscience Research Australia and Kidsafe Australia*, where draft Guidelines are being prepared to provide the first third party public health guidelines approved by NHMRC. The draft *Best Practice Guidelines on the Safe Restraint of Children Travelling in Cars* will not provide clinical guidelines but rather a public health guideline. Public consultation was sought as part of the development of these guidelines.

In the 2010 *Annual Report: Deaths of Children and Young People, Queensland, 2011-12* where an interstate comparison of national child death statistics including jurisdictions QLD, NSW, VIC, SA, Tas was undertaken, it was found that Tasmania had the highest rate of death overall (52.2 deaths per 100,000) as well as the highest rate of death from suicide (3.4 deaths per 100,000) in 2010. It has been noted however that caution must be exercised when comparing Tasmanian and other jurisdictional data as rates derived from low population numbers (as for Tasmania) are relatively imprecise.

It was heartening to find that there was a lower number of sudden unexplained infant deaths (SUDI) reported in 2011 compared with the previous year. However, the fact that deaths associated with risk factors for SUDI continue to occur highlights the need to ensure that parents and the community receive a consistent message about safe sleeping practices. In particular, the dangers of co-sleeping particularly bed-sharing with adults, particularly those who have consumed alcohol or other drugs should continue to be clearly highlighted. Despite these risk factors, it is noted that unsafe sleeping practices of co-sleeping with adults had only been reported in two of the five cases with other risk factors associated with viral respiratory tract infection having attributed to the other reported case of unexplained infant deaths with risk factors. The remaining two cases represented cases of true SIDS with no known risk factors having been identified.

Recommendations:

1. That the community continue to be alerted to risks associated with unsatisfactory restraint of children as passengers in moving vehicles and encouraged to ensure that all children are safely restrained with seatbelts when travelling in motor vehicles and preferably seated in the rear of the car.
2. That age, height and weight restrictions for children sitting in the front of a motor vehicle should be better defined and that children should not ride in motor vehicles as front seat passengers based on height/weight guidelines as well as age restrictions.
3. That children should not wear lap belts whilst travelling as passengers in a motor vehicle. As reported in previous years, the benefits of young children wearing harnesses with and without booster seats has been highlighted.
4. That a clear and consistent message is used as part of the universal distribution of educational material concerning safe sleeping practices to all new parents. It is also recommended that further education packages are provided to parents highlighting the risks associated with parental use of illegal and prescribed drugs and co-sleeping. As highlighted in previous reports, it is also

recommended that more effective crime or death scene examinations be undertaken to establish whether the cause of death is due to overlying [10].

5. That infants who have been born prematurely and are known to have viral infections should be closely monitored.

6. That a classification system is introduced in Tasmania to sub-categorise suspected cases of youth suicide from other paediatric death cases when death has been a result of injury. Classification systems used nationally are being considered with a view to utilise a nationally comparable classification system.

7. The *Paediatric Mortality & Morbidity Subcommittee* strongly supports the recommendations made by Coroner McTaggart with regards to youth suicide. To young persons whose friends have told them they are thinking about suicide, the Coroner recommends that (1) The statement is to be taken seriously; (2) Do not keep it a secret, even if your friend has asked you to; (3) tell a teacher or counsellor as soon as possible about what your friend has told you; and (4) encourage your friend to seek help from a trusted adult such as a counsellor or to call a helpline. The Coroner offers two websites providing advice and important helpline numbers for young persons considering suicide as well as for young people whose friends have spoken to them about wanting to take their own lives. Websites are ***au.reachout.com*** (Reach Out Australia) and www.youthbeyondblue.com (Youth Beyond Blue).

8. That children wear helmets when bicycling and ensure that their bicycles are properly maintained and serviced.

10 **Li, L., Zhang, Y., Zielke, R.R., Ping,Y., and Fowler, D.R. (2009). Observations on Increased Accidental Asphyxia Deaths in Infancy while Co-sleeping in the State of Maryland. *American Journal of Forensic Medical Pathology*. Vol.30, No.4, pp. 318-321.**

Maternal Mortality & Morbidity Sub-Committee

Maternal deaths for 2011

In terms of classification of maternal deaths there are three distinct classifications utilised and recognised by the World Health Organisation (WHO). These include ***direct***, ***indirect*** and ***non-maternal (incidental) death***. These classifications have been specified earlier in the Report.

Council is pleased to report that there were no maternal deaths reported in Tasmania in 2011.

Despite no deaths having been reported in this year, Council however wishes to advise that potential risks and near misses are still important to be made aware of and as such clinicians should be alerted to these so as to ensure that morbidity remains at a minimum thus reducing maternal mortality. Appropriate management of significant maternal morbidity issues is important and the establishment of the *Australian Maternity Outcomes Surveillance System (AMOSS): Improving the Safety and Quality of Maternity Care in Australia* has provided a significant step in initiating a comprehensive study of serious maternal morbidity events considered to contribute significantly to maternal morbidity in Australia. The System undertakes active surveillance and epidemiological research of selected obstetric conditions with the aim of improving the knowledge of rare obstetric disorders and their management in Australia, providing evidence-based data for; clinical guideline development, educational resources and ongoing national perinatal research. While the NH&MRC will support this project for the first five years, it is hoped that hospitals/states will, in the future, continue to support this system as part of their normal risk management framework.

All six main providers of birthing services in Tasmania (i.e., RHH, HPH, Calvary Health, LGH, Mersey Community and North West Private) are participating in AMOSS with data collection being initially based on six morbid events. Additional maternal morbid events as determined by an Advisory Group will be included as part of future data collections. The AMOSS website became operational at the end of July 2009 http://www.npsu.unsw.edu.au/NPSUweb.nsf/page/AMOSS.

While the NH&MRC will support this project for the first five years, it is hoped that hospitals/states will, in the future, continue to support this system as part of their normal risk management framework.

Recommendations:

That Perinatal Mental Health Services in Tasmania should have increased funding to improve the currently deficient services in view of its importance in relation to morbidity issues and the need for COPMM to promote psychiatric/psychological morbidity.

Data Management Sub-Committee

Membership of the Data Management Sub-Committee includes representatives derived from obstetric, paediatric, midwifery, Health Statistics and Epidemiology Unit, Population Health areas with Associate Professor Peter Dargaville agreeing to Chair this subcommittee. The subcommittee continues to meet regularly to progress discussions around formatting and preparation of future Annual Reports as well as the Electronic Perinatal Database (*ObstetrixTas System*) and development of a more comprehensive Congenital Abnormality Register for Tasmania.

The following activities have continued to be progressed in 2011 and beyond:

Data collection form:

The *National Perinatal Death Clinical Audit Tool* (NPDCAT) has been adopted as the form of choice to collect detailed information on reported stillbirths and neonatal deaths in view of the current lack of stillbirth and neonatal death forms on the *ObstetrixTas* system. It is hoped that this form will be incorporated into the *ObstetrixTas* system as a priority. All Tasmanian hospitals (including all public and NWPH) are now using this tool to complete details around reported perinatal deaths where Council urges that only the attending medical practitioner/specialist completes the NPDCA form in respect to their reported perinatal mortality case.

National interest in the development of a national database for congenital anomalies has previously been reported. Council continues to explore the issue of developing a more comprehensive Congenital Abnormality Register for Tasmania with a view to finally incorporate into the *ObstetrixTas* system in the future. The developmental process will include securing a definition for the register's upper age limit and reportable key abnormalities, investigation of the type of coding information that can be consistently extracted from hospitals; identification of other possible data sources for reporting of abnormalities and investigation of avenues for increasing the responsibility of reporting and notification.

The new Tasmanian Perinatal Data Collection Form was implemented in January 2013 and is to be completed by all services that do not have access to the *ObstetrixTas* system (i.e., private hospitals and birth centres where the birth occurs; or private midwifery and medical practitioners who deliver babies outside hospitals). Completion of this form is a mandatory requirement for data collection under the *OPMM 1994 Act*. A copy of this form and associated guidelines can be accessed via COPMM's website.

Progress in database:

The development and establishment of a statewide Electronic Perinatal Database known as *ObstetrixTas* was implemented in all statewide public maternity hospitals in 2010 to provide obstetric units with access to clinical information for management, planning, teaching and research purposes. The database is the repository of information for the perinatal data system with the aim to eliminate the need for a hand written perinatal data form and improving the timeliness, completeness and accuracy of information reported from the system. Council hopes that the NPDCAT and Congenital Abnormality Register for Tasmania are incorporated into *ObstetrixTas* as a priority.

Review the structure of the Annual Report

The 2011 report format continues to be refined as required to ensure a more effective format for clearer presentation of data. The role of the Data Management subcommittee provides opportunities to discuss and revise formatting issues as required.

Perinatal statistics

Births and birth rates

Table 9: *Livebirths* and birth rates in Tasmania 2005-2011

Year	Number of live births	Birth rate per 1000 population	Number of total births
2005	5 923	12.2	5 965
2006	6 139	12.5	6 184
2007	6 291	12.8	6 337
2008	6 401	12.9	6 461
2009	6 325	12.6	6 381
2010*	6 095	12.0	6 137
2011*	**6 289**	**12.3**	**6 323**

NB: Australian Bureau of Statistics estimates Tasmania's population 511 195 in December 2011 (Australian Bureau of Statistics June 2012, 3101.0 - Australian Demographic Statistics). Please note this estimation of population is a preliminary figure only and is subject to change.

* **Livebirths -** Births as per ObsterixTas system and available Perinatal Data Forms provided by maternity units and maternity service providers.

Over the period 2005-2008 the number of births, and birth rate, rose steadily, with a statistically significant annual rate of increase ($p=0.001$), but then gradually fell until 2010 (statistically significant annual decrease, $p<0.001$). Whilst the number of births in 2011 has increased since 2010, the difference was not statistically significant ($p>0.05$); more years of data would be required to determine whether the birth rate is again increasing.

Figure 2: Birth rate for Tasmania per 1 000 head of population 2005-2011

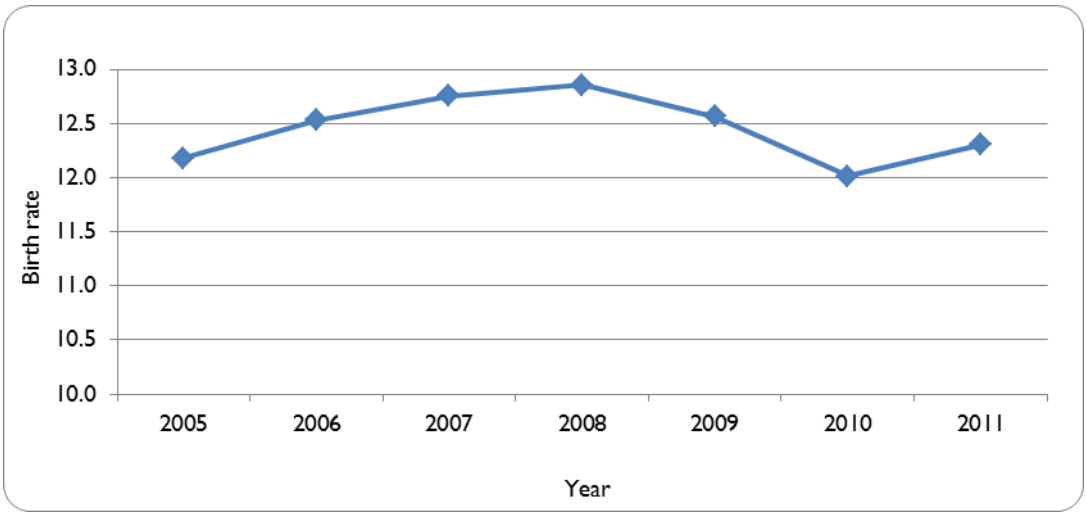


Table 10: Livebirths by region 2005-2011

Year	South	North	Northwest	Total
2005	3 006	1 625	1 292	**5 923**
2006	3 068	1 705	1 364	**6 137**
2007	3 178	1 709	1 398	**6 285**
2008	3 203	1 769	1 426	**6 398**
2009	3 180	1 721	1 416	**6 317**
2010	3 117	1 654	1 320	**6 091**
2011	**3 197**	**1 767**	**1 318**	**6 282**

Note: Some interstate not included

An increase in the number of births was reported in the Southern and Northern regions of Tasmania in 2011 with the Northern region reporting the greatest increase (6.8 per cent) in this year since 2010 followed by the Southern region (2.6 per cent). By contrast, the Northwest region reported a very slight decrease in this year (0.2 per cent) over the same period.

Table 11: Livebirths by hospital 2005-2011

Year	Royal Hobart (QAH)	Launceston General (QVH)	District hospitals	Mersey Community	Private hospitals†	Others (including homebirths)	Total
2005	1 829	1 570	37	493	1 926	68	**5 923**
2006	1 910	1 630	47	547	1 956	49	**6 139**
2007	2 017	1 606	44	537	2 033	54	**6 291**
2008	2 032	1 671	46	500	2 089	63	**6 401**
2009	1 971	1 668	26	476	2 129	55	**6 325**
2010	1 955	1 577	25	407	2 090	41*	**6 095**
2011	1 992	1 694	26	425	2 120	32	**6 289**

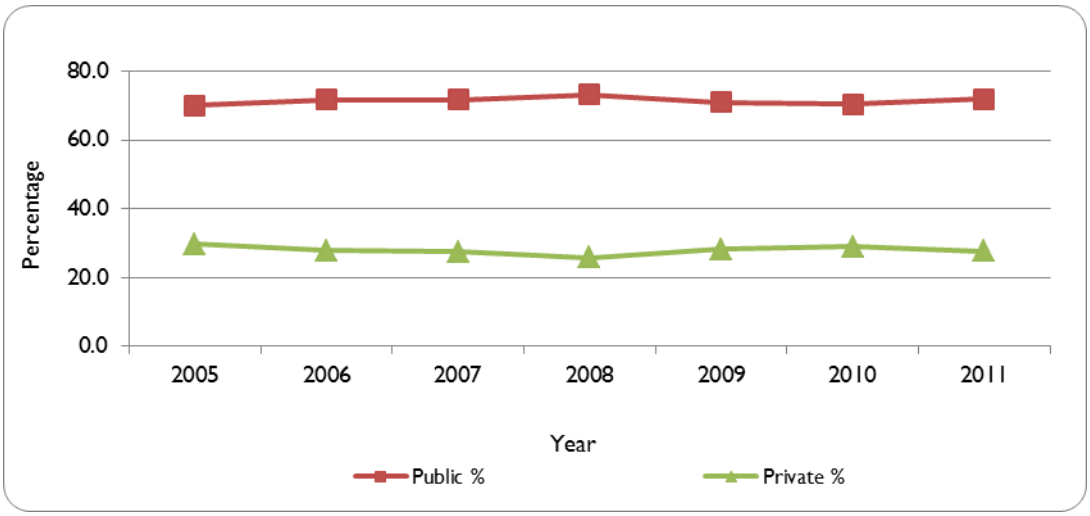
† includes for some years public patients at the North West Private Hospital.

* Includes one birth occurred at the North West Regional Hospital.

Table 12: Proportion of women who gave birth by admitted patient election status 2005-2011

Year	Public %	Private %	Not stated %
2005	70.0	29.6	0.5
2006	71.6	27.7	0.7
2007	71.8	27.4	0.8
2008	73.2	25.8	1.0
2009	71.0	28.1	0.9
2010	70.3	29.0	0.7
2011	**71.8**	**27.7**	**0.5**

Figure 3: Proportion of women who gave birth by admitted patient election status 2005-2011



Note: "Public" and "Private" is classified by the mother's elected accommodation chargeable status upon admission to hospital - thus a patient in a public hospital can elect to be treated as a private patient.

In Tasmania, the proportion of private patients (27.7 per cent) was slightly lower ($p>0.05$) in 2011 than reported in the previous couple of years in Tasmania, and also lower than the 2010 national value (29.9 per cent). Conversely, the proportion of public patients (71.8 per cent) in Tasmania in 2011 was slightly higher than recently reported in Tasmania and reported nationally in 2010 (70.1 per cent).

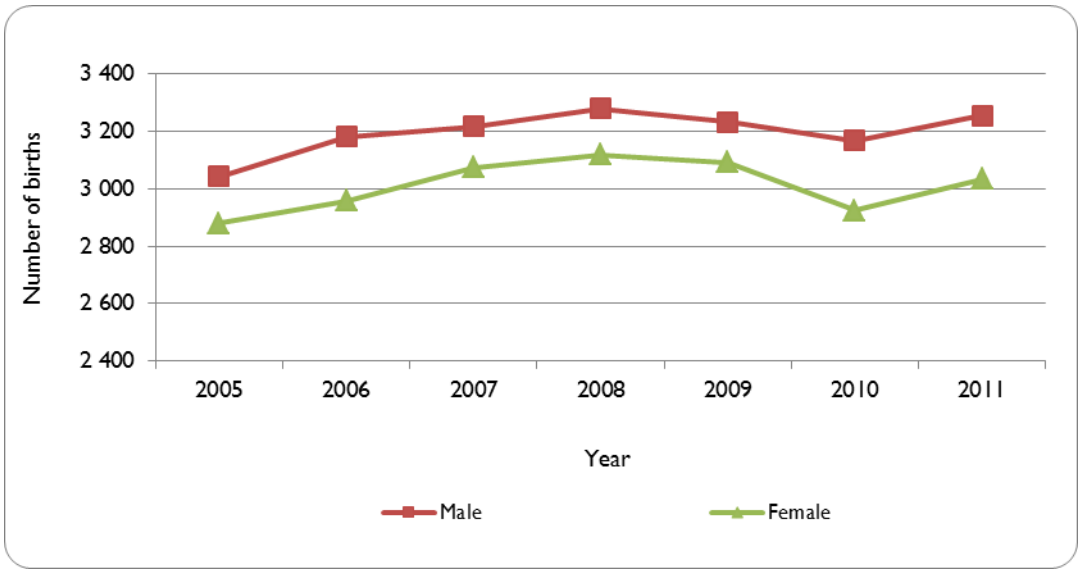
Sex of infants

Table 13: Livebirths by sex 2005-2011

Year	Male		Female		Indeterminate		Total
	Number	%	Number	%	Number	%	Number
2005	3 043	51.4	2 880	48.6	0	^	**5 923**
2006	3 181	51.8	2 958	48.2	0	^	**6 139**
2007	3 216	51.1	3 075	48.9	0	^	**6 291**
2008	3 280	51.2	3 119	48.7	2	^	**6 401**
2009	3 232	51.1	3 093	48.9	0	^	**6 325**
2010	3 169	52.0	2 925	48.0	1	^	**6 095**
2011	3 254	51.7	3 035	48.3	0	^	**6 289**

^ Less than 0.1 per cent.

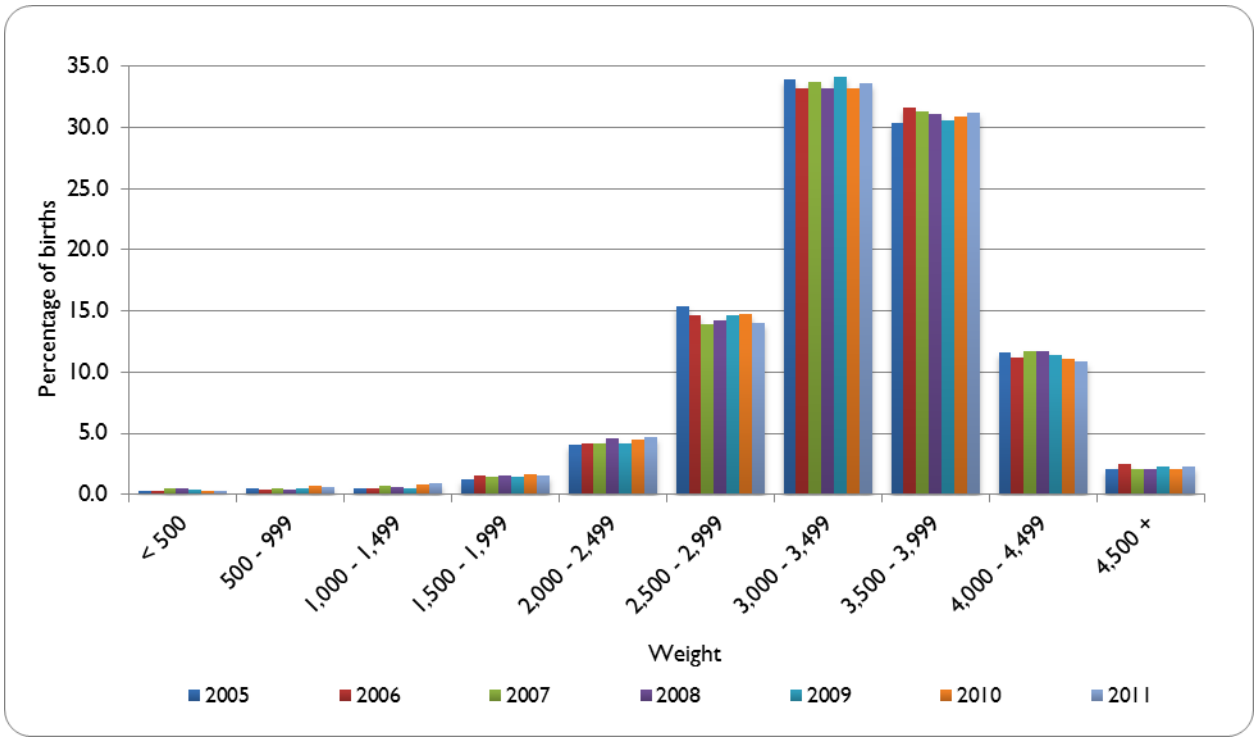
Figure 4: Number of livebirths by sex 2005-2011



Male births continue to exceed female births, accounting for 51.7 per cent of all Tasmanian births in 2011. This is comparable to national trends reported in 2010 with male births reported as higher (51.1 per cent) than female births (48.8 per cent). The 2010 national sex ratio for singleton livebirths was 104.8 male liveborn babies per 100 female liveborn babies.

Birthweight

Figure 5: Percentage of births by birthweight groups 2005-2011



Low birthweight

Low birthweight is defined as weight less than 2 500 grams and includes babies that are small for gestational age as well as those who are premature. Very low birthweight is defined as weight less than 1 500 grams.

Table 14: Incidence of low and very low birthweight 2005-2011

Year	Very low birthweight (< 1 500 grams) Number	Proportion of all births %	Low birthweight* (< 2 500 grams) Number	Proportion of all births %	Total births Number
2005	80	1.3	394	6.6	**5 965**
2006	71	1.1	426	6.9	**6 184**
2007	107	1.7	463	7.3	**6 337**
2008	95	1.5	492	7.6	**6 461**
2009	88	1.4	444	7.0	**6 381**
2010	115	1.9	487	7.9	**6 137**
2011	111	1.8	512	8.1	**6 323**

* Note that number - low birthweight (< 2 500 grams) figures also includes very low birthweight babies.

The percentage of very low birthweight infants reported in Tasmania for 2011 was slightly lower (p=0.646) than reported in 2010. The percentage of low birthweight infants reported in Tasmania in 2011 was, however, slightly higher (p=0.742) than reported in the previous year and higher than reported national figures. In 2010, the national percentage of very low birthweight infants was 1.0 per cent of all births (including stillbirths) and the percentage of low birthweight infants was 6.2 per cent of all births.

Table 15: Survival to hospital discharge by gestation 1996-2011*

Year	% Survival								
	23 wks	24 wks	25 wks	26 wks	27 wks	24-27 wks	28 wks	29 wks	30 wks
96-99	29	67	50	72	87	73	94	93	98
00-03	0	30	43	69	93	67	94	94	98
04-07	33	55	72	93	93	81	91	100	97
08-11	0	45	65	83	87	75	94	100	98

* Outcomes are for infants admitted to the Tasmanian Neonatal and Paediatric Intensive Care Unit at the Royal Hobart Hospital.

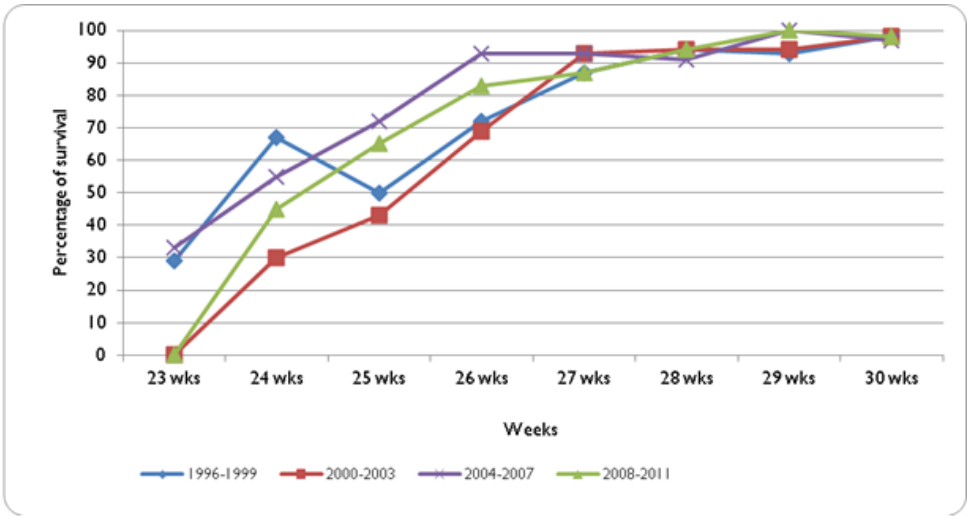
Table 16: Outcome comparison <30 weeks gestation – inborn vs outborn 2004-2011*

	Inborn	Outborn
Number (% of total)	265 (89%)	33 (11%)
Mortality, n (%)	34 (14%)	6 (18%)
Severe IVH†, n (%)	24 (9.1%)	6 (18%)

* Compares outcomes for preterm infants <30 weeks inborn at RHH with those of infants born in other Tasmanian hospitals and transferred to RHH with the Newborn Emergency Transport Service.

†Severe IVH: grade III or IV intraventricular haemorrhage.

Figure 6: Survival to hospital discharge by gestation 1996-2011



In 2011, it was a challenging time for the RHH NPICU in view of having a number of cases with very severe necrotizing enterocolitis, which led to a high mortality particularly in 25 week infants (only 2 survivors out of 8 admitted). This is reflected in the figures for the 2008-2011 quadrennium. The substantial majority of preterm infants born at or beyond 28 weeks gestation however now survive, most with few complications of prematurity. Overall, the survival for infants less than 28 weeks continues to improve in Tasmania, with around 80 per cent of infants between 24 and 27 weeks now surviving. This observation reflects the ongoing improvement in neonatal care provided to such infants in Tasmania, as well as an improvement in antenatal care, including better interhospital communication and more timely interhospital transfer.

Apgar scores

The Apgar score is routinely recorded shortly after birth, (usually at one minute and again at five minutes after birth) for all infants. It is a general measure of an infant's well-being immediately after birth based on assessment of the heart rate, breathing, colour, muscle tone, and reflex irritability. An Apgar score at five minutes is a good indication of the infant's overall health and well-being. An Apgar score of less than 6 at five minutes is indicative of an unwell infant.

Table 17: Proportion of livebirths by Apgar score at five minutes 2005-2011

Apgar score	2005 %	2006 %	2007 %	2008 %	2009 %	2010 %	2011 %
0	^	^	^	^	^	^	^
1	^	^	^	^	^	^	^
2	^	^	^	^	^	^	^
3	^	^	^	^	^	^	^
4	^	^	^	^	^	^	^
5	^	^	^	^	^	^	^
6	^	^	^	^	^	^	^
7	1.3	1.5	1.5	1.6	1.1	1.4	**1.4**
8	4.4	3.8	4.0	4.2	3.6	4.0	**5.1**
9	64.1	62.7	63.8	64.2	67.4	68.0	**71.8**
10	28.9	30.6	29.4	28.7	26.5	24.5	**22.8**
Not observed	^	^	^	^	^	^	**^**

^ Less than 0.1 per cent

Figure 7: Proportion of livebirths with Apgar score less than 6 at five minutes 2005-2011

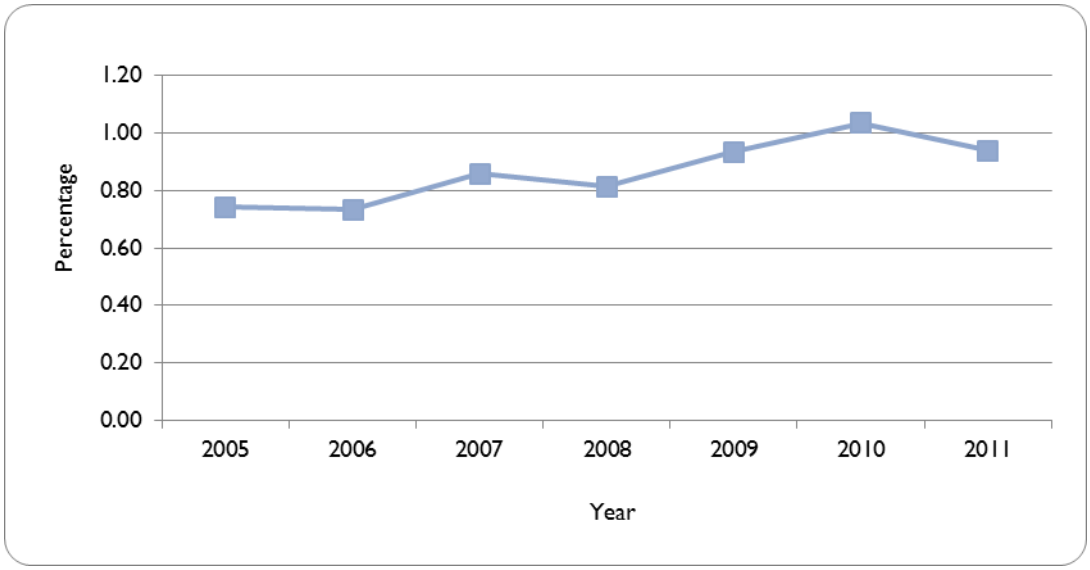


Figure 7 above reflects there has been a slight rise in the number of births associated with low Apgar scores at five minutes since 2005.

Resuscitation

The following tables show all intubations in the delivery room, including those done in conjunction with other methods of resuscitation as specified in the electronic perinatal data database system and on the paper-based form. The percentage of livebirths requiring intubation reported in 2011 was slightly lower (p=0.101) than reported in the previous year. Also the proportion of livebirths requiring resuscitation in 2011 was significantly less (p<0.001) than reported since 2005.

Table 18: Livebirths by active intubation at birth 2005-2011

Year	Number of intubations	Number of live births	Proportion (%) of live births requiring intubation
2005	32	5 923	0.5
2006	23	6 139	0.4
2007	33	6 291	0.5
2008	31	6 401	0.5
2009	30	6 325	0.5
2010	52	6 095	0.9
2011	**38**	**6 289**	**0.6**

Table 19: Livebirths by active resuscitation measures at birth 2005-2011

Year	Number of resuscitations	Number of live births	Proportion (%) of live births requiring resuscitation
2005	2 580	5 923	43.6
2006	2 578	6 139	42.0
2007	2 143	6 291	34.1
2008	1 968	6 401	30.7
2009	1 926	6 325	30.5
2010	1 689	6 095	27.7
2011	**1 336**	**6 289**	**21.2**

Presentation at Vaginal Delivery

Table 20: Births by presentation at birth 2005-2011

Year	Vertex		Face & brow		Breech		Other		Not stated	
	Number	%	Number	%	Number	%	Number	%	Number	%
2005	4 338	72.7	12	^	6	^	13	^	1 596	26.8
2006	4 466	72.2	10	^	5	^	14	^	1 689	27.3
2007	4 513	71.2	3	^	2	^	6	^	1 813	28.6
2008	4 535	70.2	11	^	4	^	16	^	1 895	29.3
2009	4 496	70.5	2	^	3	^	15	^	1 865	29.2
2010	4 238	69.1	8	^	13	^	17	^	1 861	30.3
2011	**4 265**	**67.5**	**6**	**^**	**31**	**^**	**13**	**^**	**2 008**	**31.8**

^ Less than 1 per cent. "Not-stated" corresponds to caesarean section deliveries

Table 20 above shows that the number of vaginal breech presentations in 2011 were significantly higher ($p<0.009$) than previously reported since 2005. Since the original Perinatal Data Collection Form only captured presentation at vaginal birth, efforts have been undertaken to modify this for future data collection.

Perinatal mortality

The Tasmanian Perinatal Mortality rate per 1 000 births in 2011 (8.5 deaths per 1 000 births) was found to be lower than reported in recent years as well as lower than the national figure of 9.3 deaths per 1 000 births reported in 2010. Causes of Perinatal Mortality are outlined in Table 2.

Table 21: Perinatal outcome 2005-2011

Outcome	Stillbirth	Liveborn and survived*	Neonatal death	Other (post-neonatal death)	Total
2005	42	5 912	11	0	5 965
2006	45	6 124	15	0	6 184
2007	46	6 273	18	0	6 337
2008	60	6 385	16	0	6 461
2009	56	6 308	17	0	6 381
2010	42	6 075	20 (+4)†	0	6 137
2011	**34**	**6 270**	**18 (+2)†**	**1**	**6 323**

* Survived to first hospital discharge.

† Number is bracket means that neonatal deaths occurred after first hospital discharge.

Figure 8: Stillbirths & neonatal deaths per 1 000 births 2005-2011

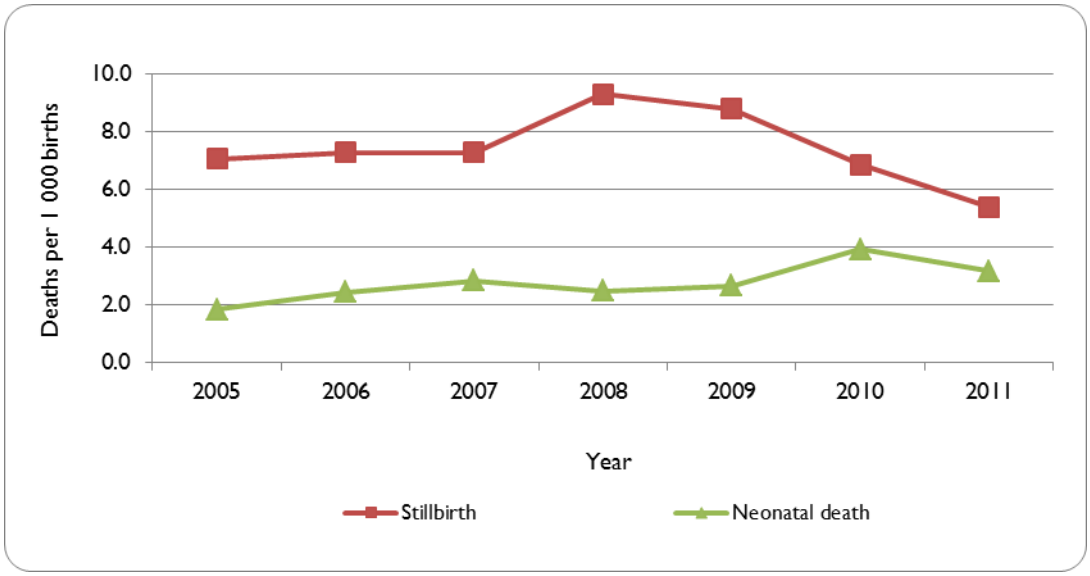
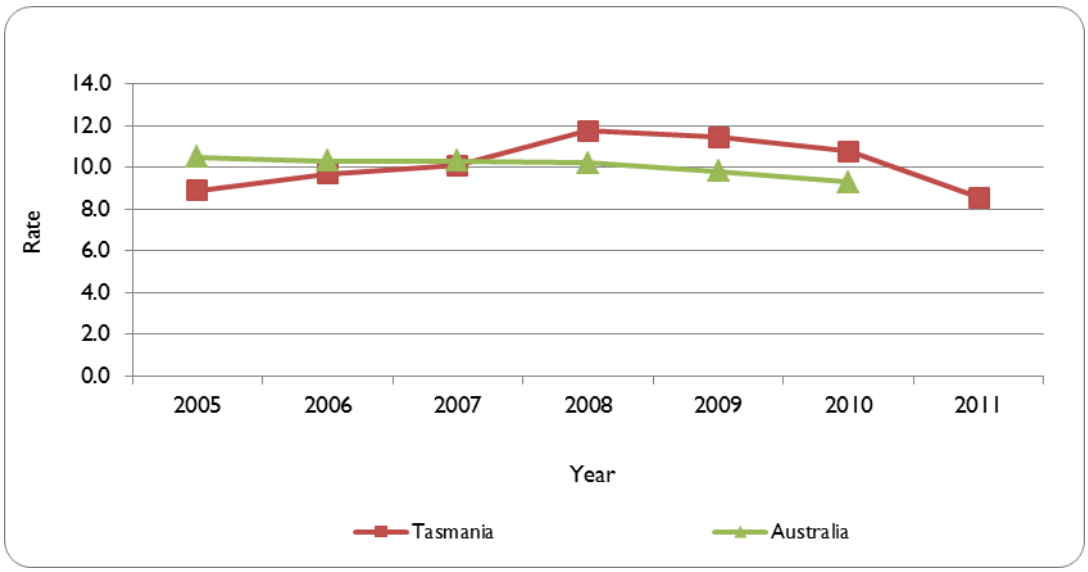


Table 22: Perinatal mortality rates 2005-2011

Year	Number of perinatal deaths	Number of total births	Rate of perinatal mortality per 1 000 births
2005	53	5 965	8.9
2006	60	6 184	9.7
2007	64	6 337	10.1
2008	76	6 461	11.8
2009	73	6 381	11.4
2010	66	6 137	10.8
2011	**54**	**6 323**	**8.5**

It is evident that for Tasmania, the perinatal mortality rate in 2011 slightly decreased (p>0.05) from the rates reported in previous years and was also slightly lower than the 2010 national rate of perinatal deaths (9.3 rate per 1 000 births). In 2010, the national stillbirth rate was 7.4 per 1 000 births; the neonatal death rate was 2.9 per 1 000 live births; and the perinatal death rate was 9.3 per 1 000 births.

Figure 9: Perinatal mortality rate per 1 000 births in Tasmania 2005-2011 and Australia 2005-2010



Source of Australian Perinatal Mortality Rate: Australia's Mothers & Babies, published annually by the Australian Institute of Health & Welfare.

Neonatal mortality

Neonatal mortality includes all deaths of liveborn babies born after 20 weeks gestation or with a birthweight greater than 400 grams within the first 28 days of life, and the rate is expressed as deaths per 1 000 births.

The neonatal mortality rate of 3.2 per 1 000 births reported in Tasmania in 2011 was slightly lower than the rate reported for Tasmania in 2010 (3.9 per 1 000 births) but marginally higher than reported nationally in 2010 (i.e., 2.9 per 1 000 births).

Table 23: Neonatal mortality, per 1 000 births, in infants over 28 weeks gestation 2005-2011

Year	Number of neonatal mortality	Rate of neonatal mortality per 1 000 births*
2005	4	0.7
2006	3	0.5
2007	8	1.3
2008	2	0.3
2009	2	0.3
2010	6	1.0
2011	**7**	**1.1**

**** showing neonatal mortality that is not related to prematurity***

Table 24: Neonatal mortality, per 1 000 births, in infants over 1 000 grams birthweight 2005-2011

Year	Number of neonatal mortality	Rate of neonatal mortality per 1 000 births*
2005	4	0.7
2006	6	1.0
2007	9	1.4
2008	3	0.5
2009	3	0.5
2010	7	1.1
2011	**8**	**1.3**

**** showing neonatal mortality that is not related to prematurity***

Table 25: Foetal, neonatal and perinatal death rate per 1 000 births by state and territory 2004-2010

Year	Aus	TAS	NT	ACT	NSW	VIC	QLD	SA	WA
Foetal									
2004	7.5	6.7	6.3	6.7	6.6	9.7	6.8	6.4	7.4
2005	7.3	6.4	11.4	9.2	5.9	9.2	6.8	7.1	7.4
2006	7.4	6.8	11.0	9.1	6.4	9.0	6.9	7.4	7.3
2007	7.4	7.0	8.9	7.2	6.6	9.6	6.9	6.6	6.3
2008	7.4	9.0	7.3	9.6	6.1	9.7	6.3	7.6	7.3
2009	7.8	8.2	11.0	6.8	6.2	10.7	7.2	7.0	7.5
2010	7.4	6.8	8.8	11.3	5.8	10.3	6.7	5.9	7.0
Neonatal									
2004	3.1	2.2	5.5	4.7	2.5	3.3	3.9	2.9	2.4
2005	3.2	1.4	6.6	4.0	2.9	3.7	3.4	3.4	2.7
2006	3.0	2.1	n.a.	5.2	2.4	3.3	4.0	2.0	2.2
2007	2.9	2.7	3.7	4.4	2.5	3.4	3.4	2.6	2.0
2008	2.8	1.9	3.9	4.4	2.6	3.0	3.3	2.5	1.9
2009	3.0	2.5	4.1	7.2	2.5	n.a.	3.8	2.3	2.5
2010	2.9	3.3	4.2	4.1	2.5	n.r	3.8	2.2	2.2
Perinatal									
2004	10.5	8.9	11.8	11.4	9.0	13.0	10.7	9.4	9.8
2005	10.5	7.8	17.8	13.2	8.7	12.9	10.1	10.5	10.1
2006	10.3	9.0	n.a.	14.2	8.8	12.2	10.8	9.4	9.5
2007	10.3	9.7	12.6	11.6	9.0	12.9	10.3	9.2	8.2
2008	10.2	10.8	11.2	14.0	8.7	12.7	9.6	10.1	9.2
2009	9.8	10.7	15.1	14.0	8.6	n.a.	11.0	9.3	10.0
2010	9.3	10.1	12.9	15.3	8.2	n.r	10.4	8.1	9.1

Source: Li, Z., Zeki R., Hilder, L. & Sullivan, E.A., (2012), *Australia's mothers and babies 2010* Perinatal statistics series, No. 27, Cat. no. PER 57, Canberra: AIHW National Perinatal Epidemiology and Statistics Unit.

Autopsy rates

In view of the repeated recommendation from the *Council of Obstetric & Paediatric Mortality & Morbidity* on the value of autopsy as an investigative tool in cases of perinatal death, especially in cases of unexplained intrauterine death, it is disappointing to find that the autopsy rate could not be determined in this year due to a significant number of cases not having been recorded.

It is important to note that the Australia and New Zealand Stillbirth Alliance is seeking to improve and conduct research into stillbirth in the Australia and New Zealand region. In particular, it aims to identify factors contributing to low autopsy consent rate for stillbirths and will provide robust information to develop information and educational materials that address the needs of parents and clinicians and improve overall autopsy rates in the future.

Table 26: Rate of autopsies on perinatal deaths 2005-2011

Year	Autopsy rate %
2005	30.8
2006	33.3
2007	27.0
2008	35.5
2009	39.7
2010	21.0
2011	**NA***

*Note that a significant number of stillbirth cases had not been recorded and as such autopsy rates could not be accurately calculated for this year

Age of mothers

Table 27: Proportion of births by maternal age groups 2005-2011

Year	Under 20 years of age %	20 – 24 years of age %	25 – 29 years of age %	30 – 34 years of age %	35 – 39 years of age %	40 and over years of age %
2005	7.3	19.6	26.8	29.8	13.9	2.5
2006	7.2	20.2	27.1	28.6	14.3	2.6
2007	6.7	20.5	27.1	27.8	14.8	3.0
2008	7.0	19.6	28.0	27.5	14.8	3.1
2009	7.0	19.6	28.4	26.8	15.0	3.2
2010	5.9	19.4	29.5	26.5	15.7	3.1
2011	**6.1**	**18.9**	**28.8**	**27.4**	**15.0**	**3.7**

In Tasmania, the ages of mothers in the various groups reported in 2011 are consistent with those reported in 2010. In general, the proportions of mothers in the 25-29 year old and the 30-34 year old age groups continue to remain higher than for the other age groups included in assessment in 2011, a trend consistent with national reports from 2010. Overall, the proportion of mothers in Tasmania aged 35 years or more has increased annually since 2005 ($p<0.001$), commensurate with national figures which has shown

the proportion of older mothers, aged 35 years and over, has continued to increase from 17.5 per cent in 2001 to 23.0 per cent in 2010. The average age of women who gave birth in Australia has increased by 7.5 per cent since 1991. Nationally, the mean age in 2010 was 30.0 years, compared with 29.2 years in 2001. Mothers aged 40 years and over constituted 4.1 per cent of women giving birth nationally in 2010 compared with 2.9 per cent in 2001. Furthermore, national figures have shown the proportion of teenage mothers (younger than 20 years) remained steady, declining from 4.0 per cent in 2009 to 3.9 per cent in 2010, compared with 5.0 per cent in 2001[11].

Figure 10: Proportion of births by maternal age groups 2005-2011

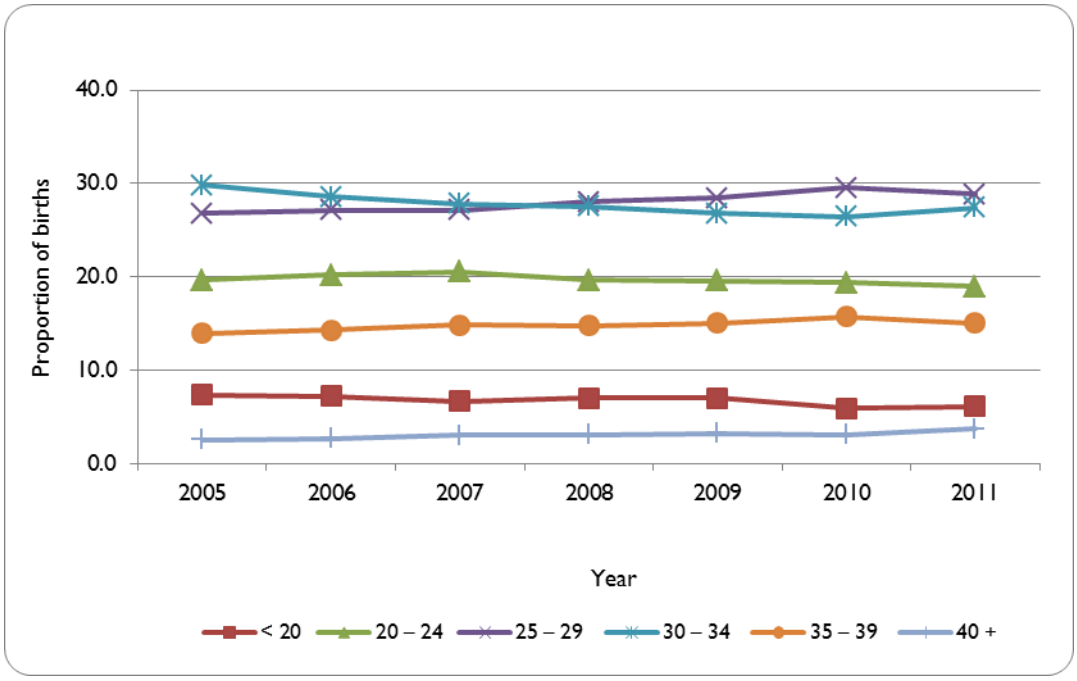
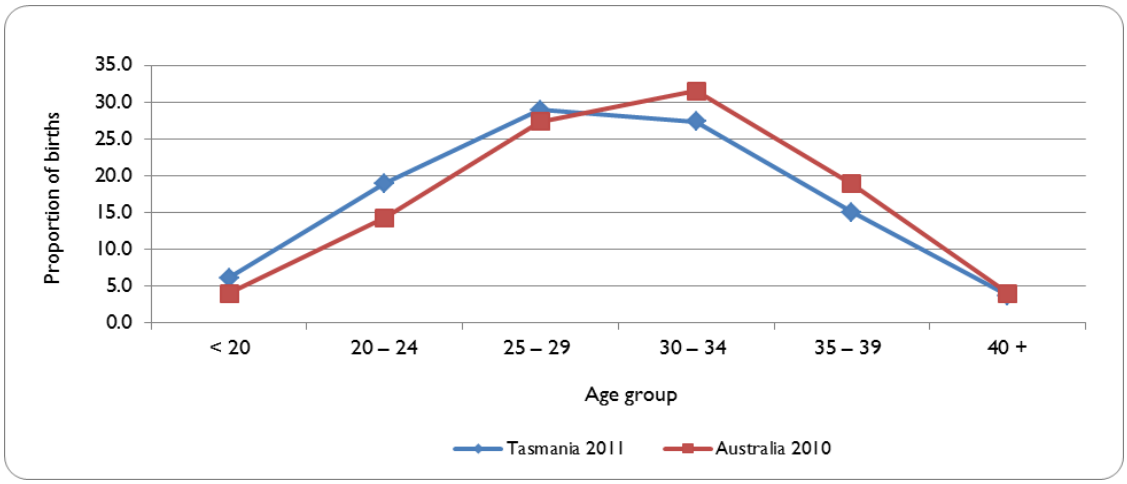


Figure 11: Proportion of women who gave birth by maternal age in Tasmania 2011 and Australia 2010



[11] Li, Z., McNally, L., Hilder, L. & Sullivan, E.A., (2011), *Australia's mothers and babies 2009*, Perinatal statistics series, No. 25, Cat. no. PER 52, Sydney: AIHW National Perinatal Epidemiology and Statistics Unit.

Table 28: Rates of birth per 1 000 female population by maternal age 2005-2011

Maternal age in years	Year	Number of estimated Tasmanian female population*	Rate of births per 1 000 female population
15 – 19	2005	16 456	26.3
	2006	16 497	26.8
	2007	16 594	25.3
	2008	16 698	26.9
	2009	16 833	26.3
	2010	17 010	21.2
	2011	NA	NA
20 – 24	2005	15 252	76.8
	2006	15 477	80.6
	2007	15 282	85.0
	2008	15 322	82.8
	2009	15 389	81.2
	2010	15 380	77.2
	2011	NA	NA
25 – 29	2005	13 660	117.0
	2006	13 835	121.3
	2007	14 106	121.9
	2008	14 250	127.1
	2009	14 502	125.1
	2010	14 825	122.2
	2011	NA	NA
30 – 34	2005	16 025	111.0
	2006	15 443	114.4
	2007	14 854	118.8
	2008	14 573	121.9
	2009	14 575	117.3
	2010	14 454	112.4
	2011	NA	NA
35 – 39	2005	16 607	50.0
	2006	17 054	51.8
	2007	17 254	54.5
	2008	17 424	54.8
	2009	17 242	55.6
	2010	17 053	56.5
	2011	NA	NA
40 – 44	2005	18 520	7.7
	2006	17 922	8.8

Maternal age in years	Year	Number of estimated Tasmanian female population*	Rate of births per 1 000 female population
	2007	17 471	10.5
	2008	17 207	11.3
	2009	17 147	11.1
	2010	17 277	10.8
	2011	NA	NA
45 –49	2005	18 342	0.4
	2006	18 745	0.3
	2007	18 935	0.4
	2008	19 107	0.3
	2009	19 211	0.5
	2010	18 862	0.2
	2011	NA	NA

* Australian Bureau of Statistics 2000-2001, 3311.6 - Demography, Tasmania; Australian Bureau of Statistics June 2002-2010, 3201.0 - Population by Age & Sex. (Note: 2011 figures not available at the time of publication of this Report)

Parity status

Parity refers to the condition of having given birth to an infant or infants, alive or deceased. A multiple birth (giving birth to >1 infant in a delivery) is considered as a single parity.

Table 29: Percentage of women who gave birth by parity 2005-2011

Year	None %	One %	Two %	Three %	Four and over %
2005	40.7	33.9	15.1	6.3	4.1
2006	40.7	32.8	16.3	6.0	4.3
2007	39.4	33.4	16.6	6.1	4.5
2008	39.0	33.4	16.4	6.3	4.9
2009	40.3	33.1	15.5	6.8	4.3
2010	40.0	34.1	14.7	6.6	4.6
2011	**40.4**	**33.6**	**15.8**	**6.1**	**4.1**

For Tasmania in 2011, 40.4 per cent of mothers gave birth for the first time and 33.6 per cent had their second baby. This trend is similar to those reported nationally in 2010, where 42.1 per cent of mothers gave birth for the first time and 33.1 per cent had their second baby. One in six mothers (15.1 per cent) nationally had given birth twice previously and 9.6 per cent had given birth three or more times.

Indigenous status

Reporting of Indigenous status is by self-identification and patients are asked if they are of Aboriginal or Torres Strait Island origin when commencing antenatal care. Low community acceptance of the need to ask the question, and a lack of confidence in how an affirmative response will be treated has possibly resulted in some under reporting of indigenous status. As a result of a targeted project to improve the quality of indigenous status data, the number of mothers identifying as Aboriginal has increased markedly since 2005. In 2011, the "not stated" data has increased where origin was not stated as a result of improvement in the data collection process.

Nationally in 2010, 11 494 women identified as being Aboriginal or Torres Strait Islander gave birth in Australia, representing 3.9 per cent of all women who gave birth.

Table 30: Percentage of women who gave birth by Indigenous status 2005-2011

Year	Aboriginal	Torres Strait Islander	Aboriginal & Torres Strait Islander	Other	Not stated
2005	182	15	24	5 650	0
2006	173	14	30	5 876	0
2007	198	14	19	6 010	0
2008	249	21	26	6 058	0
2009	238	19	28	6 007	0
2010	201	9	19	5 735	56
2011	**264**	**10**	**18**	**5 801**	**127**

Breastfeeding

Trends reported in Tasmania (see tables below) indicate that the percentage of women who gave birth and breastfeeding at maternal discharge has decreased since 2008 with a sudden drop between 2010 -2011. In December 2012, the National Health and Medical Research Council released revised *Infant Feeding Guidelines* which provide convincing evidence that breastfeeding provides major public health benefits to both the infant and mother[12] . In 2011, the percentage of public hospital patients' breastfeeding at discharge is significantly lower ($p<0.001$) than the percentage reported for private hospital patients. This is likely to reflect lower rates of breastfeeding that have been observed among women of lower socio-economic status[13]. The sudden decline in breastfeeding at maternal discharge in 2011 is alarming and would benefit from an investigation as to why women are leaving maternity service not intending to breastfeed. A redoubling of effort in the antenatal and perinatal period is warranted to prepare women for breastfeeding and to provide adequate support in the early stages, particularly in the public hospital system.

Table 31: Women who gave birth and breastfeeding at maternal discharge 2005-2011

Year	Yes	No	% Yes
2005	4 780	1 053	81.9
2006	5 004	1 045	82.7
2007	5 079	1 119	81.9
2008	4 998	1 298	79.4
2009	4 980	1 259	79.8
2010	4 678	1 302	78.2
2011	**4 643**	**1 545**	**75.0**

Table 32: Women who gave birth and breastfeeding at maternal discharge by public / private hospital 2005-2011

Year	Public % Yes	Private % Yes
2005	79.1	87.6
2006	80.3	87.7
2007	79.7	86.4
2008	77.4	83.0
2009	79.5	80.2
2010	76.3	81.7
2011	**70.3**	**84.3**

[12] National Health and Medical Research Council (2012) *Infant Feeding Guidelines*. Canberra: National Health and Medical Research Council.

[13] Australian Health Ministers Conference (2009) *Australian National Breastfeeding Strategy* 2010-2015 Canberra: Commonwealth of Australia

Table 33: Women who gave birth and breastfeeding at maternal discharge by parity 2005-2011

Year	Primiparae % Yes	Multiparae % Yes
2005	84.1	80.5
2006	84.2	81.7
2007	84.4	80.4
2008	81.8	77.8
2009	81.8	78.5
2010	80.4	76.8
2011	**73.0**	**76.4**

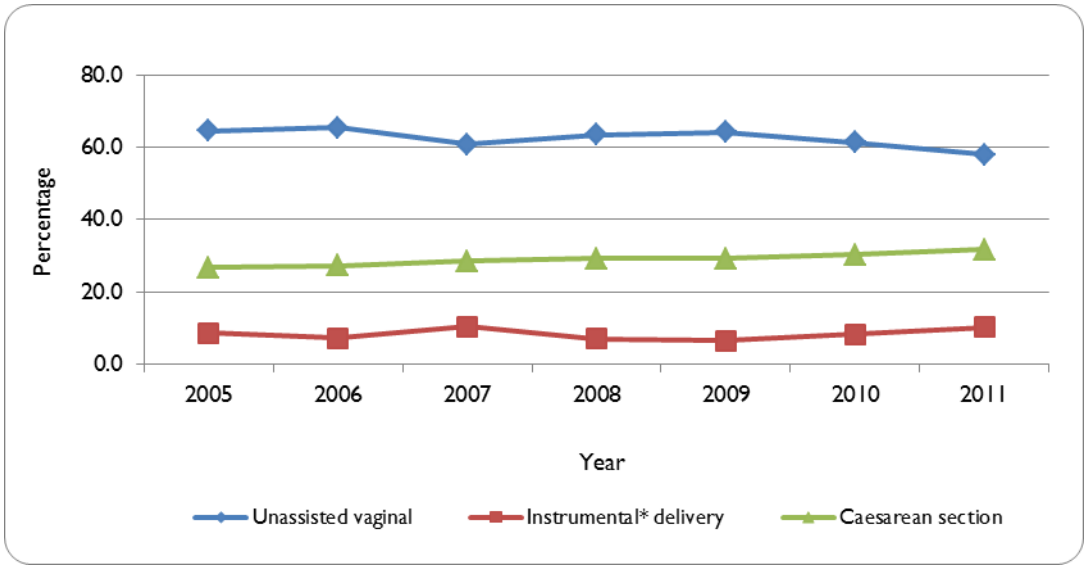
Mode of delivery

Table 34: Births by method of birth 2005-2011

Year	Total births	Unassisted vaginal		Instrumental* delivery		Caesarean section	
		Number	%	Number	%	Number	%
2005	5 965	3 845	64.5	524	8.8	1 596	26.8
2006	6 184	4 046	65.4	449	7.3	1 689	27.3
2007	6 337	3 857	60.9	667	10.5	1 813	28.6
2008	6 461	4 101	63.5	465	7.2	1 895	29.3
2009	6 381	4 092	64.1	424	6.6	1 865	29.2
2010	6 137	3 760	61.3	516	8.4	1 861	30.3
2011	**6 323**	**3 665**	**58.0**	**650**	**10.3**	**2 008**	**31.8**

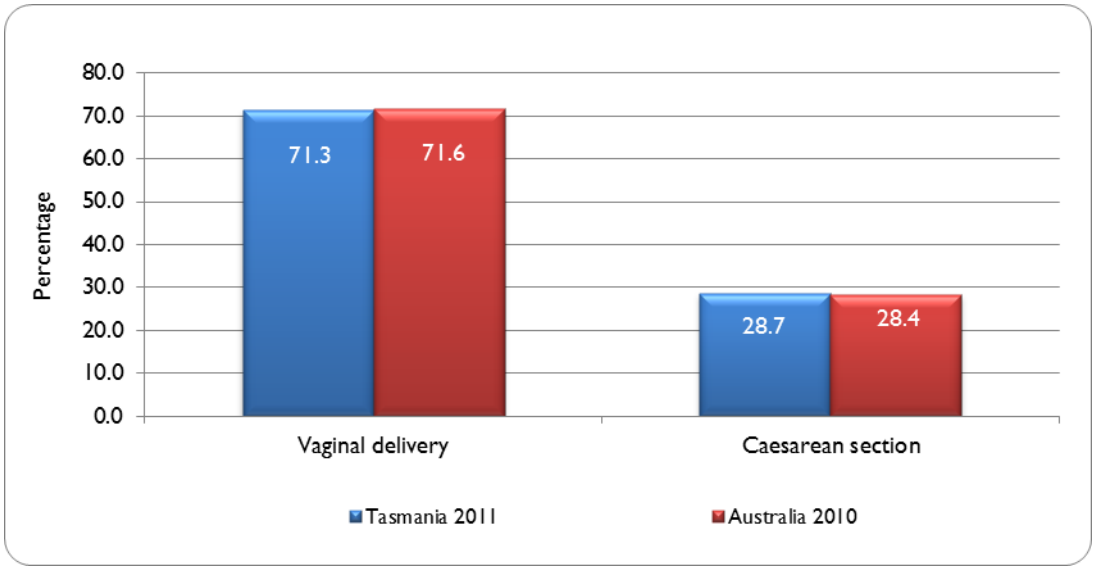
* Instrumental delivery includes forceps, forceps rotation & vacuum extraction.

Figure 12: Mode of delivery in Tasmania 2005-2011



* Instrumental delivery includes forceps, forceps rotation & vacuum extraction.

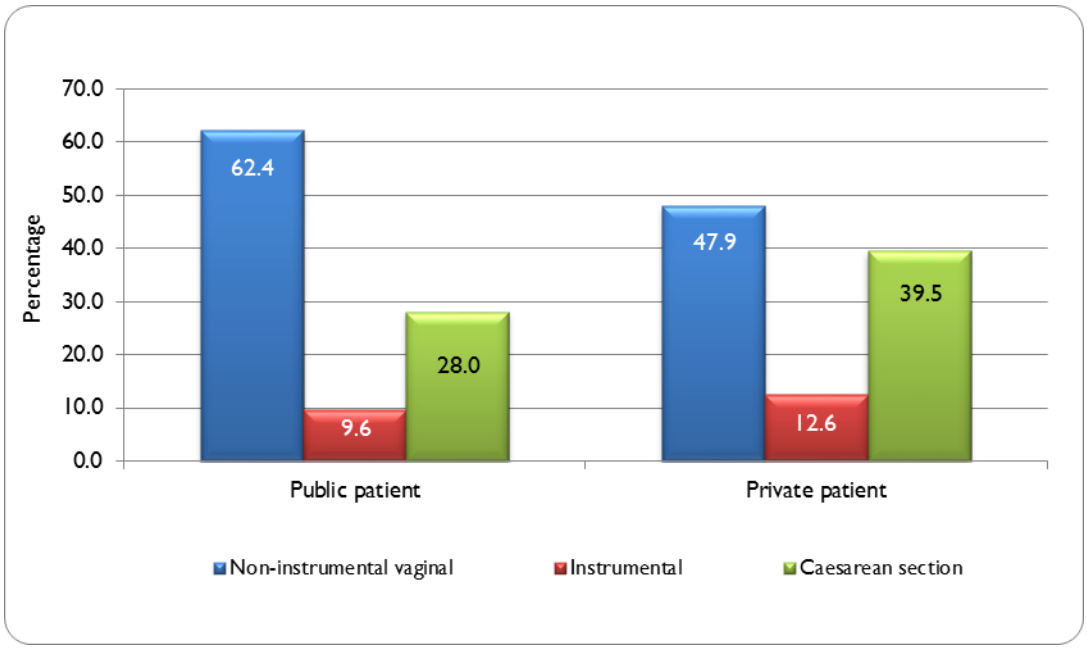
Figure 13: Percentage of women who gave birth in public hospitals by mode of delivery in Tasmania 2011 and Australia 2010



Note: It should be highlighted that Tasmanian public hospital rates reported here may be skewed since all babies that are both public and private are born at the Launceston General Hospital thus inflating the public hospital rate via the private patient contribution. Moreover, the North West Private Hospital at Burnie is a private hospital contracted to accommodate public patients.

Mode of delivery has remained relatively unchanged over recent years with Tasmania recording 71.3 per cent in 2011and Australia recording 71.6 per cent for vaginal deliveries in 2010 compared to 73.0 per cent for Tasmania in 2010 and 71.6 per cent nationally in 2009. Furthermore, caesarean sections (CS) were reported at 28.7 per cent for Tasmania in 2011 and 28.4 per cent nationally in 2010 compared with 27.6 per cent for Tasmania in 2010 and 28.4 per cent nationally in 2009.

Figure 14: Percentage of women who gave births by mode of delivery by admitted patient election status in Tasmania 2011



Note: There were 40 births where the mother had not declared insurance status undertook all non-instrumental vaginal deliveries.

Private patients in Tasmania in 2011 continued to undergo more caesarean sections and instrumental vaginal deliveries than public patients (see Figure 14), a trend which was consistent with last year's figures. Conversely, more non-instrumental deliveries continued to be performed for public patients compared to private patients during 2011. In each case, the difference between public and private patients was statistically significant ($p<0.001$). Overall in Tasmania in 2011, the total caesarean section (CS) rate was 31.8 per cent; the total unassisted vaginal delivery rate was 58.0 per cent and the total instrumental delivery rate was 10.3 per cent.

In further detail:

- The higher caesarean section rates reported in 2011 in Tasmanian *private* hospitals is a trend consistent with national findings reported in 2010. National figures derived from 2010 have shown caesarean section rates to be higher in *private* hospitals (43.1 per cent) compared with *public* hospitals (28.4 per cent) across all age groups;
- Of the vaginal deliveries nationally reported in *public* hospitals in 2010, 61.0 per cent were spontaneous, 3.4 per cent were forceps deliveries and 7.2 per cent were vacuum extraction; and
- Of the vaginal deliveries nationally reported in *private* hospitals in 2010, 42.7 per cent were spontaneous, 3.6 per cent were forceps deliveries and 10.6 per cent were vacuum extraction.

Table 35: Births by mode of delivery and gestation 2005-2011

Gestation in weeks	Year	Vaginal delivery		Caesarean section		Total
		Number	%	Number	%	Number
20 – 27	2005	34	79.1	9	20.9	43
	2006	33	82.5	7	17.5	40
	2007	45	84.9	8	15.1	53
	2008	44	75.9	14	24.1	58
	2009	39	72.2	15	27.8	54
	2010	45	72.6	17	27.4	62
	2011	36	70.6	15	29.4	51
28 – 31	2005	23	57.5	17	42.5	40
	2006	20	42.6	27	57.4	47
	2007	24	36.9	41	63.1	65
	2008	29	44.6	36	55.4	65
	2009	11	28.9	27	71.1	38
	2010	24	32.9	49	67.1	73
	2011	17	27.4	45	72.6	62
32 - 36	2005	196	59.4	134	40.6	330
	2006	240	56.1	188	43.9	428
	2007	208	52.1	191	47.9	399
	2008	266	57.0	201	43.0	467
	2009	301	62.3	182	37.7	483
	2010	255	51.8	237	48.2	492
	2011	256	48.8	269	51.2	525
37 - 41	2005	4 070	74.1	1 422	25.9	5 492
	2006	4 156	74.1	1 453	25.9	5 609
	2007	4 202	73.0	1 554	27.0	5 756
	2008	4 184	72.0	1 627	28.0	5 811
	2009	4 142	71.8	1 629	28.2	5 771
	2010	3 930	71.7	1 549	28.3	5 479
	2011	3 981	70.5	1 665	29.5	5 646
42 and over	2005	46	76.7	14	23.3	60
	2006	46	76.7	14	23.3	60
	2007	45	70.3	19	29.7	64
	2008	43	71.7	17	28.3	60
	2009	23	65.7	12	34.3	35
	2010	22	71.0	9	29.0	31
	2011	25	64.1	14	35.9	39

* Note: Due to 2 missing stillbirths within the system for 2008, the total number figure is slightly under-reported in this table

Caesarean section

Table 36: Proportion of women who gave birth by emergency / elective caesarean section 2005-2011

Year	Emergency		Elective	
	Number	%	Number	%
2005	752	48.5	800	51.5
2006	780	47.5	861	52.5
2007	820	46.8	933	53.2
2008	849	46.5	976	53.5
2009	869	48.0	941	52.0
2010	864	48.6	913	51.4
2011	**983**	**50.9**	**949**	**49.1**

Table 37: Proportion of women who gave birth by emergency / elective caesarean section by public / private hospitals 2005-2011

Year	Emergency %		Elective %	
	Public	Private	Public	Private
2005	50.5	45.1	49.5	54.9
2006	51.9	38.9	48.1	61.1
2007	52.6	37.1	47.4	62.9
2008	51.0	38.9	49.0	61.1
2009	52.9	40.2	47.1	59.8
2010	52.0	43.3	48.0	56.7
2011	**57.1**	**41.2**	**42.9**	**58.8**

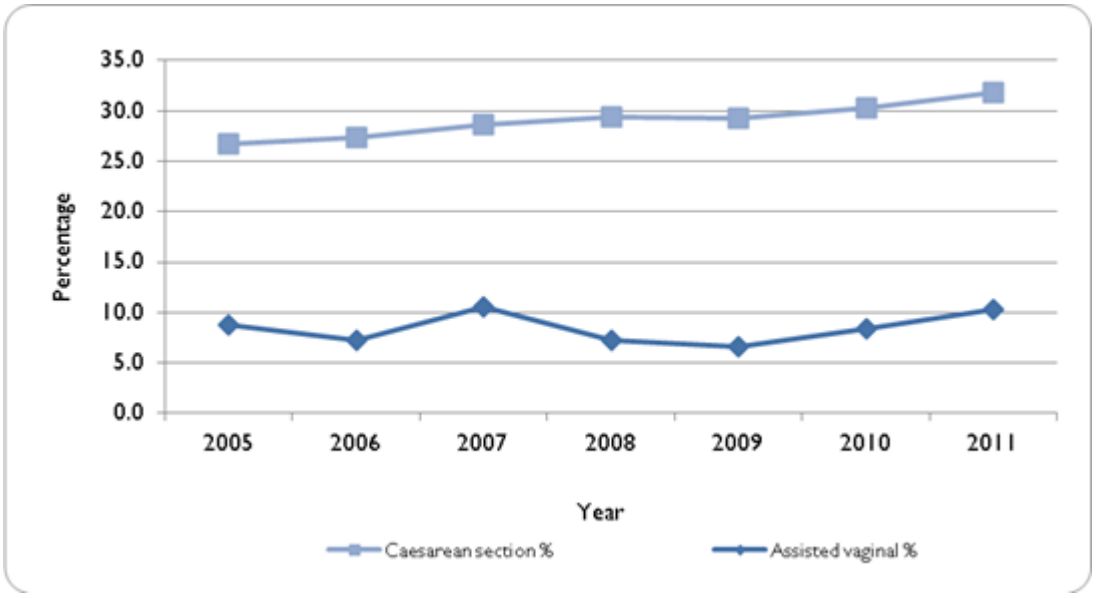
Table 38: Proportion of women who gave birth by primary / repeat caesarean section 2005-2011

Year	Primary		Repeat	
	Number	%	Number	%
2005	943	60.8	609	39.2
2006	937	57.1	704	42.9
2007	981	56.0	772	44.0
2008	1 046	57.3	779	42.7
2009	1 036	57.2	774	42.8
2010	1 005	56.6	772	43.4
2011	**1 125**	**58.2**	**807**	**41.8**

Table 39: Proportion of women who gave birth by primary / repeat caesarean section by public / private hospitals 2005-2011

Year	Primary %		Repeat %	
	Public	Private	Public	Private
2005	60.6	61.1	39.4	38.9
2006	58.2	54.9	41.8	45.1
2007	55.8	56.2	44.2	43.8
2008	58.5	55.4	41.5	44.6
2009	57.8	56.3	42.2	43.7
2010	57.3	55.4	42.7	44.6
2011	**60.3**	**55.0**	**39.7**	**45.0**

Figure 15: Caesarean section and assisted vaginal rates 2005-2011



The incidence of CS has risen progressively since the 1970s. This has been a trend in all countries, although the degree of rise has varied. In Tasmania, the rate is 31.8 per cent in year 2011, which is comparable to the Australian national rate reported in 2010 (31.6 per cent).

As outlined in recent reports, multiple factors that are likely to contribute to this trend include the following:

1. ***Maternal age.*** This has been known to be an independent variable ever since perinatal outcomes were recorded by the late Professor Joe Correy when he started the first data collection in a state population in Australian in the 1970s. In general, here has been a steady trend for a reduction in births in women in the 20-29 age group, with an equally steady trend for an increase in the 30-39 year age group and over. The CS rate for the 40+ group is approximately double the rate reported for the 20-29 age group and as a demographic change alone it would be expected that the CS rate should rise without any change in background rates changing.

2. ***Obstetric medical disorders.*** One of the consequences of an increasing maternal age in the obstetric population is that providers are now experiencing a significant increase in the incidence of medical disorders in pregnancy. Hypertension, diabetes mellitus, renal disease, connective tissue and autoimmune diseases, etc all have significant potential implications for the well-being of mother and foetus. As these disorders, per se, are associated with increased CS rates, then a move to an older obstetric population will inevitably lead to a rise in CS rates as a method of managing more complex pregnancies.

3. ***Change in parity.*** Whereas in the 1970s and before it was not unusual for women to have more than 3 babies, the rate per woman is now less than 2 babies. As has been well documented, the CS rate for primigravidae is much higher than for multipara. This concentration of primigravidae, who are also older, concentrate the numbers likely to have CS delivery as a demographic change alone, without any actual increase in rates in each age group.

4. ***Maternal weight.*** The problems of obesity in pregnancy and the issues in relation to pregnancy have been highlighted in recent times, particularly with obesity becoming a modern health epidemic. In developed countries this has reached proportions that have a significant consequence for health services. In recent years much attention has rested on smoking and its effects on health. There is emerging evidence of a similar effect and magnitude related to obesity. Even being overweight has been shown to increase morbidity and health costs. In the last decade attention has been directed to maternal body weight and its effects on pregnancy outcome. Although no obstetric weight data from Tasmania are available, it has been shown that the rate of obesity in the general population in Tasmania has increased significantly – as in other states in Australia. A research study [14] investigating body mass index (BMI) and obstetric outcome in more than thirty thousand women in Belfast showed the effect of BMI on rates of breast feeding compared to normal of 18.5-24.99. Table 40 (see below) that has extracted significant findings from this study in relation to the impact of various levels of obesity on maternal outcomes shows in particular, that as obesity severity increases the likelihood of breastfeeding decreases.

Table 40: Relative Risk of Adverse Maternal Outcomes in Overweight and Obese Women (by BMI category (Kg/m^2)

	Overweight BMI 25.00-29.99	**Obese Class 1 BMI 30.00-34.99**	**Obese Class 2 BMI 35.00-39.99**	**Obese Class 3 BMI >=40**
Gestational diabetes	1.7 (1. 3-2.3)	3.7 (2.8–5.0)	6.0 (4.2-8.5)	8.5 (5.7-12.9)
Hypertensive disorders of pregnancy	1.9 (1.7–2.3)	3.5 (2.9–4.2)	5.0 (4.0–6.4)	6.6 (4.9–8.9)

[14] Scott-Pillai, Spence, D., Cardwell, C.R., Hunter, A & Holmes, V.A. (2013). The impact of body mass index on maternal and neonatal outcomes: a retrospective study in a UK obstetric population, 2004-2011. *British Journal of Obstetrics & Gynaecology*, July, Vol 120 (no. 8), pp. 932-939.

Induction of labour	1.2 (1.1–1.3)	1.3 (1.2-1.5)	1.4 (1.2-1.7)	1.6 (1.3-2.0)
Emergency CS	1.4 (1.2-1.5)	1.6 (1.4-1.8)	1.8 (1.5-2.2)	1.9 (1.4-2.5)
PPH	1.4 (1.3-1.5)	1.8 (1.6–2.0)	2.4 (2.0-2.8)	2.7 (2.2-3.4)
Wound problems	1.2 (0.7–2.1)	1.6 (0.9–3.0)	3.5 (1.8-6.7)	6.0 (3.0-12.1)
C-section	1.4 (1.3-1.5)	1.8 (1.6–2.0)	2.5 (2.1-2.9)	2.8 (2.4-3.5)
Breast feeding at discharge	0.8 (0.7-0.8)	0.6 (0.6-0.7)	0.5 (0.4-0.6)	0.4 (0.3-0.5)

Note: Risk is relative to that for women of normal weight. All variables are adjusted for age, parity, social deprivation, smoking and year of birth. Values presented as OR (99% CI), with p<0.01 considered to be significant. All p values <0.001 were considered to be significant for all listed maternal outcomes by BMI Category except for ***wound problems*** *in* ***overweight*** *and* ***obese class 1*** *categories. Note that the findings are taken from research study previously referenced*[15]

5. ***A change in method of delivery from the early 1980s.*** Instrumental delivery rates have fallen from above 20 per cent to under 10 per cent. This is in recognition that traumatic instrumental delivery, particularly from high in the birth canal, is attended by significant morbidity both for the baby and the mother. Few breech babies are born vaginally now Australia-wide and an increasing number of twins undergo CS delivery for all of the reasons postulated with the addition of the complications of twin pregnancy including malpresentation and discrepancy in foetal growth and condition.

6. ***Altered delivery of pre-term babies.*** Table 36 shows data from year 2005 until current. There has been an increasing trend to deliver babies by CS at gestations 30-39 weeks.

   This reflects the increasing neonatal support, and survival rates, available now, where babies born very preterm from conditions such as IUGR, pre-eclampsia etc, who were managed longer in utero, are now born earlier and in better condition by CS. Those delivered by CS at very early gestations are now expected to have very high survival rates in NICU.

7. ***The use of cardiotocography (CTG).*** Although it is known that the introduction and widespread use of CTG in the 1970s to monitor foetuses in labour has been associated with a significant rise in CS rates, it is questionable whether CTG use is still responsible for ongoing rising rates. The institution of the *RANZCOG CTG* guidelines has yet to be evaluated with regard to its impact on the rate of CS since the widespread Australian use of the guidelines began.

8. ***Concern regarding Pelvic Floor function.*** The Colorectal and Urological literature has focused on the burden of both faecal and urinary incontinence in the female population highlighting the effects of childbirth. In practice this has led to a more liberal offer of CS to women perceived to be at higher risk of subsequent bowel or urinary incontinence e.g. those who experienced anal sphincter damage (a third or fourth degree tear with a prior delivery) or who have undergone surgery for prolapse or urinary incontinence.

[15] Scott-Pillai, Spence, D., Cardwell, C.R., Hunter, A & Holmes, V.A. (2013). The impact of body mass index on maternal and neonatal outcomes: a retrospective study in a UK obstetric population, 2004-2011. *British Journal of Obstetrics & Gynaecology*, July, Vol 120 (no. 8), pp. 932-939.

9. ***Debate in Obstetric Academic Circles*** and literature with regard to the safety of Vaginal Birth after Caesarean Section (VBAC) and the low acceptance of any foetal risk within the pregnant population and their families.

10. ***Empowerment of women*** as the consumer of maternity care and a preference among some groups of women to request CS. Although elective CS in a primigravida with no medical indication is still relatively rare practitioners face difficulty in the current practising climate to refuse such requests. Once minor risk factors are added – VBAC, multiple pregnancy, difficult previous vaginal delivery, IVF pregnancy, predicted larger than average baby the practitioner has limited grounds for refusal of a request for CS.

11. ***Induction of labour***. Whilst overall the effect of increasing induction of labour rates is associated with increased CS rates, research[16] shows that women carefully selected have no increase in CS rates. The practice of delaying induction of labour to term plus 10 days, in the absence of contra-indications to waiting, means labour is more likely to occur spontaneously.

[16] Patterson, J. A., Roberts, C. L., Ford, J. B. and Morris, J. M. (2011), Trends and outcomes of induction of labour among nullipara at term. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. doi: 10.1111/j.1479-828X.2011.01339.

Table 41: Births by caesarean section following augmentation of labour 2005-2011

Type of augmentation	Year	Primary	Repeat	Proportion of all augmentations
ARM* only	2005	73	8	10.4
	2006	96	14	11.1
	2007	97	17	12.4
	2008	74	16	10.2
	2009	91	17	11.3
	2010	69	14	11.4
	2011	33	16	11.3
Oxytocin only	2005	84	3	23.3
	2006	97	1	21.4
	2007	91	6	21.3
	2008	113	3	24.6
	2009	97	4	23.0
	2010	85	2	21.2
	2011	66	4	27.0
Oxytocin & ARM*	2005	68	5	21.2
	2006	68	2	24.9
	2007	103	4	24.5
	2008	93	5	24.9
	2009	125	4	29.8
	2010	98	2	31.1
	2011	58	3	28.6
Other	2005	0	0	0.0
	2006	0	0	0.0
	2007	0	0	0.0
	2008	0	0	0.0
	2009	0	0	0.0
	2010	0	0	0.0
	2011	0	0	0.0

* ARM = Artificial Rupture of Membranes

Induction of labour

Table 42: Births by method of birth following induction of labour 2005-2011

Year	Vaginal delivery		Caesarean section		Total	Induction rate
	Number	%	Number	%	Number	%
2005	1 446	80.5	351	19.5	1 797	30.1
2006	1 388	80.4	338	19.6	1 726	27.9
2007	1 322	78.7	357	21.3	1 679	26.5
2008	1 301	78.7	352	21.3	1 653	25.6
2009	1 357	78.1	381	21.9	1 738	27.2
2010	1 319	78.7	358	21.3	1 677	27.3
2011	**1 579**	**75.6**	**510**	**24.4**	**2 089**	**33.0**

The rate of induction of labour has increased since year 2000 (22.9 per cent) as highlighted in previous reports, reaching a peak in 2005 (30.1 per cent) and then remaining relatively steady until 2010, with a higher peak reached in 2011 (33.0 per cent) (see Table 42). These figures are comparable to national figures of 25.7 per cent in 2000 to 25.4 per cent in 2010. In addition, the percentage of CS deliveries has increased over the years to 2011 (see Table 43), with a statistically significant (p=0.005) annual change. The consequences of increasing maternal age are the concomitant increase in complex maternal obstetric conditions such as hypertension, diabetes mellitus, renal disease etc. As these medical conditions are known to potentially impact on the pregnancy and the well-being of the baby it is not surprising that rates of induction of labour have increased.

The true reasons for increased induction of labour and caesarean section in Tasmania remain to be elucidated. Prospective data are necessary to meaningfully analyse these trends and propose interventions that may reverse these trends.

Table 43: Percentage of births by caesarean sections following induction of labour 2005-2011

Year	Births by caesarean section	Induction of labour with caesarean section delivery	
		Number	%
2005	1 596	351	22.0
2006	1 689	338	20.0
2007	1 813	357	19.7
2008	1 895	352	18.6
2009	1 865	381	20.4
2010	1 861	358	19.2
2011	**2 008**	**510**	**25.4**

Table 44: Births by method of birth following induction of labour by public / private hospitals 2005-2011

Year	Vaginal delivery				Caesarean section				Induction rate	
	Public		Private		Public		Private		Public	Private
	Number	%	Number	%	Number	%	Number	%	%	%
2005	912	80.9	534	79.7	215	19.1	136	20.3	28.2	34.5
2006	860	78.0	528	84.6	242	22.0	96	15.4	26.3	31.7
2007	784	77.6	538	81.1	226	22.4	125	18.9	23.7	32.5
2008	787	78.6	513	78.8	214	21.4	138	21.2	23.1	31.0
2009	822	77.7	535	78.7	236	22.3	145	21.3	25.2	31.6
2010	780	78.8	539	78.5	210	21.2	148	21.5	24.6	32.7
2011	**965**	**73.6**	**614**	**78.9**	**346**	**26.4**	**164**	**21.1**	**31.3**	**36.5**

Nationally in 2010, of all women who gave birth, 56.0 per cent had a spontaneous onset of labour; 18.6 per cent of mothers had no labour; and 25.4 per cent of mothers had induced labour while labour was augmented for 18.5 per cent of all mothers, representing 33.3 per cent of mothers with spontaneous onset of labour. Of all women who gave birth nationally in 2010, 56.4 per cent had a non-instrumental vaginal birth; forceps delivery accounted for 4.0 per cent of mothers while vacuum extraction accounted for 8.0 per cent of women who gave birth. Induced labour continues to be significantly more likely ($p<0.001$) in the private sector in Tasmania (36.5 per cent).

There has been a continued increase in the caesarean section rate reported nationally over the last decade with 31.6 per cent of mothers undergoing caesarean section deliveries in 2010 compared to 25.4 per cent reported in year 2001. In contrast, the proportion of instrumental deliveries has remained stable at about 11.0 per cent throughout this period[17]. Again in 2010, national data have shown that caesarean section rates increase with advancing maternal age and continue to be higher among older mothers (e.g., 40.3 per cent for mothers aged between 35 to 39 years old; 48.0 per cent for mothers aged 40 years and over) and those who gave birth in private hospitals (43.1 per cent) compared to the public sector (28.4 per cent).

[17] Li Z, Zeki R, Hilder L & Sullivan EA 2012. Australia's mothers and babies 2010. Perinatal statistics series no. 27. Cat. No. PER 57. Canberra: AIHW National Perinatal Epidemiology and Statistics Unit.

Augmentation of labour

Table 45: Women who gave birth and had augmentation of labour 2005-2011

Year	Artificial Rupture of Membranes	Oxytocin	Other	None	Total number of augmentation	Augmentation rate (%)
2005	768	369	336	4 398	1 473	25.1
2006	979	452	278	4 384	1 709	28.0
2007	912	452	430	4 447	1 794	28.7
2008	877	466	386	4 625	1 729	27.2
2009	952	437	426	4 477	1 815	28.8
2010	725	408	316	4 571	1 449	24.1
2011	**433**	**256**	**212**	**5 318**	**901**	**14.5**

In Tasmania, 14.5 per cent of mothers were reported in 2011to have undertaken augmentation of spontaneous labour, significantly less than in any year since 2005 ($p<0.001$). In contrast, 19.0 per cent of all mothers nationally (2010) were reported to have their labour augmented. Furthermore, in 2010 nationally, the onset of labour was spontaneous for 56.0 per cent of all mothers giving birth and 25.4 per cent of mothers had their labour induced.

Multiple pregnancy

Table 46: Births by multiple pregnancies 2005-2011

Year	Number of infants born from a twin pregnancy	Number of infants born from a triplet* pregnancy
2005	183	3
2006	174	6
2007	188	3
2008	209	3
2009	166	9
2010	234	0
2011	**206**	**0**

* All birth orders >1 are multiple.

Please note that infants who do not survive beyond 20 weeks of gestation, or who do not weigh more than 400 grams are not recorded as a birth, hence some odd numbers in the figures above.

The proportion of multiple births in Tasmania continues to be higher than the national average with 32.8 multiple pregnancies per 1 000 mothers recorded in Tasmania in 2011. There were 15.9 multiple pregnancies per 1 000 mothers in 2010 nationally. Multiple pregnancies in 2010 accounted for 1.6 per cent of all mothers: 4 598 twin pregnancies, 71 triplet pregnancies and 3 quadruplet pregnancies were reported nationally in this year. It has been reported[18] that the number of multiple births has increased in the last two decades where this increasing national trend being most likely attributable to increased fertility-related drugs and reproduction technology; delay in childbearing and the increasing number of older mothers.

Table 47: Perinatal mortality in multiple pregnancies 2005-2011

Year	Twin deaths		Triplet deaths	
	Number	%	Number	%
2005	6	3.3	0	0.0
2006	2	1.1	0	0.0
2007	9	4.8	0	0.0
2008	6	2.9	0	0.0
2009	7	4.2	1	11.1
2010	13	5.6	0	0.0
2011	**8**	**3.9**	**0**	**0.0**

Twin pregnancies encompass monochorionic and dichorionic twins. It is recognised that monochorionic twins pose special risks in the form of (a) diamniotic – twin to twin transfusion syndrome, and (b) monoamniotic – cord entanglement. These pregnancies are often interrupted prematurely so the risks attached are not the same as for singleton pregnancies. The extra risk to second twins has been noted in the literature[19], hence consultant associated management is necessary. There is a widespread trend towards delivering term twins by caesarean section; however these data support the Tasmanian practice of offering vaginal deliveries having ruled out contraindications to vaginal delivery.

Table 48: Perinatal mortality in multiple pregnancies by birth order 2005-2011

Year	Twin 1		Twin 2		Triplet Stillbirth		
	Stillbirth	Neonatal death	Stillbirth	Neonatal death	Triplet 1	Triplet 2	Triplet 3
2005	2	0	3	1	0	0	0
2006	1	0	1	0	0	0	0
2007	1	3	3	2	0	0	0
2008	1	1	2	2	0	0	0
2009	3	1	2	1	0	0	1
2010	5	2	2	4	0	0	0
2011	**1**	**3**	**2**	**2**	**0**	**0**	**0**

[18] Li, Z., McNally, L., Hilder, L. & Sullivan, E.A., (2011), *Australia's mothers and babies 2009*, Perinatal statistics series, No. 25, Cat. no. PER 52, Sydney: AIHW National Perinatal Epidemiology and Statistics Unit.

[19] Smith, G., Pell, J. & Dobbie, R. (2002), 'Birth order, gestational age, and risk of delivery related perinatal death in twins: retrospective cohort study', *British Medical Journal*, vol. 325, 2 November, pp. 1004-1006.

Maternal hypertension

Table 49: Women who gave birth who had pregnancy-induced hypertension 2005-2011

Year	Pre-existing		Pregnancy-induced hypertension*	
	Number	%	Number	%
2005	86	1.5	338	5.8
2006	91	1.5	309	5.1
2007	99	1.6	322	5.2
2008	86	1.4	307	4.8
2009	104	1.7	332	5.3
2010	150	2.5	329	5.5
2011	**404**	**6.5**	**426**	**6.8**

* Due to data accuracy concerns in relation to the recording of pregnancy induced hypertension and pre-eclampsia, these figures have been combined as pregnancy-induced hypertension.

The number of cases of pregnancy-induced hypertension reported in Tasmania in 2011 was significantly higher ($p<0.024$) than figures reported in the previous few years since 2005. The number and percentage of cases of *existing* hypertension have also increased significantly over the years ($p<0.001$).

The increasing rate of obesity in the general population and maternal obesity rates in association with increasing maternal ages in the obstetric population have been found to impact on the state of pregnancy-induced hypertension and have significant potential implications for the well-being of mother and foetus.

Antepartum haemorrhage

Table 50: Women who gave birth and had antepartum haemorrhage 2005-2011

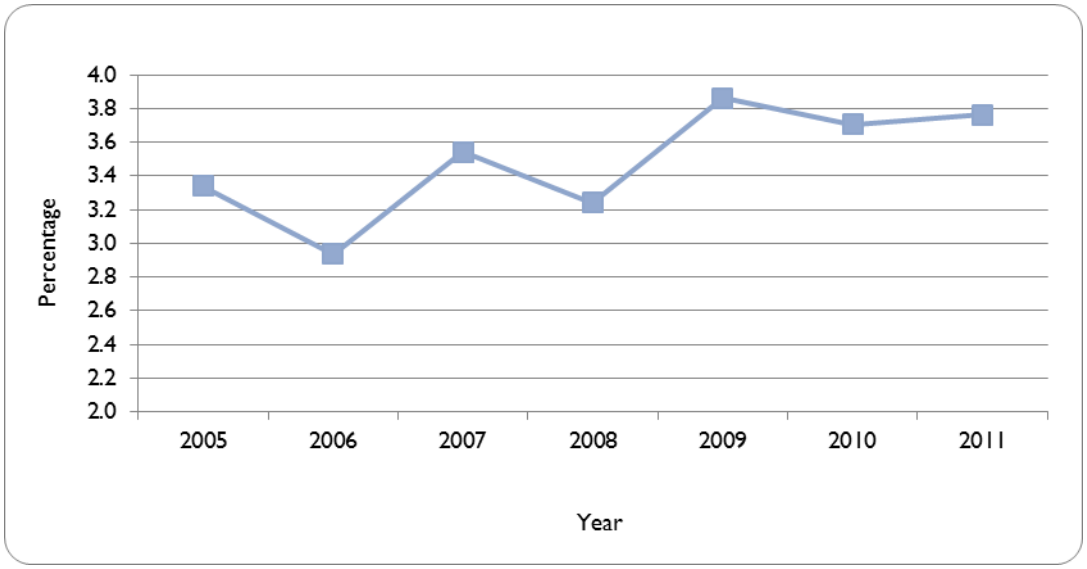
Year	Placenta praevia		Abruptio placenta		APH undetermined	
	Number	%	Number	%	Number	%
2005	22	0.4	20	0.3	104	1.8
2006	28	0.5	17	0.3	85	1.4
2007	25	0.4	17	0.3	106	1.7
2008	32	0.5	18	0.3	97	1.5
2009	22	0.3	26	0.4	97	1.5
2010	21	0.3	24	0.4	123	2.0
2011	**24**	**0.4**	**27**	**0.4**	**138**	**2.2**

Postpartum haemorrhage

Table 51: Women who gave birth and had postpartum haemorrhage 2005-2011

Year	Number	Incidence %
2005	196	3.3
2006	179	2.9
2007	221	3.5
2008	206	3.2
2009	243	3.9
2010	223	3.7
2011	**234**	**3.8**

Figure 16: Percentage of women who gave birth and had postpartum haemorrhage 2005-2011



Smoking and pregnancy

Data exploring the smoking status of Tasmanian women during pregnancy continue to be available for review in 2011 through the recently implemented ObstetrixTas system, supplementing previous work conducted in the 1980's by the late Professor Joe Correy (Obstetric and Neonatal Report, Tasmania 1981) and Dr Neville Newman.

Table 52: Smoking comparison 2011 and 1982

Age	1982* %	Age	2008 %	2009 %	2010 %	2011 %
Overall	35.3	Overall	26.9	24.6	23.0	**17.1**
<20	55.2	<20	49.4	43.0	46.8	**35.7**
21-25	46.0	20-24	43.4	39.6	35.5	**30.8**
26-30	30.2	25-29	25.5	25.1	25.0	**15.5**
30 +	21.2	30-34	18.5	14.5	12.7	**10.6**
		35-39	15.4	14.2	14.0	**9.0**
		40 an over	14.1	18.8	12.8	**9.7**
		Admitted patient election status				
		Public	34.4	32.3	30.5	**22.3**
		Private	6.5	5.7	5.4	**4.0**

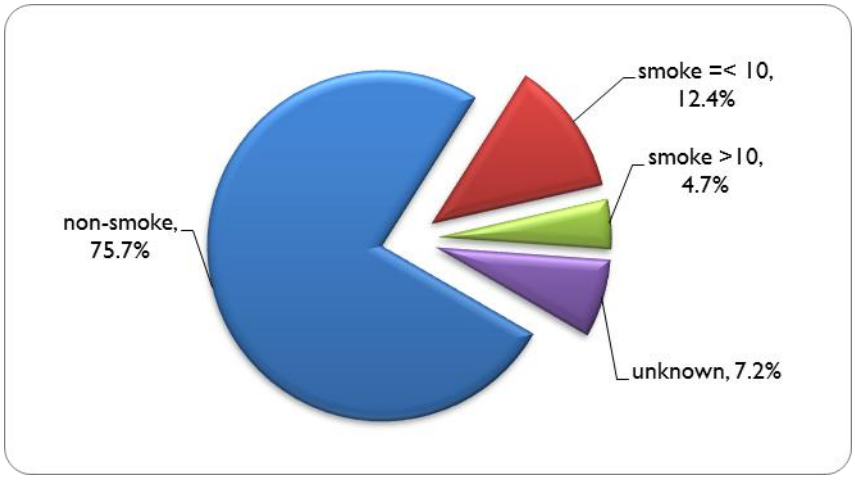
*Obstetric and neonatal Report – Tasmania 1982

The 2011 data on smoking prevalence during pregnancy are derived from self-reported information obtained by clinicians from the mother and reported on *ObstetrixTas* system.

Smoking during pregnancy is regarded as one of the key preventable causes of low birth weight and pre-term birth. Low birth weight (LBW) babies (less than 2 500 grams) are more likely to die in the first year of life and are more susceptible to chronic illness later in life, such as heart and kidney disease and diabetes.

In 2011, a significantly ($p<0.001$) reduced proportion of Tasmanian women compared to previous years had indicated that they had smoked tobacco during their pregnancy (17.1 per cent) , with 12.4 per cent reporting to have smoked less than 10 cigarettes per day and 4.7 per cent reporting to have smoked more than 10 cigarettes daily.

Figure 17: Self-reported tobacco smoking status during pregnancy in Tasmania 2011



Number of mothers who reported = 6 220

Data available for other jurisdictions show that in 2010, Tasmania showed that in this year it had the second highest proportion of women who smoked during pregnancy (see Table 53) following Northern Territory. Overall nationally, 13.5 per cent of women in these states and territories smoked during pregnancy[20]. It is indeed extremely heartening however to find that in 2011 that there was a marked reduction in the proportion of women who had reported to have smoked (17.1 per cent) compared to previous years (e.g., 23.0 per cent in 2010).

Table 53: Proportion of women smoking tobacco during pregnancy by state and territory 2010

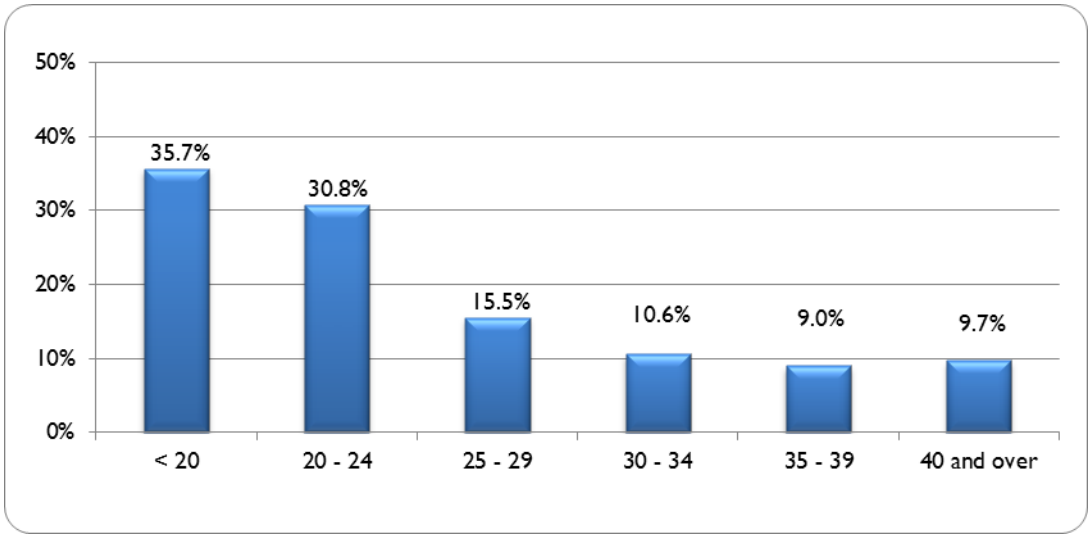
Jurisdiction	Proportion of women who smoked during pregnancy
NT	25.5
TAS	23.0
SA	17.4
QLD	17.2
WA	12.0
ACT	11.2
NSW	11.2
VIC	11.8

Source: Li, Z., Zeki, R., Hilder, L. & Sullivan, E.A., (2012), *Australia's mothers and babies 2010*, Perinatal statistics series, No. 27, Cat. no. PER 57, Sydney: AIHW National Perinatal Epidemiology and Statistics Unit.

[20] Li, Z., Zeki, R.., Hilder, L. & Sullivan, E.A., (2012), *Australia's mothers and babies 2010*, Perinatal statistics series, No. 27, Cat. no. PER 57, Sydney: AIHW National Perinatal Epidemiology and Statistics Unit.

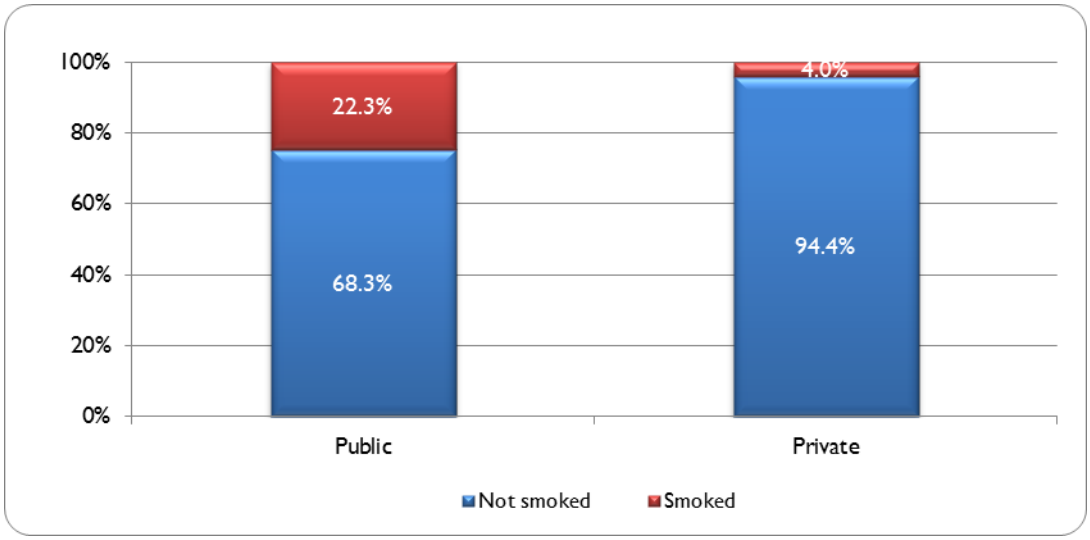
Table 52 and Figure 18 show that maternal smoking continues to be more prevalent among younger women in Tasmania, particularly those aged less than 20 years. Again, however, in 2011 the proportion of women in this age group (35.7 per cent) was significantly less than reported in previous years (e.g., 46.8 per cent in 2010). The proportion of women aged 30 years and over who smoked during pregnancy also continues to decline, from 13.1 per cent in 2010 to 10.0 per cent in 2011; this difference was statistically significant ($p<0.001$). It is encouraging to note that there is a statistically significant ($p<0.016$) reduction in mothers smoking during pregnancy across most age groups reported in 2011. Only the decreases in maternal smoking in the 30-34 and 40 years and over age groups were not statistically significant ($p>0.05$).

Figure 18: Self-reported tobacco smoking status during pregnancy by age in Tasmania 2011



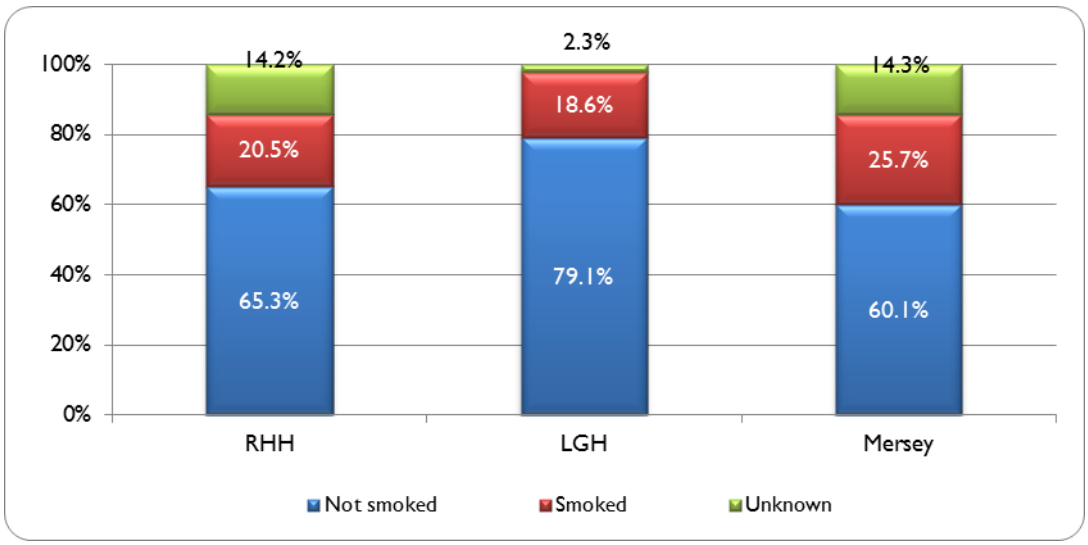
There has been a decrease in smoking during pregnancy in both private patients (4.0 per cent in 2011 vs. 5.4 per cent in 2010) and public patients (22.3 per cent in 2011 *vs.* 30.5 per cent in 2010), with the reduction for public patients being statistically significant ($p<0.001$). However, smoking during pregnancy continues to be more prevalent for public patients (22.3 per cent) compared to private patients (4.0 per cent) (Figure 19). As reported in previous years, this trend continues to reflect the higher prevalence of smoking among lower socio-economic groups. Again, it is encouraging though to find that the percentage reported in 2011 for public patients who smoked during pregnancy is significantly lower than the percentage reported in the previous year.

Figure 19: Self-reported smoking status by admitted patient election status in Tasmania 2011



For patients delivering in public hospitals, as shown in Figure 20, smoking during pregnancy was reported in 2011 most frequently by patients at the Mersey Community Hospital (25.7 per cent) down from 31.1 per cent followed by the Royal Hobart Hospital (20.5 per cent) down from 30.6 per cent the previous year, and the least frequently (18.6 per cent) reported by patients at the Launceston General Hospital which was down from levels reported in the previous year (24.5 per cent). The reduction in the level of maternal smoking reported was statistically significant for both the Royal Hobart Hospital and the Launceston General Hospital ($p<0.001$). It is important to remember that a key factor in the variations reported between public hospitals relates to the differences in the patient mix at the three hospitals.

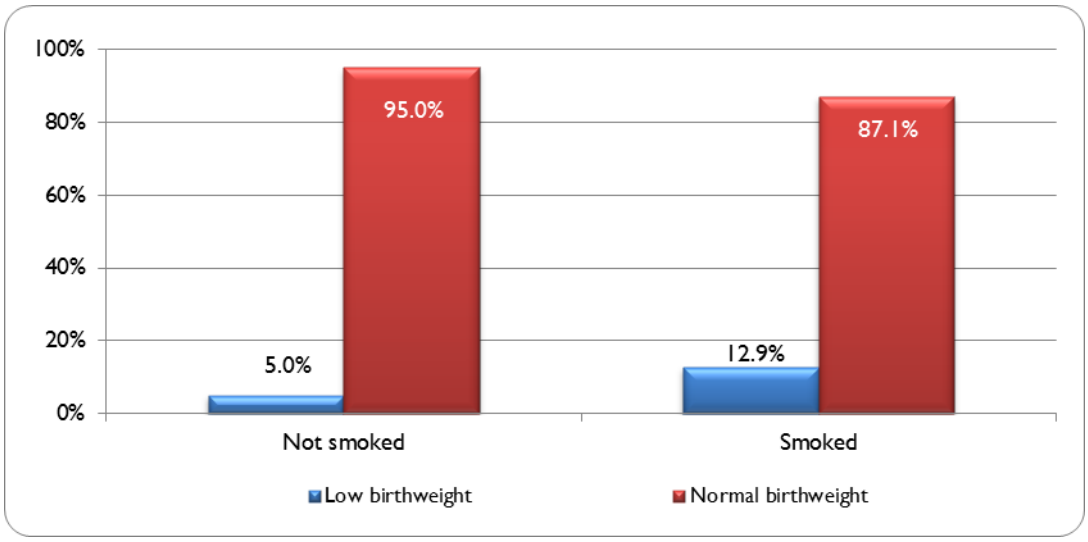
Figure 20: Self-reported tobacco smoking status during pregnancy by public hospital in Tasmania 2011



Low birthweight (LBW) is defined as a weight of less than 2 500 grams and includes babies that are small for gestational age as well as premature.

Based on the number of births (excluding multiple births, as multiparous births often result in low birth weight babies regardless of the mother's smoking status) whose mothers answered the smoking questions, a total of 399 babies had a birthweight of less than 2 500 grams. Of these, around 22.8 per cent (*91*) had a birthweight of less than 1 500 grams (very LBW). In 2011, a total of 12.9 per cent of all women who had smoked in pregnancy had a LBW baby compared to 5.0 per cent of women who reported not to have smoked (see Figure 21), a difference which is statistically significant ($p<0.001$). This figure representing the proportion of low birth weight babies in mothers who smoked remains a finding which continues to highlight the potential deleterious effects of smoking on birth weight. The relative risk of having a LBW baby in 2011 was 2.56 (95%CI: 2.09, 3.13) in women who smoked in pregnancy compared with those who reported not to smoke.

Figure 21: Self-reported smoking status during pregnancy by birthweight in Tasmania 2011



Note: Multiparous births have been omitted;

It continues to be important to note that a number of sources of error may influence the strength of this association. For example, since some women may be uncomfortable in disclosing their smoking status during the course of their pregnancy the reported data may not therefore provide an accurate measure of trends. Furthermore, maternal smokers may have other risk factors associated with LBW babies including younger maternal age, poorer prenatal care, inadequate maternal weight gain or other substance abuse. Such factors were not adjusted for in the analyses. If one or more of these factors is positively associated with LBW, they may be responsible for some of the excess risk that is attributed to maternal smoking. That is, the relative risk estimate of RR = 2.56 may be an overestimate due to confounding (Epidemiology Unit, Population Health, 2013).

Smoking in pregnancy: comments from the Council

As cited previously, evidence suggests that smoking cessation strategies do result in a reduction in the frequency of smoking, where low cost/intensity strategies, utilising maternity care providers at antenatal visits have been found to be as effective as high intensity strategies.

In view of this evidence, QUIT Tasmania continues to use the resource developed by Quit South Australia in 2008 to train midwives on how to provide intervention on smoking cessation during pregnancy. QUIT Tasmania have also trained staff that can provide counselling support specifically for pregnant women on the Quitline. Positive outcomes have been welcomed where the review of the data available from 2011 has particularly demonstrated that such smoking cessation programmes as undertaken by Quit Tasmania are providing beneficial effects across all age groups in this year especially with regard to younger mothers aged between 24 years and under. Positive outcomes from these smoking cessation programmes have also been welcomed at both public and private hospitals.

In general, the positive findings found across age groups and within both public and private hospitals demonstrate that such interventions to reduce smoking in pregnancy continue to be important especially in view of evidence suggesting that where intrauterine growth restriction continues to be a significant contributor to perinatal mortality, any strategy that reduces the incidence of growth restriction may correspondingly reduce the stillbirth rate.

Recommendation:

As reported in previous years, interventions to reduce smoking in pregnancy are important particularly in view of reducing the incidence of growth restriction and potentially stillbirth rate. Standard antenatal care should therefore continue to incorporate smoking reduction advice for all women who smoke as provided by QUIT Tasmania.

Alcohol consumption and pregnancy

The effects of alcohol consumption during pregnancy have been extensively reported in medical literature. Alcohol is evidenced to have deleterious effects on foetal development and birth outcomes. Alcohol is a teratogen and exposure of the foetus to alcohol may result in a spectrum of adverse effects - *Foetal Alcohol Spectrum Disorders* (FASD)[21]. *Foetal Alcohol Syndrome* (FAS) has been described in children exposed to high levels of alcohol in utero as a result of either chronic or intermittent maternal alcohol use[10]. Alcohol has been found to cross the placental barrier causing such problems as reduced foetal growth or weight, characteristic facial abnormalities, damaged neurons and brain structures as well as other physical, mental or behavioural problems[22]. In particular, the primary effect of FAS is permanent central nervous system damage, especially to the brain. Furthermore, developing brain cells and structures are underdeveloped or malformed by prenatal alcohol exposure and as such are often associated with an array of primary cognitive and functional disabilities (e.g., attention and memory deficits) and secondary disabilities (e.g., mental health problems and drug addiction)[23]. In fact, foetal alcohol exposure has been found to be a primary cause of neurological problems and mental retardation[24]. Of great concern is that while the risk of birth defects is greatest with high, frequent maternal alcohol intake during the first trimester, alcohol exposure throughout pregnancy, and before a pregnancy is confirmed, can have negative consequences on the development of the foetal brain since the foetal brain continues to develop throughout the whole pregnancy[10,25].

High level and/or frequent intake of alcohol in pregnancy has also been associated with increased risk of miscarriage, stillbirth and premature birth[26]. In addition, there is new evidence to suggest that prenatal alcohol exposure may increase the risk of alcohol dependence in adolescence[27].

It is also necessary to highlight that timing is important and not all "heavy" drinkers will have an affected child[10].

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[21] National Health and Medical Research Council (NHMRC) (2009), *Australian Guidelines to Reduce Health Risks from Drinking Alcohol*, Canberra.

[22] Ulleland, C.N. (1972). The offspring of alcoholic mothers. Annals New York Academy of Sciences, 197, 167-169. PMID 4504588.

Streissguth, A. (1997). Fetal Alcohol Syndrome: A Guide for Families and Communities. Baltimore: Brookes Publishing. ISBN 1-55766-283-5.

[23] Streissguth, A.P., Barr H.M., Kogan, J. & Bookstein, F.L. (1996). Understanding the occurrence of secondary disabilities in clients with fetal alcohol syndrome (FAS) and fetal alcohol effects (FAE): Final report to the Centers for Disease Control and Prevention on Grant No. RO4/CCR008515 (Tech. Report No. 96-06). Seattle: University of Washington, Fetal Alcohol and Drug Unit.

[24] Abel, E.L., & Sokol, R.J. (1987). Incidence of fetal alcohol syndrome and economic impact of FAS-related anomalies: Drug alcohol syndrome and economic impact of FAS-related anomalies. Drug and Alcohol Dependency, 19(1), 51-70. PMID 3545731.

[25] Guerri, C. (2002). Mechanisms involved in central nervous system dysfunctions induced by prenatal ethanol exposure. Neurotoxicity Research, 4(4), 327-335. PMID 12829422.

[26] O'Leary C.M., (2004). Fetal alcohol syndrome: diagnosis, epidemiology and developmental outcomes. Journal of Paediatric Child Health, 40: 2-7.

[27] Alanti R., Mamun, A.A., Williams, G. et.al., (2006). In utero alcohol exposure and prediction of alcohol disorders in early adulthood: A birth cohort study. Arch. Gen. Psychiatry, 63: 1009-1016.

In view of the potential problems associated with alcohol consumption during pregnancy, data exploring the alcohol consumption status of Tasmanian women during pregnancy were available for review last year and continue to be collected for review. Available data on alcohol consumption during pregnancy is derived from self-reported information obtained by clinicians from the mother and reported to the Perinatal Data Collection.

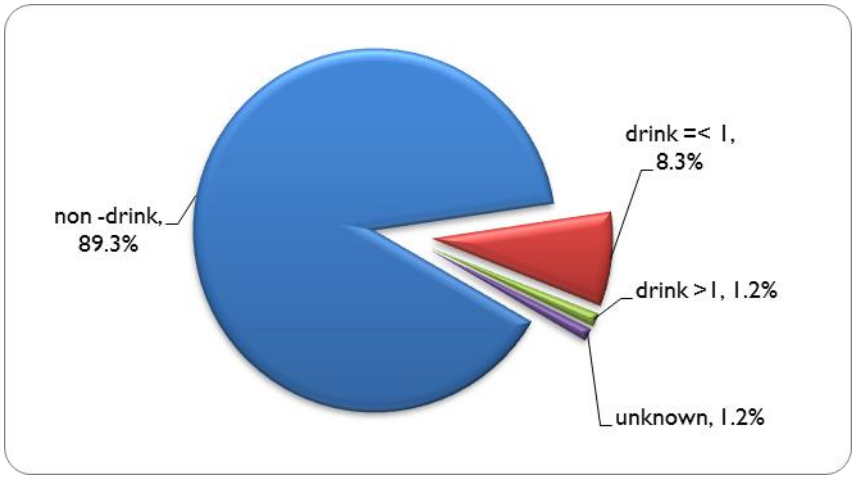
In 2011, a total of 6 220 pregnant women in Tasmania reported on their use of alcohol during pregnancy. As with the data available for smoking during pregnancy, it is important to note that some women may be similarly uncomfortable in disclosing their alcohol consumption status during the course of their pregnancy and as such the data provided may not be entirely accurate.

Table 54 and Figure 22 below show that overall 9.5 per cent of Tasmanian women indicated that they had consumed alcohol during their pregnancy with 8.3 per cent reporting to have consumed less than one standard alcoholic drink per day and 1.2 per cent reporting to have consumed more than one alcoholic drink per day. The overall proportion of women reported to have consumed alcohol in 2011 is slightly higher than reported in 2010 (not statistically significant) but significantly ($p<0.002$) lower than in 2009 and 2008.

Table 54: Alcohol consumption in 2010

Age	**2008** %	**2009** %	**2010** %	**2011** %
Overall	12.7	11.2	9.2	9.5
<20	14.7	8.7	8.7	8.1
20-24	13.0	10.5	8.8	10.0
25-29	10.3	9.8	8.0	8.3
30-34	12.6	11.0	8.5	10.2
35-39	15.4	16.1	11.6	10.8
40 and over	17.7	11.7	16.5	8.4
Admitted patient election status				
Public	11.9	9.7	9.3	10.9
Private	15.5	15.0	9.0	5.9

Figure 22: Self-reported alcohol consumption status during pregnancy in Tasmania 2011



Number of mothers who reported = 6 220

It appears that maternal alcohol consumption continues to be more prevalent among the older mothers in Tasmania especially after the age of 35 years. It is interesting to note however that in the 20-24 year old age group there was a slight (not statistically significant) increase in the proportion of women in this age group reported to have consumed alcohol during pregnancy (10.0 per cent) compared to the previous year (8.8 per cent). The proportion of women consuming alcohol during pregnancy in 2011 appears to be lowest for women aged between 25 to 29 years and less than 20 years (Table 54 & Figure 23).

Figure 23: Self-reported alcohol consumption status during pregnancy by age in Tasmania 2011

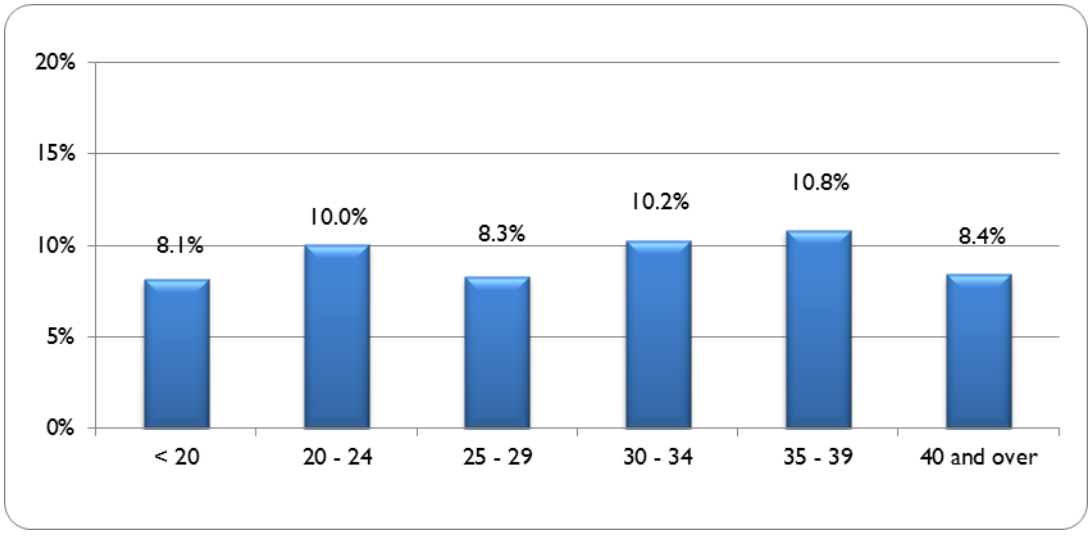
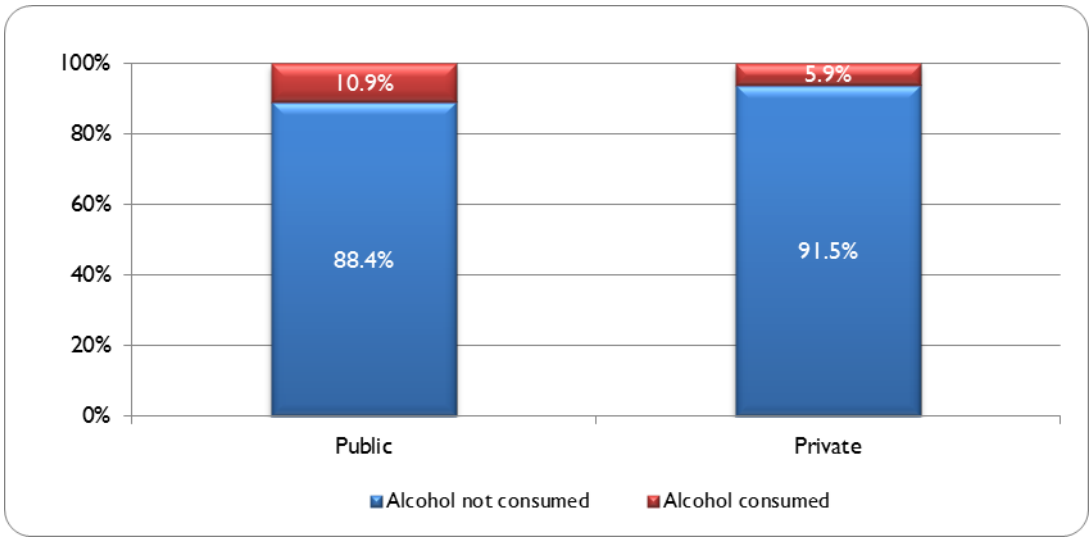


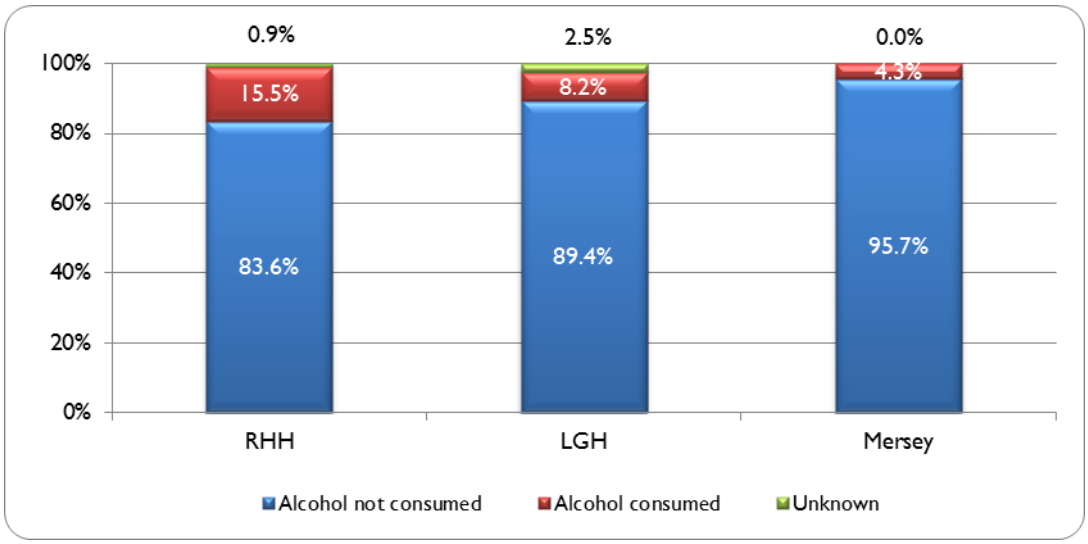
Figure 24: Self-reported alcohol consumption status by admitted patient election status in Tasmania 2011



Alcohol consumption during pregnancy by private patients (5.9 per cent) is less prevalent in 2011 compared to levels reported in recent years, with the reduction in these levels being statistically significant ($p<0.001$), and also is significantly less ($p<0.001$) than the level reported in public patients (10.9 per cent) in 2011, as shown above in Table 54 & Figure 24. Of those who reported consuming alcohol during pregnancy, the consumption of more than one alcoholic drink was reported by 14.9 per cent of public patients and 3.9 per cent of private patients.

With regard to the proportion of Tasmanian mothers from public hospitals reporting to have consumed alcohol during pregnancy, Figure 25 shows that in 2011, alcohol consumption during pregnancy was reported at the highest level by patients at the Royal Hobart Hospital (15.5 per cent), followed by patients at the Launceston General Hospital (8.2 per cent) and finally at Mersey Community Hospital (4.3 per cent). Interestingly, the increased proportion of patients reporting at the Royal Hobart Hospital (15.5 per cent) since the previous year (10.2 per cent) was a significant rise in this group ($p<0.001$). Likewise, in 2011 there was an increase in the proportion of patients who reported to have consumed alcohol at the Mersey Community Hospital (4.3 per cent) compared to the previous year (2.7 per cent); however, this increase was not statistically significant ($p>0.05$). Conversely, there were significantly ($p=0.049$) fewer patients at the Launceston General Hospital who reported alcohol consumption during pregnancy in 2011 (8.2 per cent) compared to the previous year (10.2 per cent). Similar to the smoking and pregnancy data, a key factor in these variations may relate to difference in the patient mix at the three hospitals.

Figure 25: Self-reported alcohol consumption status during pregnancy by public hospital in Tasmania 2011

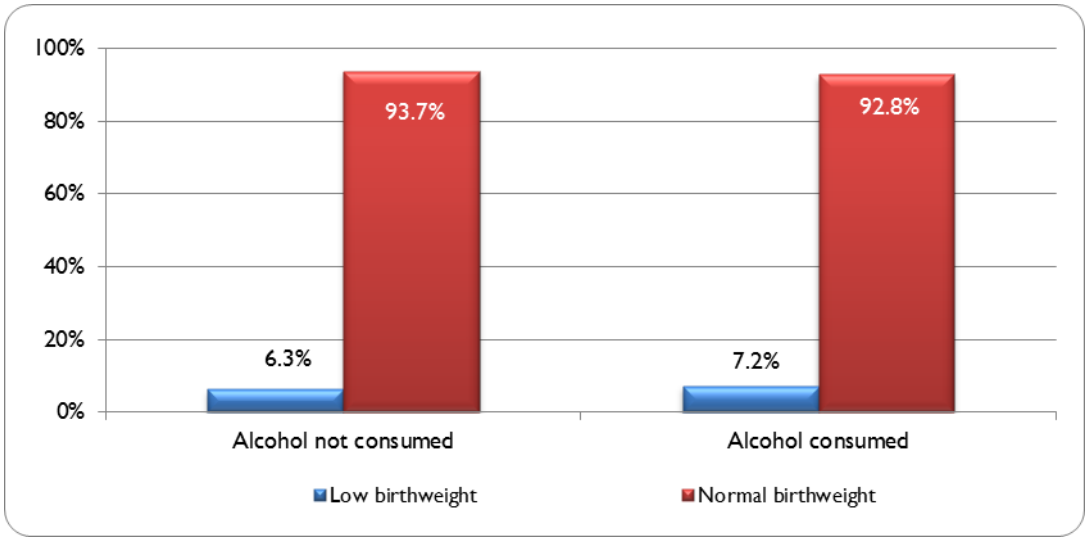


As indicated previously, low birthweight (LBW) is defined as a weight of less than 2 500 grams and includes babies that are small for gestational age as well as premature.

Based on the number of births (excluding multiple births, as multiparous births often result in low birth weight babies regardless of the mother's smoking status) whose mothers answered the alcohol consumption questions, a total of 399 babies, had a birthweight of less than 2 500 grams. Of these, 22.8 per cent (91) had a birthweight of less than 1 500 grams (very LBW). In 2011, a total of 7.2 per cent of all women who had consumed alcohol during pregnancy had a LBW baby compared to 6.3 per cent of women who reported not to consumed alcohol (Figure 26), a difference which was not statistically significant ($p>0.05$). The relative risk of having a LBW baby in 2011 was 1.14 (95% CI: 0.84, 1.55) in women who consumed alcohol in pregnancy compared to those who reported not having consumed alcohol, a ratio which was not statistically significant.

It is important to note that a number of sources of error may influence findings of this analysis. Since some women may be uncomfortable in disclosing alcohol consumption during the course of their pregnancy, the reported data may not provide an accurate measure of alcohol consumption during pregnancy. Furthermore, other risk factors associated with LBW babies may be involved, including smoking, younger maternal age, poorer prenatal care, inadequate maternal weight gain, or other substance abuse. Such factors were not adjusted for in the analyses.

Figure 26: Self-reported alcohol consumption status during pregnancy by birthweight in Tasmania 2011



Recommendation:

In relation to recommendations around alcohol consumption during pregnancy from the *NHMRC Australian Guidelines to Reduce Health Risks from Drinking Alcohol,* Australian Government, *2009 (c.f. Guideline 4: Pregnancy and breastfeeding)* Council agrees that:

A. For women who are pregnant or planning pregnancy, not drinking is the safest option.

B. For women who are breastfeeding, not drinking is the safest option.

Attachment A: Guidelines for Investigation of "Unexplained" Stillbirths

Introduction

For stillbirths where the cause is obvious, investigations should be targeted towards the cause. In all other cases where no cause is determined, the following guideline should be used.

A thorough and systematic approach will result in the likelihood of a cause being found and would help in counselling patients and might help prevent recurrences. While the list below is not meant to be comprehensive, it should serve as a guideline for investigation of stillbirths. All hospitals within the state are encouraged to implement the guideline.

Guideline

Detailed medical and social history of the mother

A possible cause for the stillbirth like intercurrent infection, cholestasis of pregnancy or drug use may be elicited by careful history taking and examination of the antenatal record.

Histopathology of placenta

Whether or not an autopsy is performed, all placentas should be sent for examination. The placenta should be placed in a dry sterile container (no formalin or saline), and sent for histopathological examination.

External examination of the baby

In cases where parental consent for autopsy cannot be obtained, external examination of the baby should be performed preferably by a perinatal pathologist or an experienced neonatologist. In addition, **clinical photographs, X-rays** and if possible **MRI** scans should be done.

Autopsy of the baby

After informed parental consent, an autopsy should be conducted by an experienced perinatal pathologist. One of the senior clinicians involved with the care of the patient should counsel the couple and explain the need for autopsy. Where consent for a full autopsy cannot be obtained from the parents, efforts should be made to at least obtain consent for limited autopsy including needle biopsies of appropriate organs.

Karyotype

Ideally obtained by amniocentesis prior to delivery, but if consent not obtained then placental biopsy and/or cord blood (if obtainable) or foetal skin should be sent for chromosomal analysis. Chromosomal analysis is still possible in macerated foetuses.

Maternal Investigations

Where there is no obvious cause for death, the following investigations should also be performed:

a) Full Blood Count
b) Maternal antibody screen
c) Kleihauer Test (blood should be obtained prior to delivery)
d) HbA1c (GTT if indicated)
e) Liver function tests including serum bile acids
f) Renal function tests including uric acid
g) Thrombophilia screen including Anticardiolipin antibodies, Lupus anticoagulant and Activated protein C resistance
h) Maternal serology – CMV, Toxoplasmosis and Parvovirus (Rubella and syphilis if not already done antenatally)
i) Microbiology – foetal ear and throat swab, placental swab
j) Drug history and urine drug screen if indicated

Attachment B: Perinatal Data Collection Form

PERINATAL DATA COLLECTION FORM — **CONFIDENTIAL**

This form is to be completed for all babies (both liveborn & stillborn) who have a gestational age greater than 20 weeks or who weigh greater than 400 grams at birth.

(Tas. Perinatal Registry Act 1994)

For multiple births please complete one form for each baby.

Denotes Additional section to be completed

** Denotes that more than 1 box may be ticked

1. **Hospital Code** ☐☐☐☐

MOTHERS' DETAILS

2. **Full name** _____
3. **Unit Record Number** ☐☐☐☐☐☐
4. **Date of Birth** ____ / ____ / 1 9 ____
5. **Residential Suburb** _____
6. **Postcode** ☐☐☐☐
7. **Country of Birth** _____
8. **Indigenous Status**
   - ☐ Neither Aboriginal nor Torres Strait Islander
   - ☐ Aboriginal
   - ☐ Torres Strait Islander
   - ☐ Both Aboriginal & Torres Strait Islander
9. **Number of Previous**
   - ☐☐ Livebirths
   - ☐☐ Stillbirths
   - ☐☐ Ectopic Pregnancy
   - ☐☐ Miscarriage
   - ☐☐ Terminated Pregnancy
10. **Parity** (after delivery) ☐☐
11. **Neonatal deaths?** ☐ Yes ☐ No Number ____
12. **Previous Caesarean** ☐ Yes ☐ No Number ____
13. **Mode of last delivery** ☐ Vaginal ☐ Caesarean Section ☐ N/A
14. **Estimated date of confinement** ____ / ____ / 2 0 ____
15. **Determined by** (select most accurate option only)
    - ☐ Known conception
    - ☐ Known date LMP
    - ☐ Ultra sound < 12 weeks
    - ☐ Ultra sound > 12 weeks
16. **Is this pregnancy the result of assisted reproductive technology?** ☐ Yes ☐ No
17. **Intended place of birth** ☐ Hospital ☐ Birth Centre ☐ Home/Other
18. **Intending to breastfeed** ☐ Yes ☐ No ☐ Unsure
19. **Antenatal Testing** **
    - ☐ None
    - ☐ 1st Trimester Downs Screening
    - ☐ 2nd Trimester Downs Screening
    - ☐ Amniocentesis
    - ☐ Chorion villus sampling
    - ☐ Screening for Gestational Diabetes
    - ☐ GBS Screen
    - ☐ Level 2 Ultrasound
20. **Plurality** ☐ Single ☐ Multiple No. ___

MOTHER's DETAILS (cont.)

21. **Pre Pregnancy Conditions** **
    - ☐ None
    - ☐ Cardiovascular
    - ☐ Thyroid
    - ☐ Diabetes Mellitus
    - ☐ Other _____
    - ☐ Mental Health
    - ☐ Renal Disease
    - ☐ Epilepsy
    - ☐ Hypertension
22. **During this pregnancy has the mother:**
    - i. Smoked tobacco ☐ Yes ☐ < 10/day ☐ > 10/day ☐ No
    - ii. Consumed alcohol ☐ Yes ☐ < 1 standard/day ☐ > 1 standard/day ☐ No
    - iii. Smoked marijuana ☐ Yes ☐ No
    - iv. Used other recreational drugs ☐ Yes ☐ No

DELIVERY DETAILS

23. **Date of Admission in which delivery occurs** ____ / ____ / 2 0 ____
24. **Admitted Patient Election Status** ☐ Public ☐ Private ☐ Not applicable
25. **Transfer of Patient Prior to delivery**
    - ☐ No transfer
    - ☐ Hospital to hospital
    - ☐ Birth Centre to hospital
    - ☐ Home to hospital (intended homebirth only)
26. **Obstetric Complications** **
    - ☐ None
    - ☐ Bleed < 20 weeks (threatened miscarriage)
    - ☐ Placenta Previa
    - ☐ APH undetermined origin
    - ☐ Placental abruption
    - ☐ Threatened premature labour
    - ☐ Pregnancy induced hypertension
    - ☐ Pre-eclampsia
    - ☐ Prolonged rupture of membranes (> 18 hours)
    - ☐ Pre-labour rupture of membranes
    - ☐ Gestational Diabetes
    - ☐ Other _____
27. **Labour** ☐ Spontaneous ☐ Induced ☐ None
28. **Method of Induction** **
    - ☐ Prostaglandin
    - ☐ Balloon
    - ☐ ARM
    - ☐ Oxytocin
29. **Indication for induction of labour** **
    - ☐ Social/geographical
    - ☐ Post dates
    - ☐ Maternal indications
    - ☐ Fetal indications
30. **Augmentation of labour** (both ARM & Oxytocin may be ticked) ☐ Not Augmented ☐ ARM ☐ Oxytocin
31. **Analgesia during Labour** **
    - ☐ None
    - ☐ O_2/Nitrous Oxide
    - ☐ IM Opioids
    - ☐ Epidural/Caudal
    - ☐ IV Opioids
    - ☐ Pudendal
    - ☐ Spinal
    - ☐ Other

DELIVERY DETAILS (cont.)

32. **Principal Accoucheur**
☐ Obstetrician ☐ Midwife ☐ GP Obstetrician
☐ Hospital Medical Officer ☐ Other

33. **Labour & Delivery Complications** **
☐ None
☐ Grade 2- 3 meconium
☐ Shoulder Dystocia
☐ Primary PPH (greater than 500 mls in first 24 hrs)
☐ Retained placenta (requiring manual removal)
☐ Other _____

34. **Perineal Status** **
☐ Intact
☐ 1st degree tear
☐ 2nd degree tear
☐ 3rd degree tear
☐ 4th degree tear
☐ Episiotomy

35. **Indication for Caesarean Section** **
☐ Maternal Indications (includes patient's choice)
☐ Dystocia (FTP, CPD)
☐ Abnormal Presentation
☐ Fetal Indications
☐ Failed Induction
☐ Failed trial of instrumental delivery
☐ Elective Repeat

36. **Was the Caesarean Section:**
a) ☐ Elective ☐ Emergency
b) ☐ Primary ☐ Repeat

37. **Anaesthesia for delivery** **
☐ None ☐ Spinal
☐ Local anaesthetic ☐ Epidural/Caudal
☐ Pudendal ☐ General Anaesthetic

BABY'S DETAILS

38. **Unit Record Number** ☐☐☐☐☐☐

39. **Date of Birth** ____ / ____ / 2 0____

40. **Presentation at Vaginal Birth**
☐ Vertex ☐ Face ☐ Other
☐ Breech ☐ Brow

41. **Mode of Birth**
☐ Non-instrumental vaginal
☐ Forceps - low ☐ Vacuum extraction
☐ Forceps - mid ☐ Vacuum rotation
☐ Forceps rotation ☐ Caesarean Section

42. **Birth Status**
☐ Liveborn ☐ Stillborn

43. **Apgar score** at 1 minute ☐☐
at 5 minutes ☐☐

44. **Cord pH**
☐ not done ☐ < 7.2 ☐ ≥ 7.2

45. **Gestational age at birth** ☐☐ (completed weeks)

46. **Weight** ☐☐☐☐ (grams)

47. **Sex**
☐ Male ☐ Female ☐ Indeterminate

BABY'S DETAILS (cont.)

48. **Birth Order**
☐ Singleton ☐ Twin/Triplet 2
☐ Twin/Triplet 1 ☐ Triplet 3

49. **Actual Place of Birth**
☐ Hospital ☐ Birth centre ☐ Home or other

50. **Resuscitation at Birth** **
☐ None
☐ Suction
☐ Passive Oxygen Therapy
☐ Bag & Mask IPPV
☐ Endoctracheal intubation & IPPV
☐ External Cardiac Massage
☐ Adrenaline

51. **Medical Admission to SCN/ICU**
☐ Yes Number of days ☐☐
☐ No

52. **Congenital Abnormalities** **
☐ None
☐ Malformation of nervous system
☐ Malformation of eye, ear, face & neck
☐ Malformation of circulatory system
☐ Cleft lip and cleft palate
☐ Malformations of digestive system
☐ Malformation of genital organs
☐ Malformation of urinary system
☐ Malformation of musculoskeletal system
☐ Chromosomal malformations
☐ Inborn errors of metabolism
☐ Other _____

53. MOTHER'S DISCHARGE

☐ Discharged ____ / ____ / 2 0____
☐ Transferred ____ / ____ / 2 0____
☐ Died ____ / ____ / 2 0____

54. **Breastfeeding at Discharge**
☐ Fully ☐ Partially ☐ Not at all

55. BABY'S DISCHARGE

☐ Discharged ____ / ____ / 2 0____
☐ Transferred ____ / ____ / 2 0____
☐ Died ____ / ____ / 2 0____
☐ Still in hospital at 28 days of age

56. **Reason for Transfer of Baby**
☐ Medical ☐ Other

Please complete the
☐ Stillbirth or Neonatal Death Forms
and / or
☐ Congenital Abnormality Notification Form

Please attach the
☐ Maternal Death Reporting Form
This is a separate form.

Congenital Abnormality Notification Form

This form must be completed for all infants (both liveborn and stillborn) where a congenital abnormality is detected.

To be completed by the Paediatrician

Please list each anomaly separately:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Case Summary

_____

_____

_____

_____

_____

_____

_____

_____

Signature: _____

Designation: _____

Date: _____ / _____ / 2 0_____

Stillbirth Clinical Review Form

This form must be completed for all stillborn infants who are greater than 20 weeks gestation, or who weigh more than 400 grams at birth

To be completed by the Obstetric Registrar or Consultant

** Denotes that more than 1 box may be ticked

1. **Tests of fetal wellbeing under taken after 20 weeks** **
   - ☐ CTG
   - ☐ Ultrasound
   - ☐ Amniocentesis
   - ☐ U/S Doppler
2. **Rupture of membranes prior to labour**
   - ☐ Yes — Number of hours prior to delivery _____
   - ☐ No
   - ☐ Uncertain
3. **Was there clinical or ultrasound evidence of IUGR (EFW ≤ 10% for GA)**
   - ☐ Yes
   - ☐ No
4. **Liquor** **
   - ☐ Clear
   - ☐ Bloodstained
   - ☐ Infected
   - ☐ Meconium (grade 2-3)
5. **Placenta - clinical evidence of:**
   - ☐ Abruption
   - ☐ Vasa Praevia
   - ☐ Infarction
6. **Cord - clinical evidence of:**
   - ☐ Prolapse
   - ☐ True Knot
7. **Fetal Heart Monitoring during Labour** **
   - ☐ Intermittent CTG
   - ☐ Intermittent Auscultation
   - ☐ Not applicable
   - ☐ Continuous electronic
   - ☐ No Monitoring
8. **Was fetal scalp blood pH monitoring performed?**
   - ☐ Yes Result _____ ☐ No
9. **Was Cord pH measured?**
   - ☐ Yes Result _____ ☐ No
10. **Maternal Investigations** **
    - ☐ HbA1C
    - ☐ TORCH Screen
    - ☐ Kleihauer
    - ☐ Antiphospholipid Antibodies
    - ☐ Fetal Karyotyping
    - ☐ Thrombophilia Screen
11. **Autopsy Performed** ☐ Yes ☐ No
12. **Cause of death**

    _____
13. **Antecedent cause of death**

    _____

    _____

    _____
14. **Case Summary**

    _____

    _____

    _____

Signature: _____

Date: _____ / _____ / 2 0_____

Neonatal Death Clinical Review Form

This form must be completed for all infants who are liveborn but die before 29 days of age.

To be completed by the Paediatrician

** Denotes that more than 1 box may be ticked

1. **Apgar score at 10 minutes** ☐☐

2. **Trauma suffered** **

- ☐ Nil trauma
- ☐ Fractures
- ☐ Bruising
- ☐ Other _____

3. **Was surgery performed during the infants life?**

- ☐ No
- ☐ Yes

Please specify

_____

_____

4. **Was there proven evidence of infection?**
(e.g. positive cultures of blood or CSF)

- ☐ No
- ☐ Yes

Please specify the organisms isolated

_____

_____

_____

5. **What antibiotics were given?**

_____

_____

_____

6. **Complications in the neonatal period** **

- ☐ Nil
- ☐ Pneumothorax
- ☐ Bronchopulmonary dysplasia
- ☐ Intraventricular haemorrhage
- ☐ Necrotising enterocolitis
- ☐ Other

Please specify

_____

_____

7. **Autopsy Performed?**

- ☐ No
- ☐ Yes

Neonatal Death Clinical Review Form (cont.)

8. **Cause of death**

_____

9. **Antecedent cause of death**

_____

_____

_____

_____

_____

10. **Case Summary**

_____

_____

_____

_____

_____

_____

Signature: _____

Date: _____ / _____ / 2 0 _____

Attachment C: National Perinatal Death Clinical Audit (NPDCA) Tool

National Perinatal Death Clinical Audit Tool

Australian and New Zealand stillbirth alliance

Tasmania

Perinatal Society of Australia & New Zealand

Type of Perinatal Death

☐ **STILLBIRTH (Fetal death) :** Death prior to the complete expulsion or extraction from its mother of a product of conception of 20 or more completed weeks of gestation or of 400 g or more birthweight where gestation is not known. The death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles.

Please select type:
- ☐ Antepartum fetal death
- ☐ Intrapartum fetal death
- ☐ Time of fetal death not known
- ☐ Termination of pregnancy

OR

☐ **NEONATAL DEATH:** Death of a liveborn infant occurring before 28 completed days after birth.

Please select type:
- ☐ Non-admitted neonatal death
- ☐ Neonatal death in hospital
- ☐ Termination of pregnancy

Please follow the instructions and answer all questions as directed. You may not know the answer to some of the questions but please provide as much detail as possible. Personally identifiable information collected on this form will be kept confidential. Information included in reports will be grouped and non identifiable.

Section 1: CLINICAL DATA RELEVANT TO PERINATAL DEATH

PLEASE COMPLETE THIS SECTION WITHIN 48 HOURS OF THE STILLBIRTH OR NEONATAL DEATH.

1. How many perinatal deaths are associated with this pregnancy? ☐
2. Mother: Surname ☐
   Given name(s): ☐
   Other name(s): ☐
3. Mother's Unit Record No: ☐
4. Mother's date of birth: ☐☐/☐☐/☐☐☐☐ (DD/MM/YYYY)
5. Usual residential address of mother at time of birth:
   Town/City/Locality ☐
   State ☐
   Post Code ☐
6. Date and time of baby's birth: Date: ☐☐/☐☐/☐☐☐☐ (DD/MM/YYYY)
   Time: ☐☐.☐☐ hrs (24hour Clock)
7. Date and time of baby's death (neonatal deaths):
   Date: ☐☐/☐☐/☐☐☐☐ (DD/MM/YYYY)
   Time: ☐☐.☐☐ hrs (24hour Clock)
8. Calculated gestation of pregnancy at birth: ☐☐ Completed Weeks
9. Birth weight: ☐☐☐☐ grams

Page 1 of 16

10. Gender: **Male** ☐ **Female** ☐ **Undetermined** ☐

11. Name of facility reporting: ☐

12. Marital status: Never Married ☐ Married ☐ De facto ☐ Widowed ☐ Divorced ☐ Separated ☐

13. Education: <High school ☐ High school ☐ Tertiary ☐

14. Mother's occupation: ☐

15. Mother's country of birth: ☐

16. Mother's ethnicity:

- ☐ Aboriginal
- ☐ Torres Strait Islander
- ☐ Aboriginal & Torres Strait Islander
- ☐ Maori / Pacific Islander
- ☐ Papua New Guinean/ Timorese
- ☐ Caucasian
- ☐ Mediterranean
- ☐ Indian, Pakistani, Bangladeshi, Sri Lankan
- ☐ Cambodian, Laos, Vietnamese, Thai
- ☐ Malay, Philippino, Indonesian
- ☐ Chinese, Korean, Japanese
- ☐ Middle Eastern, Nth African
- ☐ African
- ☐ Central / Sth American
- ☐ Other, please state: ☐

17. Mother's understanding of spoken English:

- ☐ None *or* ☐ Unknown
- ☐ Poor
- ☐ Average
- ☐ Good

18. Mother's height: ☐☐☐ cms
weight: ☐☐☐ kg (earliest measured in pregnancy)
If not available please measure height and weight.

19. Maternal BMI at booking: ☐☐.☐ *or* Unknown ☐

20. Was this a multiple pregnancy?

Yes ☐ **No** ☐ **Unknown** ☐

If yes, what was birth order of this stillborn or deceased baby?

- ☐ First
- ☐ Second
- ☐ Other

a. Number of fetuses/babies **alive** at 20 weeks gestation: ☐
b. Chorionicity (if known) _____

21. Mother's previous obstetric history:

a) total number of previous pregnancies: ☐☐ *or* Unknown ☐

b) details of previous pregnancies ***(list in order from first pregnancy- more space page 11)***

Date of Birth	Place of birth	Gestation (weeks)	Pregnancy Outcome *(codes below)*	Type of birth *(codes below)*	Birth weight	Complications (eg. IUGR) *(codes below)*
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Pregnancy Outcome: LB = live birth; **SM** = spontaneous miscarriage; **TOP** = termination of pregnancy; **E** = ectopic pregnancy; **SB** = stillbirth; **NNDE** = early neonatal death (<7 days age); **NNDL** = late neonatal death (7 days – 28 days); **NNDI** = Death 28 days – 2 years; **U** = unknown.

Type of Birth: NVB = normal vaginal birth; **OVD** = operative vaginal delivery; **VB** = vaginal breech; **CS** = caesarean section; **U** = unknown.

Complications: NIL = no complications; **HE** = hyperemesis; **APH** = ante partum haemorrhage/abruption; **CxS** = cervical stitch; **IUGR** = intrauterine growth retardation; **GDM** = gestational diabetes mellitus; **GH** = gestational hypertension; **U** = unknown; **Other** = please comment in summary section, page 11.

22. Mother's medical history (before this pregnancy)

	Yes	No	Unknown
a. Any pre-existing medical condition *(If no or unknown, go to question 23)*	☐	☐	☐
b. Asthma	☐	☐	☐
c. Diabetes pre pregnancy (type 1 or 2)	☐	☐	☐
d. Epilepsy	☐	☐	☐
e. Heart condition (congenital or acquired)	☐	☐	☐
f. Hypertension	☐	☐	☐
g. Endocrine disorder (eg.hyper/hypothyroid)	☐	☐	☐
h. Inflammatory bowel disease	☐	☐	☐
i. Systemic lupus erythematosus	☐	☐	☐
j. Other autoimmune disorder	☐	☐	☐
k. Mental health disorder	☐	☐	☐
l. Renal disease	☐	☐	☐
m. Venous thromboembolism	☐	☐	☐
n. Haematological disorders	☐	☐	☐
o. Cervical/uterine surgery	☐	☐	☐
p. Urinary tract infection	☐	☐	☐
q. Uterine abnormality	☐	☐	☐
r. Other, please state:	☐		

All remaining questions relate only to the pregnancy associated with this perinatal death.

23. Fertility treatment or assisted conception in this pregnancy?

Yes ☐ No ☐ Unknown ☐

If yes, method/s and dates: ☐

24. Is mother a smoker? Yes ☐ *If yes:* ☐☐ *per day* No ☐

If no:

Never smoked ☐
Stopped before this pregnancy ☐
Stopped during this pregnancy ☐ *at gestation:* ☐ **wks**
Unknown ☐

25. Mother's use of alcohol and other drugs: Yes ☐ No ☐ Unknown ☐

If yes specify drug and alcohol use during this pregnancy:

a) First trimester : ☐

b) Month prior to birth: ☐

26. Antenatal check ups :

a. Total number of antenatal visits recorded ☐☐ Unknown ☐

b. Gestation at first antenatal visit: ☐☐ weeks Unknown ☐

27. Model of antenatal maternity care:

(Select one in each column)	**At booking**	**At birth**
No booked care	☐	☐
Obstetric hospital	☐	☐
Maternal/Fetal Medicine	☐	☐
Hospital midwifery (eg birth centre)	☐	☐
Private obstetrician	☐	☐
Private midwife	☐	☐
General Practitioner/Shared	☐	☐
Unknown	☐	☐

28.Intended place of birth before labour:

☐ Home
☐ Birth Centre
☐ Public Hospital
☐ Private Hospital
☐ Other
☐ Unknown

Please state name of intended place: ☐

29. Actual place of birth:

☐ Home
☐ Birth Centre
☐ Public Hospital
☐ Private Hospital
☐ Unattended/Freebirth
☐ Other

Please state name of actual place: ☐

30. Obstetric conditions during this pregnancy:

Indicate all conditions known to be present during this pregnancy.

Yes

a. Hypertension ☐

If yes indicate type of hypertension

- ☐ Gestational hypertension
- ☐ Pre-eclampsia
- ☐ Pre-eclampsia with chronic hypertension
- ☐ Eclampsia
- ☐ Unspecified

b. Preterm labour ☐

c. Prolonged rupture of membranes ☐

If yes indicate gestation

- ☐ Preterm - rupture < 37 weeks gestation
- ☐ Term - rupture ≥ 37 weeks gestation

d. Cholestasis of pregnancy ☐

e. Confirmed maternal infection ☐

If yes indicate kind of infection

- ☐ Pyelonephritis
- ☐ Lower urinary tract infection
- ☐ Other infection

If other please specify: ☐

f. Trauma ☐

If yes indicate kind of trauma

- ☐ Vehicular
- ☐ Fall
- ☐ Violent personal injury
- ☐ Other, please specify: ☐

g. Vaginal bleeding ☐

If yes indicate gestation

- ☐ Before 20 weeks
- ☐ After 20 weeks

h. Gestational diabetes ☐

If yes indicate intervention

- ☐ Oral hypoglycaemic therapy
- ☐ Insulin treated
- ☐ Other, please specify: ☐

i. Other obstetric condition ☐

Please specify: ☐

- ☐ **None of the above**
- ☐ **Unknown**

31. Suspected fetal growth restriction during pregnancy: *(Select one)*

- ☐ No
- ☐ Yes and confirmed by scan
- ☐ Yes but normal growth on scan
- ☐ Yes but no scan performed
- ☐ Unknown

32. Antenatal procedures: *(Please indicate all procedures undertaken in pregnancy **before** perinatal death)*

	Yes
First trimester screening scan	☐
Anomaly scan at ≤ 20 gestation	☐
Chorion villus sampling	☐
Cervical suture	☐
Amniocentesis	☐
Doppler studies	☐
External cephalic version	☐
Fetocide	☐
Amnioreduction	☐
Laser treatment	☐
Other, please state:	
None of the above	☐
Unknown	☐

Total number of scans= ☐

33. Please indicate if obstetric consultation occurred for these reasons: *(All that apply)*

No obstetric consultations	☐
Prolonged pregnancy (>41 weeks)	☐
Poor obstetric history	☐
Breech presentation	☐
Mother's request	☐
Previous perinatal death	☐
Size of fetus	☐ large ☐ *or* small ☐
Previous caesarean section	☐
Antepartum haemorrhage	☐
Unstable lie	☐
Fetal abnormality	☐
Prolonged rupture of membranes	☐
Decreased fetal movements	☐
Non-reassuring CTG	☐
Polyhydramnios/Oligohydramnios	☐
Surgery, specify:	
Other reason, specify:	

34. Was the mother referred to other healthcare services during pregnancy?

Yes ☐ **No** ☐ **Unknown** ☐

If yes, select all applicable:

Medical	☐
Mental health	☐
Drug and alcohol	☐
Social worker	☐
Other service	☐
If other, specify:	

35. Were maternal corticosteroids given in pregnancy?

Yes ☐ **No** ☐ **Unknown** ☐

36. Medications taken in this pregnancy? **Yes** ☐ **No** ☐

(Include all over the counter and traditional medicines)

If yes, list: _____

_____

_____

_____

NB. If fetal death confirmed before labour, please go to question 42.

Labour and Birth:

37. Onset of labour:

Spontaneous ☐ **Induced** ☐ **No labour** ☐ **Unknown** ☐

(If no labour, go to question 42)

a) If labour induced, state methods used to induce labour

☐ Drugs used, please specify: _____

☐ Artificial rupture of membranes (Date & Time_____)

☐ Other, please specify: _____

b) Reason for induction:

_____

38. Labour augmentation: Yes ☐ No ☐ Unknown ☐

(If yes, please select all that apply)

☐ Artificial rupture of membranes (Date & Time _____)

☐ Oxytocin infusion

☐ Other, please specify: _____

39. Analgesia during labour: Yes ☐ No ☐ Unknown ☐

(If yes, select all relevant)

Opiate	☐
Nitrous oxide	☐
Epidural	☐
Non-pharmacological – please specify	
Other - please state:	

40. Water immersion during labour:

Did part of labour occur in bath/pool? Yes ☐ No ☐ Unknown ☐

(If yes)

Was the baby born in bath/pool? Yes ☐ No ☐ Unknown ☐

41. Fetal monitoring during labour: Yes ☐ No ☐ Unknown ☐

(If yes select all relevant)

Intermittent auscultation	☐
CTG on admission	☐
Intermittent CTG	☐
Continuous CTG external	☐
Continuous CTG - FSE	☐
Fetal scalp ph/lactate	☐
Other, please state:	

42. Method of birth of this baby

Vaginal non-instrumental		☐
Forceps		☐
Vacuum extractor		☐
LSCS	*(see below)*	☐
Classical caesarean	*(see below)*	☐
Other, please state		☐ *Details:*
Unknown/not stated		☐

If caesarean, please answer a) and b) over:

a) Main reason for caesarean: *(select one)*

- ☐ No medical indication
- ☐ Previous caesarean
- ☐ Breech presentation
- ☐ Pre-eclampsia
- ☐ Antepartum haemorrhage
- ☐ Maternal request
- ☐ Intra uterine fetal death *(Go to Question 48.)*
- ☐ Intra uterine growth restriction
- ☐ Fetal abnormality
- ☐ Fetal distress
- ☐ Cord presentation/prolapse
- ☐ Failure to progress
- ☐ Other, please specify: _____

b) Anaesthetic for operative delivery:

General ☐
Spinal ☐
Epidural ☐

43. Complications in labour: Yes ☐ No ☐ Unknown ☐

(If yes, select all relevant)

- APH ☐
- Meconium liqour ☐
- Fetal bradycardia ☐
- Non-reassuring CTG ☐
- Cord entanglement/ prolapse ☐
- Shoulder dystocia ☐
- Failure to progress/dystocia ☐
- Other, please state: ☐

44. Length of labour:

a) First stage ☐☐ hours ☐☐ minutes *or* Unknown ☐
b) Second stage ☐☐ hours ☐☐ minutes *or* Unknown ☐
c) If birth occurred in hospital, state time in hospital before birth:
☐☐ days ☐☐ hours ☐☐ minutes *or* Unknown ☐

45. Apgar scores:

☐ 1 min ☐ 5 min ☐ 10 min ☐ 15 min
☐ Unknown

46. a) Resuscitation at birth: Yes ☐ No ☐ Unknown ☐

If yes answer the rest of this question:

Baby resuscitated and transferred to another clinical area ☐
Baby not able to be resuscitated ☐

b) Details of resuscitation at birth: *If resuscitation commenced indicate methods:*

- ☐ Suction
- ☐ Oxygen
- ☐ IPPV – bag and mask
- ☐ External cardiac massage
- ☐ Medications, specify: ☐
- ☐ Other resuscitation, specify: ☐

State category of senior staff present: ☐

47. Cord gases at birth: Yes ☐ No ☐ Unknown ☐

		Arterial	Venous
pH		☐.☐☐	☐.☐☐
Base deficit	+/-	☐☐.☐	+/- ☐☐.☐
CO_2		☐☐.☐	☐☐.☐
Lactate		☐☐.☐	☐☐.☐

48. Baby's examination after birth (live and stillborn babies):

a) Length ☐☐.☐ cm **and** Head circumference ☐☐.☐ cm

b) External abnormalities noted on examination of baby: Yes ☐ No ☐

If yes, specify (including birth trauma) _____

_____

_____

_____

c) If stillborn, degree of maceration: None ☐ Slight ☐ Moderate ☐ Marked ☐

NB. If fetal death confirmed before labour, go to question 53.

49. Was baby transferred from place of birth (eg via NETS) prior to death?

Yes ☐ **No** ☐ **Unknown** ☐

If yes, where was the baby transferred to? *(Select one)*

NICU/SCU* ☐
Post natal ward ☐
Home ☐
Died in transfer ☐
Tertiary Services ☐
Other ☐
If other please state: _____

*Neonatal Intensive Care Unit/Special Care Unit

50. If baby admitted to hospital, provide details of further treatments.

a) Diagnoses made: _____
b) Investigations/procedures: _____
c) IV therapy and drugs: _____
d) Mechanical ventilation details: _____
e) Were active life supporting measures withdrawn? Yes ☐ No ☐

f) **Summary of significant neonatal events:**

Date	Time	Baby's age	Event

51. Place of death if baby was born alive:

Home ☐
Hospital ☐ Specify location in hospital: _____
Other ☐ Give details: _____

52. Baby examination after neonatal death:

External abnormalities noted on examination of the baby?

Yes ☐ No ☐

*If yes, please specify (including birth trauma)*_____

_____

_____

53. Placental examination:

a) Placenta weight: ☐☐☐☐ gm or Unknown ☐

b) Placental examination

☐ Not examined
☐ Normal
☐ Abnormalities, please state: _____

c) Placenta sent to pathology: Yes ☐ No ☐ Unknown ☐

54. Umbilical cord notable features: Yes ☐ No ☐ Unknown ☐

If yes, indicate all features noted:

True knot	☐	tight ☐	loose ☐		
Cord round neck	☐	tight ☐	loose ☐		
Cord round limbs or body	☐	tight ☐	loose ☐		
Hyper-coiled appearance	☐				
Marginal/ velamentous insertion	☐				
Abnormal cord length	☐	short ☐	long ☐	____	cms
Unusual thickness	☐	thin ☐	thick ☐	____	cms
Meconium stained	☐				
2 vessels	☐				
Other abnormality, please state:	_____				

55. Maternal outcome:

☐ Alive and generally well

☐ Alive but with serious morbidity (e.g. admitted to ICU, hysterectomy, stroke).

☐ Dead

Please add further details in the summary (page 11) if serious maternal morbidity or mortality.

56. Post mortem examination:

a) Parents offered a post mortem examination? Yes ☐ No ☐ Unknown ☐

Parental consent to full post mortem? Yes ☐ No ☐

Parental consent to limited post mortem? Yes ☐ No ☐

Parental consent to external examination? Yes ☐ No ☐

b) Death referred to the Coroner? Yes ☐ No ☐

57. Were there any other factors which contributed to the perinatal death?

Yes ☐ No ☐

If yes, please specify and complete ***section 2****.*

_____

_____

58. Bereavement support program commenced with family? Yes ☐ No ☐

59. **Summary:** Please provide any relevant information not covered in the previous questions, which you consider may have contributed to the perinatal death.

Section 1 of this form completed by:-
Name:-

Designation:-

Contact details: - Phone-
Email-
Date:-

Please mail completed original Section 1 marked 'Confidential' to:

Executive
Service Quality and Improvement Unit
System Purchasing and Performance Division
5th Floor, 24 Davey Street
HOBART TAS 7000

SECTION 2 : CAUSE OF DEATH AND ASSOCIATED FACTORS

COMPLETE THIS SECTION AT PERINATAL MORTALITY COMMITTEE REVIEW

Mother's Surname *(If multiple birth, indicate birth number of this baby)*	
Date of perinatal death	
Gestation	
Facility reporting	

1. Classification of cause of death

A) Cause of death recorded on Medical Certificate

i. Main disease or condition in fetus or infant:_____

ii. Other diseases or conditions in fetus or infant:_____

iii. Main maternal disease or condition affecting fetus or infant:_____

iv. Other maternal diseases or conditions affecting fetus or infant:_____

v. Other relevant circumstances_____

B) PSANZ Perinatal Mortality Classification of Cause of Death

(I) Perinatal Death Classification (PSANZ-PDC) Category ☐

Category description_____

(II) Neonatal Death Classification (PSANZ-NDC) Category ☐

Category classification_____

C) PSANZ Perinatal Mortality Classification of associated conditions

Associated condition 1:

(a) Perinatal Death Classification (PSANZ-PDC) Category ☐

Category description_____

OR

(b) Neonatal Death Classification (PSANZ-NDC) Category ☐

Category classification_____

Associated condition 2:

(a) Perinatal Death Classification (PSANZ-PDC) Category ☐

Category description_____

OR

(b) Neonatal Death Classification (PSANZ-NDC) Category ☐

Category classification_____

2. Post mortem Investigations and results

(a) Autopsy conducted **Yes - Full** ☐ **Yes - Limited** ☐ **No** ☐

If yes, state limits (if applicable) and findings (or attach copy of report)

_____

_____

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(b) Placental histopathology Yes ☐ No ☐

If yes, state limits (if applicable) and findings (or attach copy of report)

(c) Maternal investigations

(c) State other tests and available results

3. Factors relating to care

Were any potentially contributing factors relating to provision of (or access to) care present?

Yes ☐ No ☐ If no, go to question 4.

If yes, complete table and state whether each event was antenatal, intrapartum or postnatal:

A. Factors related to the woman/her family/social situation	Sub-optimal factor code	Relevance to outcome code
1.		
2.		
3.		
B. Factors related to access to care		
1.		
2.		
3.		
C. Factors related to professional care		
1.		
2.		
3.		
D. Other factors:		

Suboptimal factors – coding	Relevance of sub-optimal factor to outcome - coding
R - *Failure to recognise problem* A - *Failure to act appropriately* C - *Communication failure* S - *Failure to supervise* H - *Inadequate human resources* O - *Other*	I - *Insignificant. Sub-optimal factor(s) identified but unlikely to have contributed to outcome.* P- *Possible. Sub-optimal factor(s) identified might have contributed to outcome.* S - *Significant. Sub-optimal factor(s) identified likely to have contributed to outcome* U - *Undetermined. Insufficient information available.*

4. **Recommendations for practice improvement:** Yes ☐ No ☐

Recommendation 1: _____

Action required: _____

Review date: _____

Recommendation 2: _____

Action required: _____

Review date: _____

Recommendation 3: _____

Action required: _____

Review date: _____

5. **Other recommendations (eg. education or research):** Yes ☐ No ☐

Recommendation 1: _____

Recommendation 2: _____

Recommendation 3: _____

6. **Perinatal mortality review administrative details**

Location of perinatal mortality review: _____

Date of review: _____

Review finalized? Yes ☐ No ☐

If yes, date finalized: _____

If no, please specify outstanding areas for review _____

_____

Section 2 of this form completed by:-

Name:- _____

Designation:- _____

Contact details: - Phone- _____

Email-_____

Date:- _____.

Please copy Section 2 for perinatal mortality committee records and mail completed original marked 'Confidential' to:
Executive
Service Quality and Improvement Unit
System Purchasing and Performance Division
5th Floor, 24 Davey Street
HOBART TAS 7000

SECTION 3 : PERINATAL DEATH FOLLOW-UP (*OPTIONAL*)

COMPLETE THIS SECTION WHEN MOTHER DISCHARGED FROM MEDICAL CARE (FILE IN CASE NOTES)

1. Follow-up visits for family

Obstetrician:_____ Yes ☐ Date/time:_____

Neonatologist:_____ Yes ☐ Date/time:_____

Midwife:_____ Yes ☐ Date/time:_____

General Practitioner:_____ Yes ☐ (Date/time:_____)

Bereavement support: _____ Yes ☐ Date/time:_____

Other, specify_____ Yes ☐ Date/time:_____

G.P. notified of the perinatal death: Yes ☐ Date notified:_____

Genetic counselling required? Yes ☐ No ☐
If yes, please specify
_____

Further investigations required? Yes ☐ No ☐
If yes, please specify
_____

Specific religious or cultural considerations? Yes ☐ No ☐
If yes, please specify _____

Other relevant information: _____
_____

2. Other investigations proceeding:

Coroner's case **Yes** ☐ **No** ☐
Please provide details:
_____

Sentinel event report **Yes** ☐ **No** ☐
Please provide details:
_____

Root Cause Analysis report **Yes** ☐ **No** ☐
Please provide details:
_____

Perinatal Mortality Review Committee **Yes** ☐ **No** ☐
Please provide details:
_____

Section 3 of this form completed by:-
Name:-
Designation:-
Contact details: -
Phone-
Date:-
Email-

Feedback Form

The *Council of Obstetric & Paediatric Mortality & Morbidity* is committed to ensuring that the Annual Report is a useful tool for Obstetricians, Paediatricians and Midwives in monitoring the care and outcomes for Mothers and Babies. To this end we would welcome your feedback. Please complete the following form and return it to:

Executive
Service Quality and Improvement Unit
System Purchasing and Performance Division
5th Floor, 24 Davey Street
HOBART TAS 7000

	Please circle one option	
1. Did you find the information contained within this Report useful? If no, please specify what was lacking:	Yes	No
2. Is there additional information you would like to routinely see included in the Report? If yes, please specify:	Yes	No
3. Are there any other suggestions you would make to assist in improving the usefulness of this Report? If yes, please specify:	Yes	No

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If you require further information please contact the Executive, Service Quality and Improvement Unit, System Purchasing and Performance Division on 6233 4828.

Notes

Notes

COUNCIL OF OBSTETRIC & PAEDIATRIC MORTALITY & MORBIDITY (TASMANIA)

Service Quality and Improvement Unit,
System Purchasing and Performance Division
Department of Health and Human Services

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