Section 7of 7- Perinatal Mortality Classifications

SECTION 7 PERINATAL MORTALITY CLASSIFICATIONS

7.1 Introduction

This document presents the third revision of the Perinatal Society of Australia and New Zealand (PSANZ) classifications for perinatal death (Perinatal Death and Neonatal Death Classifications) and the accompanying Classification Guide (which provides a detailed description of the classification and case examples) which was first released in May 2003. The PSANZ Classifications and Guide for use are a result of the collaborative efforts of members of the PSANZ over many years. This activity has been focused on development of a uniform classification system for Australia and New Zealand, of perinatal mortality by antecedent cause using the PSANZ Perinatal Death Classification and, in addition for neonatal deaths, by conditions in the neonatal period, or prior to discharge home, leading to the death using the PSANZ Neonatal Death Classification.

The November 2004 revision included the ability to classify factors associated with perinatal death. Following classification of the main obstetric antecedent factor according to the PSANZ-PDC, and in addition for neonatal deaths the neonatal factor according to the PSANZ-NDC, it is now recommended that up to two associated factors can be recorded using the classifications.
For example, when the death was due to placental abruption which was preceded by pre-eclampsia, according to the PSANZ-PDC, the death is classified as *Hypertension - Pre-eclampsia* (subcategory 3.5) and the associated factor is classified as *Antepartum Haemorrhage Placental Abruption* (subcategory 4.1).

The changes made in this update are not considered to be major and are summarized in Appendix 1.

In addition to application of the classification, the PSANZ PMG recommends collection of a standardised data set included in a comprehensive confidential clinical summary to facilitate local audit and, if required, forwarded to the relevant agency within the jurisdiction's Health Department. The *PSANZ Perinatal Mortality Audit Package (*Section 2; Appendix 1) is recommended for this purpose. This data set includes all significant family, medical and obstetric history; all major pregnancy complications including whether the pregnancy was terminated; and investigations undertaken around the time of the death including placental histopatholgy and autopsy. A different data collection tool is currently being used across New Zealand. A working party is being established to review this data collection with the aim of reaching agreeement on a minimum data set for use in Australia and New Zealand.

7.2 Purpose of the Classifications

The purpose of the PSANZ Perinatal Death Classification (PSANZ-PDC) is to identify the single most important factor which led to the chain of events which resulted in the death.

The purpose of the PSANZ Neonatal Death Classification (PSANZ-NDC) is in addition to the PSANZ-PDC to identify the single most important factor in the neonatal period which caused the death.

7.3 Background

Since 1986, clinicians in some Australian States and Territory Perinatal Committees (notably South Australia and Queensland) and the Perinatal Mortality Committee at the National Women's Hospital in Auckland, have been considering ways of classifying fetal and neonatal deaths beyond standard ICD (International Classification of Diseases) coding, with a view to better assessing aetiology (in order to consider preventable factors) and to more accurately determine specific factors leading to neonatal death.

Experience with the Whitfield obstetric antecedent classification[1] led to realisation that there were shortcomings with this system - it was not hierarchical and did not accommodate more recent knowledge about the causation of some perinatal deaths. Modifications of the Whitfield system were made and published independently by the South Australian and Queensland committees and in the National Women's Hospital report. In 1999, the National Perinatal Data Development Committee (NPDDC) recommended that the topic be further considered at a workshop to be held about the time of the 4th Annual Conference of the Perinatal Society of Australia and New Zealand, held in Brisbane on the 16th March 2000, attended by representatives of most jurisdictions. This was the third such workshop, the two previous being in Brisbane 1996 and Alice Springs 1998. At this workshop it was agreed to attempt to develop uniform classification systems for use throughout Australia and New Zealand. It was agreed that drafts be developed by the Queensland and South Australian

representatives, and circulated for comment and discussion, to representatives from the other Australian States and Territories and from New Zealand, with a view to presenting a consensus to the NPDDC in July 2000. Consensus was reached and the finalised classifications were accepted by the NPDDC.

The classifications systems were originally named the Australian and New Zealand Antecedent Classification of Perinatal Mortality (ANZACPM), and the Australian and New Zealand Neonatal Death Classification (ANZNDC). Following endorsement of this activity as a Special Interest Group of the PSANZ in March 2003, the classifications have been renamed to the Perinatal Society of Australia and New Zealand Perinatal Death Classification (PSANZ-PDC) and the Perinatal Society of Australia and New Zealand Neonatal Death Classification (PSANZ-NDC). A description of the classification development in the context of other classification systems was recently published in the Journal of Paediatrics and Child Health[(2)].

The PSANZ-PDC is intended for use in a hierarchical manner in relation to its major categories, but not within subcategories. This is reflected in the numbering system used. Thus Category 1 *Congenital Abnormality*, if present, would take precedence over other categories. However, in some situations, this hierarchical system may not apply, as in the relationship between Category 3 *Hypertension* or Category 4 *Antepartum Haemorrhage* and Category 5 *Maternal Conditions*, and each case may need to be coded according to its own particular clinical circumstances.

As far as possible, the subcategory .8 has been used for 'Other conditions' and .9 for 'Unspecified conditions' within its category, as has been the case in the ICD classification. PSANZ-PDC is a 4 digit coding system. If data are entered with a decimal point, a subcategory such as 'Central nervous system' (Category 1 *Congenital Abnormality*) would be 1.1, but as a 4 digit numeric would be 0110. Similarly subcategory 'Group B Streptococcus' (Category 2, *Perinatal Infection*) would be 2.11 or 0211, while subcategory Consistent with SIDS (Category 11, *No Obstetric Antecedent*) would be 11.11 or 1111.

PSANZ-NDC is not intended for use in a hierarchical manner. However, its Category 1 is also *Congenital Abnormality*, in keeping with PSANZ-PDC, which takes precedence over other categories. It is a 3 digit coding system.

7.4 PSANZ Perinatal Mortality Classification

7.4.1 PSANZ Perinatal Death Classification (PSANZ-PDC)

1 Congenital abnormality (including terminations for congenital abnormalities)

- 1.1 Central nervous system
- 1.2 Cardiovascular system
- 1.3 Urinary system
- 1.4 Gastrointestinal system
- 1.5 Chromosomal
- 1.6 Metabolic
- 1.7 Multiple/non chromosomal syndromes
- 1.8 Other congenital abnormality
  - 1.81 Musculoskeletal
  - 1.82 Respiratory
  - 1.83 Diaphragmatic hernia
  - 1.84 Haematological
  - 1.85 Tumours
  - 1.88 Other specified congenital abnormality
- 1.9 Unspecified congenital abnormality

Please note that terminations of pregnancy for perinatal deaths within this category should be identified by the inclusion of an "09" for two-digit codes and a "9" for the three digit codes

2 Perinatal infection

- 2.1 Bacterial
  - 2.11 Group B Streptococcus
  - 2.12 E coli
  - 2.13 Listeria monocytogenes
  - 2.14 Spirochaetal e.g. Syphilis
  - 2.18 Other bacterial
  - 2.19 Unspecified bacterial
- 2.2 Viral
  - 2.21 Cytomegalovirus
  - 2.22 Parvovirus
  - 2.23 Herpes simplex virus
  - 2.24 Rubella virus
  - 2.28 Other viral
  - 2.29 Unspecified viral
- 2.3 Protozoal e.g. Toxoplasma
- 2.5 Fungal
- 2.8 Other specified organism
- 2.9 Other unspecified organism

3 Hypertension

- 3.1 Chronic hypertension: essential
- 3.2 Chronic hypertension: secondary, e.g. renal disease
- 3.3 Chronic hypertension: unspecified
- 3.4 Gestational hypertension
- 3.5 Pre-eclampsia
  - 3.51 With laboratory evidence of thrombophilia
- 3.6 Pre-eclampsia superimposed on chronic hypertension
  - 3.61 With laboratory evidence of thrombophilia
- 3.9 Unspecified hypertension

4 Antepartum haemorrhage (APH)

- 4.1 Placental abruption
  - 4.11 With laboratory evidence of thrombophilia
- 4.2 Placenta praevia
- 4.3 Vasa praevia
- 4.8 Other APH
- 4.9 APH of undetermined origin

5 Maternal conditions

- 5.1 Termination of pregnancy for maternal psychosocial indications
- 5.2 Diabetes / Gestational diabetes
- 5.3 Maternal injury
  - 5.31 Accidental
  - 5.32 Non-accidental
- 5.4 Maternal sepsis
- 5.5 Antiphospholipid syndrome
- 5.6 Obstetric cholestasis
- 5.8 Other specified maternal conditions

6 Specific perinatal conditions

- 6.1 Twin-twin transfusion
- 6.2 Fetomaternal haemorrhage
- 6.3 Antepartum cord complications
  - 6.31 Cord haemorrhage
  - 6.32 True knot with evidence of occlusion
  - 6.38 Other
  - 6.39 Unspecified
- 6.4 Uterine abnormalities, eg bicornuate uterus, cervical incompetence
- 6.5 Birth trauma (typically infants of >24 weeks gestation or >600g birthweight)
- 6.6 Alloimmune disease
  - 6.61 Rhesus
  - 6.62 ABO
  - 6.63 Kell
  - 6.64 Alloimmune thrombocytopenia
  - 6.68 Other
  - 6.69 Unspecified
- 6.7 Idiopathic hydrops
- 6.8 Other specific perinatal conditions
  - 6.81 Rupture of membranes after amniocentesis
  - 6.82 Termination of pregnancy for suspected but unconfirmed congenital abnormality.
  - 6.83 Fetal subdural haematoma
  - 6.88 Other
  - 6.89 Unspecified

7 Hypoxic peripartum death (typically infants of >24 weeks gestation or >600g birthweight)

- 7.1 With intrapartum complications
  - 7.11 Uterine rupture
  - 7.12 Cord prolapse
  - 7.13 Shoulder dystocia
  - 7.18 Other
- 7.2 Evidence of non-reassuring fetal status in a normally grown infant (e.g. abnormal fetal heart rate, fetal scalp pH/lactate, fetal pulse oximetry without intrapartum complications)
- 7.3 No intrapartum complications and no evidence of non-reassuring fetal status.
- 7.9 Unspecified hypoxic peripartum death

8 Fetal Growth Restriction (FGR)

- 8.1 With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
- 8.2 With chronic villitis
- 8.3 No placental pathology
- 8.4 No examination of placenta
- 8.8 Other specified placental pathology
- 8.9 Unspecified or not known whether placenta examined

9 Spontaneous preterm (<37 weeks gestation)

- 9.1 Spontaneous preterm with intact membranes, or membrane rupture <24 hours before delivery
  - 9.11 With chorioamnionitis on placental histopathology
  - 9.12 Without chorioamnionitis on placental histopathology
  - 9.13 With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.17 No clinical signs of chorioamnionitis, no examination of placenta
  - 9.19 Unspecified or not known whether placenta examined
- 9.2 Spontaneous preterm with membrane rupture ≥24 hours before delivery
  - 9.21 With chorioamnionitis on placental histopathology
  - 9.22 Without chorioamnionitis on placental histopathology
  - 9.23 With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.27 No clinical signs of chorioamnionitis, no examination of placenta
  - 9.29 Unspecified or not known whether placenta examined
- 9.3 Spontaneous preterm with membrane rupture of unknown duration before delivery
  - 9.31 With chorioamnionitis on placental histopathology
  - 9.32 Without chorioamnionitis on placental histopathology
  - 9.33 With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.37 No clinical signs of chorioamnionitis, no examination of placenta
  - 9.39 Unspecified or not known whether placenta examined

10 Unexplained antepartum death

- 10.1 With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
- 10.2 With chronic villitis
- 10.3 No placental pathology
- 10.4 No examination of placenta
- 10.8 Other specified placental pathology
- 10.9 Unspecified or not known whether placenta examined

11 No obstetric antecedent

- 11.1 Sudden Infant Death Syndrome (SIDS)
  - 11.11 SIDS Category IA: Classic features of SIDS present and completely documented.
  - 11.12 SIDS Category IB: Classic features of SIDS present but incompletely documented.
  - 11.13 SIDS Category II : Infant deaths that meet Category I except for one or more features.
- 11.2 Postnatally acquired infection
- 11.3 Accidental asphyxiation
- 11.4 Other accident, poisoning or violence (postnatal)
- 11.8 Other specified
- 11.9 Unknown/Undetermined
  - 11.91 Unclassified Sudden Infant Death
  - 11.92 Other Unknown/Undetermined

7.4.2 PSANZ Neonatal Death Classification (PSANZ-NDC)

1. Congenital abnormality (including terminations for congenital abnormalities)
- 1.1 Central nervous system
- 1.2 Cardiovascular system
- 1.3 Urinary system
- 1.4 Gastrointestinal system
- 1.5 Chromosomal
- 1.6 Metabolic
- 1.7 Multiple/non chromosomal syndromes
- 1.8 Other congenital abnormality
  - 1.81 Musculoskeletal
  - 1.82 Respiratory
  - 1.83 Diaphragmatic hernia
  - 1.84 Haematological
  - 1.85 Tumours
  - 1.88 Other specified congenital abnormality
- 1.9 Unspecified congenital abnormality

2. Extreme prematurity (typically infants of ≤24 weeks gestation or ≤600g birthweight)
- 2.1 Not resuscitated
- 2.2 Unsuccessful resuscitation
- 2.9 Unspecified or not known whether resuscitation attempted

3. Cardio-respiratory disorders
- 3.1 Hyaline membrane disease / Respiratory distress syndrome (RDS)
- 3.2 Meconium aspiration syndrome
- 3.3 Primary persistent pulmonary hypertension
- 3.4 Pulmonary hypoplasia
- 3.5 Chronic neonatal lung disease (typically, bronchopulmonary dysplasia)
- 3.6 Pulmonary haemorrhage
- 3.7 Pneumothorax
- 3.8 Other

4. Infection
- 4.1 Bacterial
  - 4.11 Congenital bacterial
    - 4.111 Group B Streptococcus
    - 4.112 E coli
    - 4.113 Lysteria monocytogenes
    - 4.114 Spirochaetal, eg syphilis
    - 4.118 Other bacterial
    - 4.119 Unspecified bacterial
  - 4.12 Acquired bacterial
    - 4.121 Group B Streptococcus
    - 4.122 E coli
    - 4.125 Other Gram negative bacilli (other than E coli)
    - 4.126 Staphylococcus aureus
    - 4.127 Coagulase negative Staphylococcus
    - 4.128 Other specified bacterial
    - 4.129 Unspecified bacterial
- 4.2 Viral
  - 4.21 Congenital viral
    - 4.211 Cytomegalovirus
    - 4.213 Herpes simplex virus
    - 4.214 Rubella virus
    - 4.218 Other specified viral
    - 4.219 Unspecified viral
  - 4.22 Acquired viral
    - 4.221 Cytomegalovirus
    - 4.223 Herpes simplex virus
    - 4.224 Rubella virus
    - 4.228 Other specified viral
    - 4.229 Unspecified viral

4.3 Protozoal e.g. Toxoplasma
4.5 Fungal
4.8 Other specified organism
4.9 Unspecified organism

5. Neurological

5.1 Hypoxic ischaemic encephalopathy / Perinatal asphyxia (typically infants of >24 weeks gestation or >600g birthweight)
5.2 Intracranial haemorrhage
5.21 Intraventricular Haemorrhage
5.22 Subgaleal Haemorrhage
5.23 Subarachnoid Haemorrhage
5,24 Subdural Haemorrhage
5.28 Other Intracranial Haemorrhage
5.8 Other

6. Gastrointestinal

6.1 Necrotising enterocolitis
6.8 Other

7. Other

7.1 Sudden Infant Death Syndrome (SIDS)
7.11 SIDS Category IA: Classic features of SIDS present and completely documented.
7.12 SIDS Category IB: Classic features of SIDS present but incompletely documented.
7.13 SIDS Category II : Infant deaths that meet category I except for one or more features.
7.2 Multisystem failure
7.21 Secondary to intrauterine growth restriction
7.28 Other specified
7.29 Unspecified/undetermined primary cause or trigger event
7.3 Trauma
7.31 Accidental
7.32 Non accidental
7.39 Unspecified
7.4 Treatment complications
7.41 Surgical
7.42 Medical
7.8 Other specified
7.9 Unknown/Undetermined
7.91 Unclassified Sudden Infant Death
7.92 Other Unknown/Undetermined

7.5 PSANZ Classification Guide

7.5.1 PSANZ-PDC Classification Guide

1. Congenital abnormality (including terminations for congenital abnormalities)

- 1.1 Central nervous system
- 1.2 Cardiovascular system
- 1.3 Urinary system
- 1.4 Gastrointestinal system
- 1.5 Chromosomal
- 1.6 Metabolic
- 1.7 Multiple/non chromosomal syndromes
- 1.8 Other congenital abnormality
  - 1.81 Musculoskeletal
  - 1.82 Respiratory
  - 1.83 Diaphragmatic hernia
  - 1.84 Haematological
  - 1.85 Tumours
  - 1.88 Other specified congenital abnormality
- 1.9 Unspecified congenital abnormality

Please note that terminations of pregnancy for perinatal deaths within this category should be identified by the inclusion of an "09" for two-digit codes and a "9" for the three digit codes

This category includes deaths in which a congenital abnormality, whether structural, functional or chromosomal, is considered to have made a major contribution, even though the abnormality may not always be lethal. It includes terminations of pregnancy ≥20 weeks undertaken because of congenital abnormalities, even if they are not considered to be lethal abnormalities.

If fetal hydrops is associated with congenital abnormalities, e.g. with pulmonary hypoplasia or multiple abnormalities, it is classified here under subcategory 1.7 *Multiple/non chromosomal syndromes.* If fetal hydrops is the result of cardiac failure from congenital heart disease, it is classified here under subcategory 1.2 *Cardiovascular system.* If it occurs in isolation and the cause is unknown, classify under *Specific Perinatal Conditions*, subcategory 6.7 *Idiopathic hydrops.*

Category 1.84 *Haematological* includes deaths due to congenital haematological abnormalities, such as thalassemia; Category 1.85 *Tumours* includes congenital tumours including cystic hygroma; and Category 1.88 *Other specified congenital abnormality* is used to classify identified abnormalities which are not included in Categories 1.1 to 1.85. Category 1.9 *Unspecified congenital abnormality* includes cases where there is an obvious abnormality but the investigation is incomplete and is therefore unknown or unspecified.

2. Perinatal infection

- 2.1 Bacterial
  - 2.11 Group B Streptococcus
  - 2.12 E coli
  - 2.13 Listeria monocytogenes
  - 2.14 Spirochaetal, e.g. Syphilis
  - 2.18 Other bacterial
  - 2.19 Unspecified bacterial
- 2.2 Viral
  - 2.21 Cytomegalovirus
  - 2.22 Parvovirus
  - 2.23 Herpes simplex virus
  - 2.24 Rubella virus
  - 2.28 Other viral
  - 2.29 Unspecified viral
- 2.3 Protozoal, e.g. Toxoplasma
- 2.5 Fungal
- 2.8 Other specified organism
- 2.9 Other unspecified organism

This category includes (i) primary infections occurring in term and preterm neonatal and fetal deaths and (ii) secondary infections e.g. following ≥24 hours of membrane rupture before delivery, resulting in neonatal early onset infection (within 48 hours of birth) in term infants. Deaths in preterm infants from

such secondary infection would be classified under the *Spontaneous Preterm* group, subcategory 9.2, and in this situation, the hierarchical system for categories would not apply. Category 2.8 *Other specified organism* includes deaths due to other identified organisms other than those in Categories 2.1 to 2.5. Category 2.9 *Other unspecified organism* includes cases where there is an obvious infection however the organism was either not identified or not specified.

In order to qualify for this category, there must be evidence of fetal or neonatal infection as described in Table 1. Determination of perinatal infection.

Examples:
Classify here: Term prelabour rupture of the membranes, delivery following ≥ 24 hours of membrane rupture, neonatal pneumonia identified within 48 hours of birth, subsequent neonatal death, group B Streptococcus identified on vaginal culture and in gastric aspirate. Classify as subcategory 2.11.

Do not classify here: Neonatal death from late onset (≥48 hrs of age) Group B Streptococcal disease. Classify under No Obstetric Antecedent (subcategory 11.2).

Classify here: Spontaneous rupture of membranes, followed by spontaneous labour at 26 weeks and delivery of a stillborn baby. Membranes were ruptured for 12 hours prior to delivery. Fetal pneumonia was detected at autopsy and growth of E Coli from the lungs. Classify 2.12.

Do not classify here:
Spontaneous rupture of the membranes at 24 weeks gestation. Clinical chorioamnionitis ensued after 4 days of membrane rupture. Induction of labour was undertaken resulting in a vaginal delivery of a liveborn infant. Birthweight was 650gms and Apgars scores were 2 at 1 minute and at 5 mins. Despite active resuscitation the infant died at 15 minutes of age. No autopsy or placental pathology was undertaken. Cord blood cultures grew E coli. Classify as PSANZ-PDC 9.23 and PSANZ-NDC 4.11.

Table 1. Determination of perinatal infection

DEATH TYPE	CRITERIA OF INFECTION
Fetal	1. Histological confirmation of infection in cord (funisitis) or fetus (pneumonitis or pneumonia) with or without microbiological evidence of infection. OR 2a. Convincing clinical evidence of primary maternal infection AND 2b. Positive culture of a pathogen from mother or placenta
Neonatal	Congenital infection Early onset infection (within 48 hours of birth), defined as: 1. Clinical signs in neonate consistent with sepsis AND *2.* Haematological changes consistent with sepsis AND ONE OR MORE OF 3a – 3d 3a. Positive culture of a pathogen (bacterial or viral) from the neonate OR 3b. Pathological evidence at autopsy OR 3c. Positive serology OR 3d. Positive culture of a pathogen from the mother or the placenta. NB: Some congenital viral infections may have onset later than 48 hours after birth. For neonatal deaths occurring within a few hours of birth, especially those for which resuscitation was not attempted, where infection is presumed to be the cause of death, the infection criteria for fetal death may be used.

3. Hypertension

- 3.1 Chronic hypertension: essential
- 3.2 Chronic hypertension: secondary, e.g. renal disease
- 3.3 Chronic hypertension: unspecified
- 3.4 Gestational hypertension
- 3.5 Pre-eclampsia
  - 3.51 With laboratory evidence of thrombophilia
- 3.6 Pre-eclampsia superimposed on chronic hypertension
  - 3.61 With laboratory evidence of thrombophilia
- 3.9 Unspecified hypertension

This category includes deaths where the hypertensive disorder is considered the factor initiating the chain of events leading to the death. If placental abruption complicates a hypertensive disorder, the death is classified here, as the abruption is attributed to the hypertensive disorder. This category excludes the circumstance when the hypertension is secondary to an underlying systemic disorder, e.g. Diabetes, where this is severe and uncontrolled (in which case, classify as subcategory 5.2 Diabetes, under *Maternal Conditions*). However, if the systemic disorder such as diabetes or gestational diabetes is mild or well controlled, and the death appeared to be due to hypertension or its complications, classify in this category. This category also includes hypertension secondary to renal disease as this often presents first with hypertension.

Thus, although the numbering of main groups of causes of death is in a hierarchical order in general, in some cases, as in the relationship between *Maternal Conditions* and *Hypertension* or *APH*, this hierarchy may not always apply, and each case needs to be classified according to its own particular circumstances.

The classification of *Hypertension* follows that of the Australasian Society for the Study of Hypertension in Pregnancy[3] with the exceptions that unspecified subcategories have been included. The definitions also follow those in the consensus statement, which should be referred to whenever any classification difficulties arise:

Hypertension is diagnosed when the systolic blood pressure is $\geq$140 mm Hg and /or diastolic blood pressure (Korotkoff V) is $\geq$90 mm Hg. These blood pressures should be confirmed by repeated readings over several hours in a clinic or day assessment unit or after rest in hospital.

Gestational hypertension is defined as hypertension arising in pregnancy after 20 weeks gestation without any other feature of the multisystem disorder pre-eclampsia and which resolves within 3 months postpartum.

Pre-eclampsia may be defined as hypertension arising after 20 weeks gestation and the onset after 20 weeks gestation of one or more of: proteinuria, renal insufficiency, liver disease, neurological problems, haematological disturbances, fetal growth restriction. The hypertension will have returned to normal within 3 months postpartum.

With recent increasing interest in thrombophilic conditions, the 4th digit or second decimal point is used for associations of thrombophilia with pre-eclampsia, i.e. subcategories 3.51 and 3.61. There should be laboratory (biochemical or haematological) evidence of thrombophilia to warrant inclusion. Due to the rapidly unfolding area of thrombophilia in pregnancy, the Special Interest Group had some difficulty developing a definition for laboratory (biochemical or haematological) evidence of thrombophilia. A working party of the SIG has been formed to develop a definition appropriate for inclusion in the classification guide in the future.

4. Antepartum Haemorrhage (APH)

- 4.1 Placental abruption
  - 4.11 With laboratory evidence of thrombophilia
- 4.2 Placenta praevia
- 4.3 Vasa praevia
- 4.8 Other APH
- 4.9 APH of undetermined origin

This category includes all perinatal deaths where the primary factor leading to the death was an APH. If abruption occurs as a complication of a hypertensive disorder, the death is attributed to the hypertensive disorder (Category 3).

With recent increasing interest in thrombophilic conditions, the 4th digit or second decimal point can be used to identify associations of thrombophilia with antepartum haemorrhage, i.e. subcategory 4.11. There should be laboratory (biochemical or haematological) evidence of thrombophilia to warrant inclusion.

5. Maternal conditions

- 5.1 Termination of pregnancy for maternal psychosocial indications
- 5.2 Diabetes / Gestational diabetes
- 5.3 Maternal injury
  - 5.31 Accidental
  - 5.32 Non-accidental
- 5.4 Maternal sepsis
- 5.5 Antiphospholipid Syndrome
- 5.6 Obstetric cholestasis
- 5.8 Other specified maternal conditions

This category includes deaths attributed to any medical or surgical disorder in the mother, or to its complications or treatment, excluding hypertensive disorders. The subcategory 5.1 includes terminations of pregnancy undertaken for any other indication than congenital abnormality; a termination of pregnancy undertaken because of congenital abnormality would be classified under *Congenital Abnormality*, Category 1.

Renal disease is not included as a separate subcategory here, but under *Hypertension*, subcategory 3.2, as it usually presents first as hypertension. Maternal conditions should only be attributed here if there is a high probability that they were the cause of death, e.g. a well-documented history of lupus obstetric syndrome with a previous stillbirth. Substance abuse may also be included under subcategory 5.8 *Other specific maternal condition* if there is a significant history of abuse and the fetal or neonatal death is believed to have been caused by the abuse.

Example:
Classify here: Fetal death as a result of severe uncontrolled Type I Diabetes with mild pre-eclampsia classify as subcategory 5.2, rather than *Hypertension* Category 3.

6. Specific perinatal conditions

- 6.1 Twin-twin transfusion
- 6.2 Fetomaternal haemorrhage
- 6.3 Antepartum cord complications
  - 6.31 Cord haemorrhage
  - 6.32 True knot with evidence of occlusion
  - 6.38 Other
  - 6.39 Unspecified
- 6.4 Uterine abnormalities, e.g. bicornuate uterus, cervical incompetence
- 6.5 Birth trauma (typically infants of >24 weeks gestation or >600g birthweight)
- 6.6 Alloimmune disease
  - 6.61 Rhesus
  - 6.62 ABO
  - 6.63 Kell
  - 6.64 Alloimmune thrombocytopenia
  - 6.68 Other
  - 6.69 Unspecified
- 6.7 Idiopathic hydrops
- 6.8 Other specific perinatal conditions
  - 6.81 Rupture of membranes after amniocentesis
  - 6.82 Termination of pregnancy for suspected but unconfirmed congenital abnormality,
  - 6.83 Fetal subdural haematoma
  - 6.88 Other
- 6.9 Unspecified

This category includes deaths of normally formed, appropriately grown babies in which the specific perinatal condition made a major contribution. Cord complications during labour should be categorised under *Hypoxic Peripartum Death*, subcategory 7.1.

As preterm rupture of the membranes and preterm labour are often preceded by premature cervical dilatation as a result of subclinical infection, the subcategory of cervical incompetence should be reserved for those rare circumstances where the clinical history and ultrasound scanning unequivocally point to pre-existing damage to the cervix from a surgical procedure or to congenital structural abnormality (as in some cases of DES exposure). Thus, there should be convincing evidence from the previous obstetric history and/or the state of the cervix, whether or not a cervical suture has been inserted.

Category 6.3.2 *True knot with evidence of occlusion*
A cord knot is where the cord becomes tangled with itself (or another cord in a multiple pregnancy)such that the vessels of the cord may be compromised. To be considered significant there should be evidence of congestion of haemorrhage in the cord, and/or changes in the placenta such as fetal vessel thrombosis or villous oedema to suggest vascular compromise. A knot could cause death without these changes but not every knot causes fetal compromise and therefore should not be accepted as a cause of death without further evidence as above, or strong clinical
suspicion by the delivering clinician based on CTG or other changes during delivery.
Cord accidents usually only account for a few percent of perinatal deaths.

Category 6.5: *Birth trauma* includes infants with evidence of significant trauma at autopsy (e.g. tentorial tears, skull fracture), typically those of >24 weeks gestation or >600g birthweight.

Example:
Do not classify here: Spontaneous prelabour rupture of membranes (ROM) at 33 weeks, with immediate cord prolapse and fetal death. Categorise as *Spontaneous Preterm* Category 9 as the cord complication occurred as a result of the preterm ROM.

7. Hypoxic peripartum death (typically infants of >24 weeks gestation or >600g birthweight)

- 7.1 With intrapartum complications
  - 7.11 Uterine rupture
  - 7.12 Cord prolapse
  - 7.13 Shoulder dystocia
  - 7.18 Other
- 7.2 Evidence of non-reassuring fetal status in a normally grown infant (e.g. abnormal fetal heart rate, fetal scalp pH/lactate, fetal pulse oximetry without intrapartum complications)
- 7.3 No intrapartum complications and no evidence of non-reassuring fetal status
- 7.9 Unspecified hypoxic peripartum death.

This category includes deaths from acute or chronic hypoxia of normally formed babies, typically of >24 weeks gestation or >600g birthweight. For subcategories 7.2 to 7.9, the presence of fetal growth restriction (FGR) overrides this classification and, if present, the death should be classified under FGR, Category 8.

This category includes deaths where the fetus was **alive at the onset of labour**, during which there may have been intrapartum complications (subcategory 7.1), or no intrapartum complications but with evidence of non-reassuring fetal status in a normally grown infant (subcategory 7.2), or no intrapartum complications or evidence of non-reassuring fetal status (subcategory 7.3). If there was no labour, and there were no apparent complications, the death would be classified in either subcategory 7.2 or 7.3. A specific major intrapartum complication, such as uterine rupture, cord prolapse or shoulder dystocia, is required for inclusion as subcategory 7.1. However, if there were no apparent intrapartum complications (as defined in category 7.1) but there was fetal growth restriction (FGR), then the death should be attributed to *FGR*, Category 8.

If there is insufficient information about fetal wellbeing or intrapartum complications, classify as subcategory 7.9 *Unspecified hypoxic peripartum death.*

Neonatal deaths as a result of hypoxic ischaemic encephalopathy[4, 5] and otherwise unexplained severe cardiorespiratory depression at birth are included here. Where possible, evidence for intrapartum hypoxia should include fetal, umbilical artery or early neonatal (within one hour) blood gases showing evidence of a severe metabolic acidosis. Otherwise peripartum death might also be due to non-hypoxic causes, e.g. infection or chronic ischaemia but wrongly assumed to be due to acute hypoxia.

The term 'non-reassuring fetal status' has been used in preference to the term 'fetal distress' as 'clinical signs often poorly predict a compromised fetus and continued use of this latter term may encourage wrong assumptions or inappropriate management'[3, 4].

Examples:
Classify here: No known problems prior to labour at gestation 38 weeks. Severe fetal heart rate decelerations in second stage of labour. Baby is born with no signs of life with a birthweight of 3500gm. Classify as subcategory 7.2.

Classify here: No known problems prior to labour at 36 weeks. No FGR. No evidence of intrapartum fetal distress. At delivery, the baby shows signs of severe respiratory depression and hypoxia. Subsequently develops encephalopathy and multiorgan failure and dies on Day 10 of life. Classify as subcategory 7.3.

8. Fetal Growth Restriction (FGR)

- 8.1 With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
- 8.2 With chronic villitis
- 8.3 No placental pathology
- 8.4 No examination of placenta
- 8.8 Other specified placental pathology
- 8.9 Unspecified or not known whether placenta examined

This category includes deaths of babies with birthweight <10th percentile for gestational age for livebirths or non macerated stillbirths, or for all perinatal deaths where repeated antenatal ultrasound measurements have already shown growth restriction or growth arrest before death. This category excludes perinatal deaths with FGR as a result of an identified maternal or fetal condition where the death is classified according to the condition.

In the situation of a macerated stillbirth with suspected Small for Gestational Age (SGA) but without prior antenatal ultrasound evidence of FGR, a brain:liver ratio equal to or greater than 4:1 at autopsy is required for classification of FGR. For macerated stillbirths, in the absence of prior ultrasound evidence of FGR and where no autopsy has been performed or the brain:liver ratio is less than 4:1, the death should be classified as *Unexplained Antepartum Death* (Category 10), as the weight discrepancy may be a post mortem effect.

Customised birthweight centiles (CBW) are being increasingly used to more accurately determine the presence of FGR. [6-8] It is recommended that the variables required for calculation of CBW (maternal age, ethnicity, height, weight, and fetal gestation and gender) be routinely collected to enable calculation of FGR according to CBW centiles. It is also recommended that for fetal deaths, where possible, the date of death and not date of birth be used to define the presence of FGR.

The subcategory 8.8 *Other specified placental pathology* is used when placental pathology other than that described in the subcategories 8.1 or 8.2 is present. The subcategory 8.9 *Unspecified or not known whether placenta examined* is used when information is not available on whether placental pathology was undertaken or where there is insufficient information about the placental pathology to categorise elsewhere.

Examples:
Do not classify here: A woman with an uncomplicated pregnancy presents with no fetal movements for 2 days at 34 weeks gestation, with no labour and intact membranes. An ultrasound scan confirms an intrauterine fetal death. Labour begins spontaneously after 4 days and a macerated female infant is born 12 hours later weighing 1500gms (<5th centile for 34 weeks). An autopsy is undertaken which did not reveal a cause for the death, a brain:liver ratio was not available. The histopathological report on the placenta stated that small areas of infarction were present but were not considered to be an explanation for the death. Further maternal investigations failed to identify a cause for the death. Classify as *Unexplained Antepartum Death: Other placental pathology* subcategory 10.8.

9. Spontaneous preterm (<37 weeks gestation)

- 9.1 Spontaneous preterm with intact membranes, or membrane rupture <24 hours before delivery
  - 9.11 With chorioamnionitis on placental histopathology
  - 9.12 Without chorioamnionitis on placental histopathology
  - 9.13 With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.17 No clinical signs of chorioamnionitis, no examination of placenta
  - 9.19 Unspecified or not known whether placenta examined
- 9.2 Spontaneous preterm with membrane rupture ≥24 hours before delivery
  - 9.21 With chorioamnionitis on placental histopathology
  - 9.22 Without chorioamnionitis on placental histopathology
  - 9.23 With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.27 No clinical signs of chorioamnionitis, no examination of placenta
  - 9.29 Unspecified or not known whether placenta examined
- 9.3 Spontaneous preterm with membrane rupture of unknown duration before delivery
  - 9.31 With chorioamnionitis on placental histopathology
  - 9.32 Without chorioamnionitis on placental histopathology
  - 9.33 With clinical evidence of chorioamnionitis, no examination of placenta
  - 9.37 No clinical signs of chorioamnionitis, no examination of placenta
  - 9.39 Unspecified or not known whether placenta examined

Deaths of normally formed, appropriately grown preterm babies following spontaneous onset of preterm labour or spontaneous rupture of membranes, irrespective of induction of labour or mode of delivery (e.g. elective caesarean section). There should be no evidence of fetal or neonatal infection (see Table 1 Determination of perinatal infection) among those with membranes ruptured less than 24 hours, otherwise classify under Category 2 *Perinatal Infection*. Careful examination of the placenta macroscopically and microscopically is recommended. The diagnosis of placental evidence of chorioamnionitis should only be made when there is histological or microbiological evidence of inflammation or infection of the placenta and membranes.

In cases where there is placental evidence of chorioamnionitis with or without evidence of clinical chorioamnionitis classify as subcategory 9.11, 9.21 or 9.31 as appropriate. Clinical evidence of chorioamnionitis is defined as maternal fever (≥38 ^{0}C) associated with one or more of the following symptoms or signs: maternal or fetal tachycardia, uterine tenderness, malodorous amniotic fluid, and maternal leukocytosis or raised C-reactive protein[9-11]. In cases of clinical chorioamnionitis where placental pathological examination was not performed or it is not known whether the placenta was examined, classify as subcategory 9.13, 9.23 or 9.33 as appropriate.

There may be some bleeding at the time of onset of labour, or earlier in pregnancy, but not in amounts to warrant the antecedent cause being attributed to *Antepartum Haemorrhage* Category 4.

Examples:
Classify here: Spontaneous labour at 26 weeks, no apparent explanation, and membranes intact. Vaginal delivery after 6 hours of membrane rupture, no evidence of intrapartum hypoxia or chorioamnionitis; subsequent early neonatal death from respiratory distress syndrome. Classify here as subcategory 9.12 *Without chorioamnionitis on placental histopathology.*

Classify here: Spontaneous onset of labour at 28 weeks with intact membranes. No cause identified for preterm labour. Delivery following 24 hours of membrane rupture. Maternal intrapartum pyrexia. Chorioamnionitis on placental histology, no organism identified. Classify here as subcategory 9.21.

10. Unexplained antepartum death

- 10.1 With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
- 10.2 With chronic villitis
- 10.3 No placental pathology
- 10.4 No examination of placenta
- 10.8 Other specified placental pathology
- 10.9 Unspecified or not known whether placenta examined

This category includes deaths of normally formed fetuses prior to the onset of labour where no predisposing factors are considered likely to have caused the death e.g. Fetal Growth Restriction or any other primary complication such as spontaneous preterm rupture of the membranes. The subcategory 10.8 *Other specified placental pathology* is used when other placental pathology is present. other than that included elsewhere (categories 10.1, 10.2). Subcategory 10.9 *Unspecified or not known whether placenta examined* is used to classify deaths fulfilling the criteria for this category where it is not known *either* whether the placenta was examined *or* if the placenta was examined, the results of this examination.

Examples:
Classify here: Intrauterine Fetal Death (IUFD) at 27 weeks, with membranes intact, before onset of labour, no explanation. No autopsy or examination of placenta. Classify as *Unexplained Antepartum Death*, subcategory 10.4.

Do not classify here: Spontaneous ROM at 27 weeks, no significant maternal conditions present, subsequent IUFD prior to onset of labour. No chorioamnionitis on examination of the placenta. Classify as subcategory 9.32 *Spontaneous Preterm.*

11. No obstetric antecedent
- 11.1 Sudden Infant Death Syndrome (SIDS) (See appendix p130)
  - 11.11 SIDS Category IA: Classic features of SIDS present and completely documented.
  - 11.12 SIDS Category IB: Classic features of SIDS present but incompletely documented.
  - 11.13 SIDS Category II : Infant deaths that meet Category I except for one or more features.
- 11.2 Postnatally acquired infection
- 11.3 Accidental asphyxiation
- 11.4 Other accident, poisoning or violence (postnatal)
- 11.8 Other specified
- 11.9 Unknown/Undetermined
  - 11.91 Unclassified Sudden Infant Death
  - 11.92 Other Unknown/Undetermined

Subcategories 11.1 *SIDS* and 11.91 *Unclassified Sudden Infant Death* are defined according to the new SIDS classification system by Krous et al[12]. This classification system provides a broad overall definition of SIDS which is then subcategorised on the basis of specific epidemiological features and the amount of information available (*Please see below*). Subcategory 11.92 *Other Unknown/Undetermined* has been included to identify unknown causes of death which do not fulfil the criteria of Category 11.91.

Subcategory 11.4 *Other accident, poisoning or violence (postnatal)* excludes cases of antepartum deaths which should be classified in Category 5 *Maternal Conditions* under subcategory 5.3 *Maternal injury.* Subcategory 11.8 *Other specified* is used to classify other identified conditions which are not included in subcategories 11.1 to 11.4.

Definitional approach to Sudden Infant Death[12]

General Definition of SIDS
SIDS is defined as the sudden unexpected death of an infant <1 year of age, with onset of the fatal episode apparently occurring during sleep, that remains unexplained after a thorough investigation, including performance of a complete autopsy and review of the circumstances of death and the clinical history.

Category IA SIDS: *Classic Features of SIDS Present and Completely Documented*
Category IA includes infant deaths that meet the requirements of the general definition and also all of the following requirements.

Clinical
- More than 21 days and <9 months of age.
- Normal clinical history, including term pregnancy (gestational age of $\geq$37 weeks).
- Normal growth and development.

No similar deaths among siblings, close genetic relatives (uncles, aunts or first-degree cousins), or other infants in the custody of the same caregiver.

Circumstances of Death
Investigation of the various scenes where incidents leading to death might have occurred and determination that they do not provide an explanation for the death.
Found in a safe sleeping environment, with no evidence of accidental death.

Autopsy
Absence of potentially fatal pathologic findings. Minor respiratory system inflammatory infiltrates are acceptable; intrathoracic petechial haemorrhage is a supportive but not obligatory or diagnostic finding.
No evidence of unexplained trauma, abuse, neglect, or unintentional injury.
No evidence of substantial thymic stress effect (thymic weight of <15g and/or moderate/severe cortical lymphocyte depletion). Occasional "starry sky" macrophages or minor cortical depletion is acceptable.
Negative results of toxicologic, microbiologic, radiologic, vitreous chemistry, and metabolic screening studies.

***Category IB SIDS**: Classic Features of SIDS Present but Incompletely Documented*
Category IB includes infant deaths that meet the requirements of the general definition and also meet all of the criteria for category IA except that investigation of the various scenes where incidents leading to death might have occurred was not performed and or ≥ 1 of the following analyses was not performed: toxicologic, microbiologic, radiologic, vitreous chemistry, or metabolic screening studies.

Category II SIDS
Category II includes infant deaths that meet category I criteria except for ≥ 1 of the following.

Clinical
Age range outside that of category 1A or 1B (i.e., 0-21 days or 270 days [9 months] through first birthday).

Similar deaths among siblings, close relatives, or other infants in the custody of the same caregiver that are not considered suspect for infanticide or recognised genetic disorders.

Neonatal or perinatal conditions (for example, those resulting from preterm birth) that have resolved by the time of death.

Circumstances of Death
Mechanical asphyxia or suffocation caused by overlaying not determined with certainty.

Autopsy
Abnormal growth and development not thought to have contributed to death.
Marked inflammatory changes or abnormalities not sufficient to be unequivocal causes of death.

Unclassified Sudden Infant Death
The unclassified category includes deaths that do not meet the criteria for category I or II SIDS but for which alternative diagnoses of natural or unnatural conditions are equivocal, including cases for which autopsies were not performed.

Post-resuscitation cases
Infants found in extremis who are resuscitated and later die ("temporarily interrupted SIDS") may be included in the aforementioned categories, depending on the fulfilment of relevant criteria.

7.5.2 PSANZ-NDC Classification Guide

The Neonatal Death Classification has been developed for use in conjunction with the PSANZ Classification of Perinatal Death in order to provide more comprehensive information on the factors in the neonatal period associated with neonatal deaths.

For example, a mother who has an antepartum haemorrhage at 32 weeks gestation delivers a 1500g infant which thrives in the neonatal nursery but subsequently acquires a lethal nosocomial infection: the obstetric antecedent is antepartum haemorrhage, but neonatal death classification is subcategory 4.12 *Acquired Bacteria.* Neonatal nosocomial infection is an important potentially preventable condition and its contribution to perinatal deaths may not be identified by applying the antecedent classification alone.

1. Congenital abnormality (including terminations for congenital abnormalities)
- 1.1 Central nervous system
- 1.2 Cardiovascular system
- 1.3 Urinary system
- 1.4 Gastrointestinal system
- 1.5 Chromosomal
- 1.6 Metabolic
- 1.7 Multiple/non chromosomal syndromes
- 1.8 Other congenital abnormality
  - 1.81 Musculoskeletal
  - 1.82 Respiratory
  - 1.83 Diaphragmatic hernia
  - 1.84 Haematological
  - 1.85 Tumours
  - 1.88 Other specified congenital abnormality
- 1.9 Unspecified congenital abnormality

2. Extreme prematurity (typically infants of ≤24 weeks gestation or ≤600g birthweight)
- 2.1 Not resuscitated
- 2.2 Unsuccessful resuscitation
- 2.9 Unspecified or unknown whether resuscitation attempted

This group includes infants deemed too immature for resuscitation or continued life support beyond the delivery room, typically infants of gestational age ≤24 weeks or birthweight ≤600g. Resuscitation in this context means the use of positive pressure ventilation.

3. Cardio-respiratory disorders
- 3.1 Hyaline membrane disease / Respiratory Distress Syndrome (RDS)
- 3.2 Meconium aspiration syndrome
- 3.3 Primary persistent pulmonary hypertension
- 3.4 Pulmonary hypoplasia
- 3.5 Chronic neonatal lung disease (typically, bronchopulmonary dysplasia (BPD))
- 3.6 Pulmonary haemorrhage
- 3.7 Pneumothorax
- 3.8 Other

Subcategory 3.1 *Hyaline membrane disease / Respiratory Distress Syndrome (RDS)* is used for deaths of infants who were receiving mechanical ventilation for acute RDS at the time of death or at the time of the complication such as pulmonary haemorrhage, sepsis or pneumothorax.

Neonates with resolving RDS, i.e. who are past the acute phase of the disease and are stable or improving, but who are still on low rate ventilation for immature lungs, extreme prematurity or apnoea, or who no longer require mechanical ventilation, and who developed a complication which led to the death should be classified according to that particular complication. For example, a non-ventilated neonate who dies of sepsis, is classified as Category 4 *Infection*.

Examples

1. A 26 week gestation infant with RDS receives mechanical ventilation (SIPPV R50, P20/5, $Fi0_2$ 0.4) develops complications of pneumothorax requiring drainage followed by a patent ductus arteriosus is classified as Category 3.1.

2. A 26 week gestation infant with RDS weaning off mechanical ventilator has a Grade IV Intraventricular Haemorrhage (IVH) with ventricular dilation on ultrasound on Day 5 is successfully weaned to CPAP on Day 7. He requires re-ventilation for sepsis on Day 10 and on Day 21 has developing BPD and post hemorrhagic hydrocephalus (PHH) and ventilation is withdrawn. Classification is dependent on the major reason for withdrawal of support. In this case PHH. Classify as 3.5.

Categorisation as chronic neonatal lung disease (subcategory 3.5) should be reserved for infants with deteriorating lung function and major chest X-ray changes consistent with bronchopulmonary dysplasia.

4. Infection

- 4.1 Bacterial
- 4.11 Congenital bacterial
  - 4.111 Group B Streptococcus
  - 4.112 E coli
  - 4.113 Lysteria monocytogenes
  - 4.114 Spirochaetal, eg syphilis
  - 4.118 Other bacterial
  - 4.119 Unspecified bacterial
- 4.12 Acquired bacterial
  - 4.121 Group B Streptococcus
  - 4.122 E coli
  - 4.125 Other Gram negative bacilli (other than E coli)
  - 4.126 Staphylococcus aureus
  - 4.127 Coagulase negative Staphylococcus
  - 4.128 Other specified bacterial
  - 4.129 Unspecified bacterial
- 4.2 Viral
- 4.21 Congenital viral
  - 4.211 Cytomegalovirus
  - 4.213 Herpes simplex virus
  - 4.214 Rubella virus
  - 4.218 Other specified viral
  - 4.219 Unspecified viral
- 4.22 Acquired viral
  - 4.221 Cytomegalovirus
  - 4.223 Herpes simplex virus
  - 4.224 Rubella virus
  - 4.228 Other specified viral
  - 4.229 Unspecified viral
- 4.3 Protozoal e.g. Toxoplasma
- 4.5 Fungal
- 4.8 Other specified organism
- 4.9 Unspecified organism

Table 2. Determination of infection

Determination of Infection
A. Congenital Early onset infection (within 48 hours of birth), defined as: 1. Clinical signs in neonate consistent with sepsis AND 2. Haematological changes consistent with sepsis AND 3a. Positive culture of a pathogen (bacterial or viral) from the neonate OR 3b. Pathological evidence at autopsy OR 3c. Positive serology OR 3d. Positive culture of a pathogen from the mother or the placenta. NB: Some congenital viral infections may have onset later than 48 hours after birth. B. Acquired Onset of infection at 48 hours or later, with criteria as above, but excluding 3d.

5. Neurological

- 5.1 Hypoxic ischaemic encephalopathy / Perinatal asphyxia (typically infants of >24 weeks gestation or >600g birthweight)
- 5.2 Intracranial haemorrhage
  - 5.21 Intraventricular Haemorrhage
  - 5.22 Subgaleal Haemorrhage
  - 5.23 Subarachnoid Haemorrhage
  - 5.24 Subdural Haemorrhage
  - 5.28 Other Intracranial Haemorrhage
- 5.8 Other

Inclusion as hypoxic ischaemic encephalopathy or perinatal asphyxia usually requires a sentinel asphyxial event +/- evidence of severe non-reassuring fetal status or early onset encephalopathy.

Examples of sentinel events (this would apply to infants typically of >24 weeks gestation or of >600g birthweight).

Massive antepartum haemorrhage from abruption, placenta praevia or ruptured vasa praevia, breech presentation or delivery with complications, e.g. cervical constriction ring or difficult delivery, feto-maternal haemorrhage, twin-twin transfusion.

Where possible, evidence for perinatal asphyxia should include fetal, umbilical artery or early neonatal (within one hour) blood gases showing evidence of a severe metabolic acidosis. Otherwise peripartum death might also be due to non-hypoxic causes, e.g. infection or chronic ischaemia but wrongly assumed to be due to acute hypoxia. On the absence of a sentinel asphyxial event every effort must be undertaken to exclude alternative diagnosis.

6. Gastrointestinal

- 6.1 Necrotising enterocolitis
- 6.8 Other

7. Other

- 7.1 Sudden Infant Death Syndrome (SIDS)
  - 7.11 SIDS Category IA: Classic features of SIDS present and completely documented.
  - 7.12 SIDS Category IB: Classic features of SIDS present but incompletely documented.
  - 7.13 SIDS Category II : Infant deaths that meet category I except for one or more features.
- 7.2 Multisystem failure
  - 7.21 Secondary to intrauterine growth restriction
  - 7.28 Other specified
  - 7.29 Unspecified/undetermined primary cause or trigger event
- 7.3 Trauma
  - 7.31 Accidental
  - 7.32 Non accidental
  - 7.39 Unspecified
- 7.4 Treatment complications
  - 7.41 Surgical
  - 7.42 Medical
- 7.8 Other specified
- 7.9 Unknown/Undetermined
  - 7.91 Unclassified Sudden Infant Death
  - 7.92 Other Unknown/Undetermined

The new classification for SIDS, by Krous et al[11], has been adopted as follows:

Definitional approach to Sudden Infant Death

General Definition of SIDS

SIDS is defined as the sudden unexpected death of an infant <1 year of age, with onset of the fatal episode apparently occurring during sleep, that remains unexplained after a thorough investigation, including performance of a complete autopsy and review of the circumstances of death and the clinical history.

Category IA SIDS: *Classic Features of SIDS Present and Completely Documented*

Category IA includes infant deaths that meet the requirements of the general definition and also all of the following requirements.

Clinical

- More than 21 days and <9 months of age.
- Normal clinical history, including term pregnancy (gestational age of $\geq$37 weeks).
- Normal growth and development.

No similar deaths among siblings, close genetic relatives (uncles, aunts or first-degree cousins), or other infants in the custody of the same caregiver.

Circumstances of Death

Investigation of the various scenes where incidents leading to death might have occurred and determination that they do not provide an explanation for the death.
Found in a safe sleeping environment, with no evidence of accidental death.

Autopsy

Absence of potentially fatal pathologic findings. Minor respiratory system inflammatory infiltrates are acceptable; intrathoracic petechial haemorrhage is a supportive but not obligatory or diagnostic finding.
No evidence of unexplained trauma, abuse, neglect, or unintentional injury.
No evidence of substantial thymic stress effect (thymic weight of <15g and/or moderate/severe cortical lymphocyte depletion). Occasional “starry sky” macrophages or minor cortical depletion is acceptable.
Negative results of toxicologic, microbiologic, radiologic, vitreous chemistry, and metabolic screening studies.

Category IB SIDS: *Classic Features of SIDS Present but Incompletely Documented*
Category IB includes infant deaths that meet the requirements of the general definition and also meet all of the criteria for category IA except that investigation of the various scenes where incidents leading to death might have occurred was not performed and or ≥ 1 of the following analyses was not performed: toxicologic, microbiologic, radiologic, vitreous chemistry, or metabolic screening studies.

Category II SIDS
Category II includes infant deaths that meet category I criteria except for ≥ 1 of the following.

Clinical
Age range outside that of category 1A or 1B (i.e., 0-21 days or 270 days [9 months] through first birthday).
Similar deaths among siblings, close relatives, or other infants in the custody of the same caregiver that are not considered suspect for infanticide or recognised genetic disorders.
Neonatal or perinatal conditions (for example, those resulting from preterm birth) that have resolved by the time of death.

Circumstances of Death
Mechanical asphyxia or suffocation caused by overlaying not determined with certainty.

Autopsy
Abnormal growth and development not thought to have contributed to death.
Marked inflammatory changes or abnormalities not sufficient to be unequivocal causes of death.

Unclassified Sudden Infant Death
The unclassified category includes deaths that do not meet the criteria for category I or II SIDS but for which alternative diagnoses of natural or unnatural conditions are equivocal, including cases for which autopsies were not performed.

Postresuscitation Cases
Infants found in extremis who are resuscitated and later die ("temporarily interrupted SIDS") may be included in the aforementioned categories, depending on the fulfilment of relevant criteria.

7.6 References:

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Appendix 1: Changes - April 2009

The previous version of the classification is dated October 2004. This revision incorporates amendments to the PSANZ-PDC and PSANZ-NDC based on feedback received from users and discussion with the guideline working party which includes developers of the classification systems. The changes to previous version dated October 2004 are listed here. Previous changes made are listed at the end of this appendix.

1. Changes made in the March 2009 revision

1.1. PSANZ Perinatal Death Classification (PSANZ-PDC)

1.1.1 The inclusion of a code to identify terminations of pregnancy for congenital abnormality

PSANZ-PDC version October 2004	*PSANZ-PDC version April 2009*
1 Congenital Abnormality (including terminations for congenital abnormalities)	**1 Congenital Abnormality (including terminations for congenital abnormalities)**
1.1 Central nervous system	1.1 Central nervous system
1.2 Cardiovascular system	1.2 Cardiovascular system
1.3 Urinary system	1.3 Urinary system
1.4 Gastrointestinal system	1.4 Gastrointestinal system
1.5 Chromosomal	1.5 Chromosomal
1.6 Metabolic	1.6 Metabolic
1.7 Multiple/non chromosomal syndromes	1.7 Multiple/non chromosomal syndromes
1.8 Other congenital abnormality	1.8 Other congenital abnormality
1.81 Musculoskeletal	1.81 Musculoskeletal
1.82 Respiratory	1.82 Respiratory
1.83 Diaphragmatic hernia	1.83 Diaphragmatic hernia
1.84 Haematological	1.84 Haematological
1.85 Tumours	1.85 Tumours
1.88 Other specified congenital abnormality	1.88 Other specified congenital abnormality
1.9 Unspecified congenital abnormality	1.9 Unspecified congenital abnormality
	Please note that terminations of pregnancy for perinatal deaths within this category should be identified by the inclusion of an “09” for two-digit codes and a “9” for the three digit codes

1.1.2 Change of wording for Category 5.5

PSANZ-PDC version October 2004	*PSANZ-PDC version April 2009*
5 Maternal conditions	**5 Maternal conditions**
5.1 Termination of pregnancy for maternal psychosocial indications	5.1 Termination of pregnancy for maternal psychosocial indications
5.2 Diabetes / Gestational diabetes	5.2 Diabetes / Gestational diabetes
5.3 Maternal injury	5.3 Maternal injury
5.31 Accidental	5.31 Accidental
5.32 Non-accidental	5.32 Non-accidental
5.4 Maternal sepsis	5.4 Maternal sepsis
5.5 Lupus obstetric syndrome	5.5 Antiphospholipid syndrome
5.6 Obstetric cholestasis	5.6 Obstetric cholestasis
5.8 Other specified maternal conditions	5.8 Other specified maternal conditions

1.1.3 Addition of subcategories under Categories 6.3 and 6.8

PSANZ-PDC version October 2004	*PSANZ-PDC version February 2009*
6 Specific perinatal conditions	**6 Specific perinatal conditions**
6.1 Twin-twin transfusion	6.1 Twin-twin transfusion
6.2 Fetomaternal haemorrhage	6.2 Fetomaternal haemorrhage
6.3 Antepartum cord complications (e.g. cord haemorrhage; true knot with evidence of occlusion)	6.3 Antepartum cord complications 6.31 Cord haemorrhage 6.32 True knot with evidence of occlusion 6.38 Other 6.39 Unspecified
6.4 Uterine abnormalities, e.g. bicornuate uterus, cervical incompetence	6.4 Uterine abnormalities, e.g. bicornuate uterus, cervical incompetence
6.5 Birth trauma (typically infants of >24 weeks gestation or >600g birthweight)	6.5 Birth trauma (typically infants of >24 weeks gestation or >600g birthweight)
6.6 Alloimmune disease 6.61 Rhesus 6.62 ABO 6.63 Kell 6.64 Alloimmune thrombocytopenia 6.68 Other 6.69 Unspecified	6.6 Alloimmune disease 6.61 Rhesus 6.62 ABO 6.63 Kell 6.64 Alloimmune thrombocytopenia 6.68 Other 6.69 Unspecified
6.7 Idiopathic hydrops	6.7 Idiopathic hydrops
6.8 Other specific perinatal conditions (includes iatrogenic conditions such as rupture of membranes after amniocentesis, termination of pregnancy for suspected but unconfirmed congenital abnormality).	6.8 Other specific perinatal conditions 6.81 Rupture of membranes after amniocentesis 6.82 Termination of pregnancy for suspected but unconfirmed congenital abnormality, 6.83 Fetal subdural haematoma 6.88 Other 6.89 Unspecified

1.1.4 Fetal growth restriction (FGR) Category 8 - customised birthweight centiles

A recommendation for the collection of data to determine FGR according to Customised birthweight centiles.(please see item 7.5.1.)

1.2 PSANZ Neonatal Death Classification (PSANZ-NDC)

1.2.1 Addition of new categories: 3.6 Pulmonary haemorrhage and 3.7 Pneumothorax

PSANZ-NDC version October 2004	*PSANZ-NDC version February 2009*
3 Cardio-respiratory disorders	**3 Cardio-respiratory disorders**
3.1 Hyaline membrane disease / Respiratory Distress Syndrome (RDS)	3.1 Hyaline membrane disease / Respiratory distress syndrome (RDS)
3.2 Meconium aspiration syndrome	3.2 Meconium aspiration syndrome
3.3 Primary persistent pulmonary hypertension	3.3 Primary persistent pulmonary hypertension
3.4 Pulmonary hypoplasia	3.4 Pulmonary hypoplasia
3.5 Chronic neonatal lung disease (typically, bronchopulmonary dysplasia)	3.5 Chronic neonatal lung disease (typically, bronchopulmonary dysplasia)
3.8 Other	3.6 Pulmonary haemorrhage 3.7 Pneumothorax 3.8 Other

1.2.1 Addition of new categories: 4.1 Congenital and 4.2 Acquired; Additional subcategories under Categories 4.1 and 4.2

PSANZ-NDC version October 2004	*PSANZ-NDC version February 2009*
4 Infection	**4 Infection**
4.1 Bacterial 4.11 Congenital bacterial 4.12 Acquired bacterial	4.1 Bacterial 4.11 Congenital bacterial 4.111 Group B Streptococcus 4.112 E coli 4.113 Lysteria monocytogenes 4.114 Spirochaetal, eg syphilis 4.118 Other bacterial 4.119 Unspecified bacterial 4.12 Acquired bacterial 4.121 Group B Streptococcus 4.122 E coli 4.125 Other Gram negative bacilli (other
4.2 Viral 4.21 Congenital viral 4.22 Acquired viral	
4.3 Protozoal e.g. Toxoplasma	
4.4 Spirochaetal e.g. Syphilis	
4.5 Fungal	
4.8 Other	
4.9 Unspecified organism	

	than E coli) 4.126 Staphylococcus aureus 4.127 Coagulase negative Staphylococcus 4.128 Other specified bacterial 4.129 Unspecified bacterial 4.2 Viral 4.21 Congenital viral 4.211 Cytomegalovirus 4.213 Herpes simplex virus 4.214 Rubella virus 4.218 Other specified viral 4.219 Unspecified viral 4.22 Acquired viral 4.221 Cytomegalovirus 4.223 Herpes simplex virus 4.224 Rubella virus 4.228 Other specified viral 4.229 Unspecified viral 4.3 Protozoal e.g. Toxoplasma 4.5 Fungal 4.8 Other specified organism 4.9 Unspecified organism

1.2.2Additional subcategories under Category 5.2 Intracranial haemorrhage

PSANZ-NDC version October 2004	*PSANZ-NDC version February 2009*
5. Neurological 5.1 Hypoxic ischaemic encephalopathy / Perinatal asphyxia (typically infants of >24 weeks gestation or >600g birthweight) 5.2 Intracranial haemorrhage 5.8 Other	**5. Neurological** 5.1 Hypoxic ischaemic encephalopathy / Perinatal asphyxia (typically infants of >24 weeks gestation or >600g birthweight) 5.2 Intracranial haemorrhage 5.21 Intraventricular Haemorrhage 5.22 Subgaleal Haemorrhage 5.23 Subarachnoid Haemorrhage 5.24 Subdural Haemorrhage 5.28 Other Intracranial Haemorrhage 5.8 Other

1.2.3 Addition of a new category – 7.4 Treatment complications; Additional subcategories under 7.2 and 7.3.

PSANZ-NDC version October 2004	*PSANZ-NDC version February 2009*
7 Other 7.1 Sudden Infant Death Syndrome (SIDS) 7.11 SIDS Category IA: Classic features of SIDS present and completely documented. 7.12 SIDS Category IB: Classic features of SIDS present but incompletely documented. 7.13 SIDS Category II : Infant deaths that meet category I except for one or more features. 7.2 Multisystem failure-only if unknown primary cause or trigger event 7.3 Trauma 7.8 Other specified 7.9 Unknown/Undetermined 7.91 Unclassified Sudden Infant Death 7.92 Other Unknown/Undetermined	**7 Other** 7.1 Sudden Infant Death Syndrome (SIDS) 7.11 SIDS Category IA: Classic features of SIDS present and completely documented. 7.12 SIDS Category IB: Classic features of SIDS present but incompletely documented. 7.13 SIDS Category II : Infant deaths that meet category I except for one or more features. 7.2 Multisystem failure 7.21 Secondary to intrauterine growth restriction 7.28 Other specified 7.29 Unspecified/undertemined primary cause or trigger event 7.3 Trauma 7.31 Accidental 7.32 Non accidental 7.39 Unspecified 7.4 Treatment complications 7.41Surgical 7.42 Medical 7.8 Other specified 7.9 Unknown/Undetermined 7.91 Unclassified Sudden Infant Death 7.92 Other Unknown/Undetermined

2. Changes made in the October 2004 revision

1. Classification of associated factors

To enable consideration of factors associated with perinatal death, following classification of the main obstetric antecedent factor according to the PSANZ-PDC, and in addition for neonatal deaths the neonatal factor according to the PSANZ-NDC, it is now recommended that up to two associated factors, where present, be recorded using the classifications.

For example, when the death was due to placental abruption which was preceded by pre-eclampsia, according to the PSANZ-PDC, the death is classified as *Hypertension - Pre-eclampsia* (subcategory 3.5) and the associated factor is classified as *Antepartum Haemorrhage Placental Abruption* (subcategory 4.1).

2. Subcategories for Special Interest Groups: PDC and NDC

The subcategories in Addendums 1 and 2 for Special Interest Groups in the PSANZ-PDC and PSANZ-NDC version May 23rd 2003 have been removed from the guideline. These subcategories have been superseded by the incorporation of classifying associated factors as discussed in 1 above and the additional of subcategories within the classification (*Please see Hypertension* Category 3 and *APH* Category 4).

3. Minimum data set for perinatal deaths

The SIG has developed a recommended core dataset for the purpose of classification and reporting of perinatal deaths (see *PSANZ Perinatal Mortality Audit Package* Section 2; Appendix 1) is recommended for this purpose. It is hoped that the use of this core dataset will enhance the quality of perinatal audit and thus the value of analyses of perinatal mortality audit and research activities across ANZ.

4. Changes to the Perinatal Death Classification Categories

4.1 Congenital abnormality: Category 1.

Additional subcategories have been included under Category 1.8 *Other congenital abnormality*. These are: Category 1.84 *Haematological* for classification of deaths due to haematological abnormalities such as thalassemia; and Category 1.85 *Tumours* for classification of tumours which includes cystic hygroma. Subcategory 1.7 has been renamed to *Multiple/non chromosomal syndromes*. In addition, clarification of Categories 1.8 *Other congenital abnormality* and 1.9 *Unspecified congenital abnormality* has been included in the Classification Guide. Categories 1.3 *Urinary tract* and 1.4 *Gastrointestinal tract* have been renamed to Urinary system and Gastrointestinal system.

PSANZ-PDC version May 23rd 2003	***PSANZ-PDC version October 2004***
1. Congenital Abnormality (including terminations for congenital abnormalities)	**1. Congenital Abnormality (including terminations for congenital abnormalities)**
1.1 Central nervous system	1.1 Central nervous system
1.2 Cardiovascular system	1.2 Cardiovascular system
1.3 Urinary tract	1.3 Urinary system
1.4 Gastrointestinal tract	1.4 Gastrointestinal system
1.5 Chromosomal	1.5 Chromosomal
1.6 Metabolic	1.6 Metabolic
1.7 Multiple	1.7 Multiple/non chromosomal syndromes
1.8 Other congenital abnormality	1.8 Other congenital abnormality
1.81 Musculoskeletal	1.81 Musculoskeletal
1.82 Respiratory	1.82 Respiratory
1.83 Diaphragmatic hernia	1.83 Diaphragmatic hernia
1.88 Other specified congenital abnormality	1.84 Haematological
1.9 Unspecified congenital abnormality	1.85 Tumours
	1.88 Other specified congenital abnormality
	1.9 Unspecified congenital abnormality

4.2 Perinatal infection: Category 2.

Subcategory 2.4 *Spirochaetal e.g. Syphilis* has been moved to 2.14. Category 2.8 has been renamed *Other specified organism* and 2.9 *Other unspecified organism*. In addition, clarification of the use of subcategories 2.8 and 2.9 has been included in the Classification Guide.

PSANZ-PDC version May 23rd 2003	***PSANZ-PDC version October 2004***
2. Perinatal infection	**2. Perinatal infection**
2.1 Bacterial	2.1 Bacterial
2.11 Group B Streptococcus	2.11 Group B Streptococcus
2.12 E coli	2.12 E coli
2.13 Listeria monocytogenes	2.13 Listeria monocytogenes
2.18 Other bacterial	2.14 Spirochaetal e.g. Syphilis
2.19 Unspecified bacterial	2.18 Other bacterial
2.2 Viral	2.19 Unspecified bacterial
2.21 Cytomegalovirus	2.2 Viral
2.22 Parvovirus	2.21 Cytomegalovirus
2.23 Herpes simplex virus	2.22 Parvovirus
2.24 Rubella virus	2.23 Herpes simplex virus
2.28 Other viral	2.24 Rubella virus
2.29 Unspecified viral	2.28 Other viral
2.3 Protozoal e.g. Toxoplasma	2.29 Unspecified viral
2.4 Spirochaetal e.g. Syphilis	2.3 Protozoal e.g. Toxoplasma
2.5 Fungal	2.5 Fungal
2.8 Other	2.8 Other specified organism
2.9 Unspecified organism	2.9 Other unspecified organism

4.3 Hypertension: Category 3

Two subcategories have been included to identify laboratory evidence of thrombophilia with pre-eclampsia (Subcategories 3.51 and 3.61). These categories were included in the previous version of the guideline in the Addendum for Special Interest Groups.

PSANZ-PDC version May 23rd 2003	***PSANZ-PDC version October 2004***
3. Hypertension	**3. Hypertension**
3.1 Chronic hypertension: essential	3.1 Chronic hypertension: essential
3.2 Chronic hypertension: secondary, e.g. renal disease	3.2 Chronic hypertension: secondary, e.g. renal disease
3.3 Chronic hypertension: unspecified	3.3 Chronic hypertension: unspecified
3.4 Gestational hypertension	3.4 Gestational hypertension
3.5 Pre-eclampsia	3.5 Pre-eclampsia
3.6 Pre-eclampsia superimposed on chronic hypertension	3.51 With laboratory evidence of thrombophilia
3.9 Unspecified hypertension	3.6 Pre-eclampsia superimposed on chronic hypertension
	3.61 With laboratory evidence of thrombophilia
	3.9 Unspecified hypertension

4.4 Antepartum haemorrhage Category 4

An additional subcategory 4.11 has been included to identify laboratory evidence of thrombophilia with placental abruption. This category was previously included in the Addendum for Special Interest Groups.

PSANZ-PDC version May 23rd 2003	***PSANZ-PDC version October 2004***
4. Antepartum Haemorrhage (APH)	**4. Antepartum Haemorrhage (APH)**
4.1 Placental abruption	4.1 Placental abruption
4.2 Placenta praevia	4.11 With laboratory evidence of thrombophilia
4.3 Vasa praevia	4.2 Placenta praevia
4.8 Other APH	4.3 Vasa praevia
4.9 APH of undetermined origin	4.8 Other APH
	4.9 APH of undetermined origin

4.5 Maternal conditions: Category 5.

Category 5.1 has been renamed to *Termination of pregnancy for maternal psychosocial indications.* Additional subcategories have been included as follows: 5.5 *Lupus obstetric syndrome* and 5.6 *Obstetric cholestasis* (previously classified under 5.8 *Other maternal conditions).*

PSANZ-PDC version May 23rd 2003	*PSANZ-PDC version October 2004*
5. Maternal Conditions 5.1 Termination of pregnancy (other than for congenital (fetal) abnormality) 5.2 Diabetes / Gestational diabetes 5.3 Maternal injury 5.31 Accidental 5.32 Non-Accidental 5.4 Maternal sepsis 5.8 Other maternal conditions, e.g. Lupus obstetric syndrome.	**5. Maternal Conditions** 5.1 Termination of pregnancy for maternal psychosocial indications 5.2 Diabetes / Gestational diabetes 5.3 Maternal injury 5.31 Accidental 5.32 Non-accidental 5.4 Maternal sepsis 5.5 Lupus obstetric syndrome 5.6 Obstetric cholestasis 5.8 Other specified maternal conditions

4.6 Hypoxic peripartum death: Category 7

An additional subcategory has been included: 7.2 Evidence of non-reassuring fetal status in a normally grown infant (e.g. abnormal fetal heart rate, fetal scalp ph/lactate, fetal pulse oximetry without intrapartum complications). This category identifies hypoxic peripartum deaths where there was evidence of fetal distress in a normally grown infant without apparent intrapartum complications as defined in 7.1. A new subcategory 7.3 has been included to identify deaths where there are no apparent complications as defined in 7.1 and no evidence of non-reassuring fetal status as defined in 7.2.

In the circumstance of a growth restricted infant fulfilling the criteria for this category, the death should be classified as Category 8 *Fetal Growth Restriction* with the exception of deaths due to an intrapartum obstetric complication where the death should be classified as Category 7.1. The Classification Guide has been updated to incorporate these changes and also to clarify the application of Category 7.9 *Unspecified hypoxic peripartum death.*

PSANZ-PDC version May 23rd 2003	*PSANZ-PDC version October 2004*
7. Hypoxic Peripartum Death (typically infants of >24 weeks gestation or >600g birthweight) 7.1 With intrapartum complications 7.11 Uterine rupture 7.12 Cord prolapse 7.13 Shoulder dystocia 7.18 Other 7.2 No apparent complications 7.9 Unspecified hypoxic peripartum death	**7. Hypoxic Peripartum Death (typically infants of >24 weeks gestation or >600g birthweight)** 7.1 With intrapartum complications 7.11 Uterine rupture 7.12 Cord prolapse 7.13 Shoulder dystocia 7.18 Other 7.2 Evidence of non-reassuring fetal status in a normally grown infant (e.g. abnormal fetal heart rate, fetal scalp pH/lactate, fetal pulse oximetry without intrapartum complications) 7.3 No intrapartum complications and no evidence of non-reassuring fetal status. 7.9 Unspecified hypoxic peripartum death

4.7 Fetal Growth Restriction (FGR): Category 8

Revised definition

The definition of FGR in the case of a macerated stillborn infant with suspected Small for Gestational Age (SGA) and without prior antenatal ultrasound evidence of FGR has been revised to include infants with a brain:liver ratio of 4:1 at autopsy. Suspected Small for Gestational Age (SGA) macerated stillbirths without prior ultrasound evidence of FGR or brain:liver ratio of 4:1 at autopsy should be classified as *Unexplained Antepartum Death* (Category 10), as the weight discrepancy may be a post mortem effect. Customised centiles[(2)] should be used in determining the presence of FGR, however, as yet data are not available to recommend their routine use in ANZ. It is also recommended that for fetal deaths, where possible, the date of death and not date of birth be used to define the presence of FGR.

The changes to subcategories are as follows:

Subcategory 8.1 description changed to include Doppler evidence; subcategory 8.3 new wording: *No placental pathology*; new subcategory 8.8 *Other placental pathology* is used when placental pathology as described in the subcategories 8.1 or 8.2 is not present.

Clarification of the use of subcategory 8.9 *Unspecified or not known whether placenta examined* has been included in the Classification Guide.

PSANZ-PDC version May 23rd 2003	*PSANZ-PDC version October 2004*
8. Fetal Growth Restriction (FGR)	**8. Fetal Growth Restriction (FGR)**
8.1 With evidence of uteroplacental insufficiency e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction	8.1 With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
8.2 With chronic villitis	8.2 With chronic villitis
8.3 Without the above placental pathology	8.3 No placental pathology
8.4 No examination of placenta	8.4 No examination of placenta
8.9 Unspecified FGR or not known whether placenta examined	8.8 Other specified placental pathology
	8.9 Unspecified or not known whether placenta examined

4.8 Spontaneous preterm: Category 9

Description change for subcategories 9.11, 9.21 and 9.31 to *With chorioamnionitis confirmed on placental histopathology* to clarify the need for placental confirmation of chorioamnionitis for this category; new subcategories 9.13, 9.23 or 9.33 for clinical chorioamnionitis where no placental histopathology is available; new subcategories 9.17, 9.27 and 9.37 *No clinical signs of chorioamnionitis, no examination of placenta.*

Clinical chorioamnionitis is defined as maternal fever (≥38 ^{0}C) associated with one or more of the following symptoms or signs: maternal or fetal tachycardia, uterine tenderness, malodorous amniotic fluid, and maternal leukocytosis or raised C-reactive protein. Clarification on the use of subcategory 9.39 has been included in the Classification Guide.

PSANZ-PDC version May 23rd 2003	*PSANZ-PDC version October 2004*
9. Spontaneous Preterm (<37 weeks gestation)	**9. Spontaneous Preterm (<37 weeks gestation)**
9.1 Spontaneous preterm with intact membranes, or membrane rupture <24 hours before delivery	9.1 Spontaneous preterm with intact membranes, or membrane rupture <24 hours before delivery
9.11 With chorioamnionitis	9.11 With chorioamnionitis on placental histopathology
9.12 Without chorioamnionitis	9.12 Without chorioamnionitis on placental histopathology
9.13 No examination of placenta	9.13 With clinical evidence of chorioamnionitis, no examination of placenta
9.19 Unspecified or not known whether placenta examined	9.17 No clinical signs of chorioamnionitis, no examination of placenta
9.2 Spontaneous preterm with membrane rupture ≥24 hours before delivery	9.19 Unspecified or not known whether placenta examined
9.21 With chorioamnionitis,	9.2 Spontaneous preterm with membrane rupture ≥24 hours before delivery
9.22 Without chorioamnionitis,	9.21 With chorioamnionitis on placental histopathology
9.23 No examination of placenta	9.22 Without chorioamnionitis on placental histopathology
9.3 Spontaneous preterm with membrane rupture of unknown duration before delivery,	9.23 With clinical evidence of chorioamnionitis, no examination of placenta
9.31 With chorioamnionitis	9.27 No clinical signs of chorioamnionitis, no examination of placenta
9.32 Without chorioamnionitis	9.29 Unspecified or not known whether placenta examined
9.33 No examination of placenta	9.3 Spontaneous preterm with membrane rupture of unknown duration before delivery
	9.31 With chorioamnionitis on placental histopathology
	9.32 Without chorioamnionitis on placental histopathology
	9.33 With clinical evidence of chorioamnionitis, no examination of placenta
	9.37 No clinical signs of chorioamnionitis, no examination of placenta
	9.39 Unspecified or not known whether placenta examined

4.9 Unexplained antepartum death: Category 10

Description change to subcategory 10.1 to include Doppler evidence of reduced vascular perfusion; subcategory 10.3 has been reworded; new subcategory 10.8 *Other placental pathology* is used when placental pathology as described in the subcategories 10.1 or 10.2 is not present; Category 10.9 description changed for clarity. Clarification of the use of subcategory 10.9 *Unspecified or not known whether placenta examined* has been included in the Classification Guide.

PSANZ-PDC version May 23rd 2003	***PSANZ-PDC version October 2004***
10. Unexplained Antepartum Death	**10. Unexplained Antepartum Death**
10.1 With evidence of uteroplacental insufficiency, e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction	10.1 With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology (e.g. significant infarction, acute atherosis, maternal and/or fetal vascular thrombosis or maternal floor infarction)
10.2 With chronic villitis	10.2 With chronic villitis
10.3 Without the above placental pathology	10.3 No placental pathology
10.4 No examination of placenta	10.4 No examination of placenta
10.9 Unspecified unexplained antepartum death or not known whether placenta examined	10.8 Other specified placental pathology
	10.9 Unspecified or not known whether placenta examined

4.10 No obstetric antecedent: Category 11.

Subcategories 11.1 *SIDS* and 11.91 *Unclassified Sudden Infant Death* are defined according to the new SIDS classification system by Krous et al[11]. This classification system provides a broad overall definition of SIDS which is then subcategorised on the basis of specific epidemiological features and the amount of information available (*Please* see below). Subcategory 11.92 *Other Unknown/Undetermined* has been included to identify unknown causes of death which do not fulfil the criteria of Category 11.92. An explanation of the categories is included in the Classification Guide.

In addition, subcategory 11.8 has been renamed to *Other specified* for clarity and includes classification of conditions which are not included in subcategories.

PSANZ-PDC version May 23rd 2003	***PSANZ-PDC version October 2004***
11. No Obstetric Antecedent	**11. No Obstetric Antecedent**
11.1 SIDS	11.1 Sudden Infant Death Syndrome (SIDS)
11.11 Consistent with SIDS	11.11 SIDS Category IA: Classic features of SIDS present and completely documented.
11.12 Possible SIDS	11.12 SIDS Category IB: Classic features of SIDS present but incompletely documented.
11.2 Postnatally acquired infection	11.13 SIDS Category II : Infant deaths that meet Category I except for one or more features.
11.3 Accidental asphyxiation	11.2 Postnatally acquired infection
11.4 Other accident, poisoning or violence (postnatal)	11.3 Accidental asphyxiation
11.8 Other	11.4 Other accident, poisoning or violence (postnatal)
11.9 Unknown / Unexplained	11.8 Other specified
	11.9 Unknown/Undetermined
	11.91 Unclassified Sudden Infant Death
	11.92 Other Unknown/Undetermined

5. Changes to the Neonatal Death Classification Categories

5.1 Congenital abnormality: Category 1.

Changes to subcategories have been made as for the Perinatal Death Classification.

5.2 Other: Category 7.

Changes to the classification of SIDS have been made as for the Perinatal Death Classification.

Appendix 2a: Table 1. Birthweight percentile values (g) for live singleton males, Australia, 1991-1994

Gestation (weeks)	No. births	Mean (gm)	Standard Deviation	Percentile (gm) 1st	3rd	5th	10th	25th	50th	75th	90th	95th	97th	99th
20	27	385	76					330	380	430				
21	43	447	66					410	440	490				
22	74	495	80				400	440	490	540	600			
23	95	607	92			470	500	550	610	660	710	780		
24	135	690	129		470	480	520	610	680	780	860	930	990	
25	180	791	132		560	580	620	700	785	870	980	1000	1030	
26	235	921	158		610	620	720	840	920	1020	1130	1160	1170	
27	284	1017	209		610	650	740	900	1000	1140	1280	1350	1440	
28	361	1157	240	570	670	720	850	1000	1170	1300	1440	1550	1600	1790
29	397	1316	261	670	760	840	950	1170	1340	1480	1640	1740	1810	1900
30	571	1477	313	730	860	960	1080	1270	1490	1680	1860	1950	2050	2270
31	743	1682	311	910	1070	1130	1310	1490	1670	1870	2070	2170	2280	2450
32	1117	1875	378	1020	1150	1230	1400	1640	1890	2100	2320	2470	2690	2980
33	1471	2142	415	1210	1360	1450	1640	1900	2120	2370	2650	2920	3060	3300
34	2657	2358	418	1310	1560	1670	1840	2100	2350	2600	2870	3080	3250	3530
35	4092	2610	413	1600	1830	1960	2110	2360	2590	2850	3140	3330	3490	3770
36	8788	2835	432	1780	2020	2150	2320	2560	2820	3100	3380	3570	3730	3960
37	18660	3089	442	2030	2270	2380	2550	2800	3080	3370	3660	3840	3960	4200
38	51404	3317	431	2310	2520	2620	2780	3030	3310	3600	3870	4050	4160	4390
39	72871	3471	426	2500	2690	2790	2940	3180	3460	3750	4020	4200	4310	4520
40	141553	3610	432	2630	2830	2920	3070	3320	3600	3890	4170	4340	4460	4680
41	55946	3739	443	2730	2930	3030	3180	3440	3730	4030	4310	4490	4600	4820
42	14781	3787	463	2730	2950	3040	3210	3470	3780	4090	4390	4570	4680	4910
43	1267	3698	501	2510	2770	2910	3080	3360	3680	4000	4360	4580	4670	4970
44	409	3612	474	2620	2720	2850	3050	3290	3590	3900	4270	4440	4530	4790

From: Roberts CL & Lancaster PAL. Australian national birthweight percentiles by gestational age. MJA 1999; 170: 114-118.

Appendix 2a: Table 2. Birthweight percentile values (g) for live singleton females, Australia, 1991-1994

Gestation (weeks)	No. births	Mean (gm)	Standard Deviation	Percentile (gm) 1st	3rd	5th	10th	25th	50th	75th	90th	95th	97th	99th
20	12	418	184						345					
21	25	414	55					400	420	440				
22	71	485	85				400	430	480	540	600			
23	79	591	103				470	520	580	640	740			
24	115	661	95		490	500	540	600	660	720	780	830	850	
25	136	760	116		510	560	620	700	750	840	900	960	980	
26	188	865	158		540	550	680	780	865	960	1040	1130	1180	
27	231	944	183		600	620	730	830	950	1070	1180	1250	1280	
28	287	1060	228		610	700	760	900	1070	1200	1340	1400	1440	
29	325	1233	247	630	720	810	890	1070	1250	1400	1510	1580	1660	1820
30	440	1403	275	740	860	945	1045	1220	1420	1560	1730	1885	1950	2100
31	548	1581	336	800	990	1050	1140	1360	1590	1765	2000	2130	2330	2560
32	877	1797	383	920	1070	1170	1340	1560	1780	2000	2230	2470	2640	2970
33	1200	2038	403	1135	1280	1385	1520	1790	2040	2265	2515	2755	2955	3150
34	2086	2282	439	1260	1440	1570	1760	2010	2260	2530	2810	3090	3290	3510
35	3418	2523	433	1520	1740	1840	2030	2260	2490	2760	3100	3340	3500	3710
36	7320	2738	433	1740	1950	2060	2220	2450	2720	3000	3300	3505	3650	3860
37	16105	2967	432	1940	2170	2280	2430	2680	2960	3240	3520	3700	3830	4050
38	47809	3187	419	2220	2420	2520	2660	2900	3170	3460	3730	3900	4020	4220
39	68846	3329	412	2390	2580	2670	2820	3050	3320	3600	3860	4030	4140	4340
40	137570	3463	414	2530	2720	2810	2950	3180	3450	3730	4000	4170	4280	4490
41	53260	3577	421	2630	2820	2910	3050	3290	3560	3850	4130	4300	4410	4620
42	13318	3627	442	2630	2830	2930	3080	3320	3610	3920	4210	4370	4500	4700
43	1285	3539	463	2460	2710	2770	2950	3240	3540	3840	4120	4320	4430	4620
44	433	3490	448	2420	2590	2720	2930	3180	3490	3800	4070	4230	4320	4470

From: Roberts CL & Lancaster PAL. Australian national birthweight percentiles by gestational age. MJA 1999: 170: 114-118.

Appendix 2a: Table 3. Birthweight percentile values (g) for male twins, Australia, 1991-1994

Gestation (weeks)	No. Births	Mean (g)	Standard Deviation	Percentile (g) 1st	3rd	5th	10th	25th	50th	75th	90th	95th	97th	99th
20	5	354	72						370					
21	17	479	202						420					
22	33	475	76					410	480	530				
23	37	549	119					460	560	630				
24	34	653	149					520	675	770				
25	67	764	125				580	690	770	840	920			
26	57	853	142				690	750	860	940	1000			
27	80	990	159			750	780	885	995	1080	1170	1245		
28	93	1168	224			760	850	1060	1170	1310	1400	1590		
29	54	1304	230		860	930	1010	1160	1310	1450	1590	1670	1790	
30	171	1459	238		1000	1070	1170	1300	1460	1620	1760	1830	1860	
31	191	1622	283		1020	1060	1250	1460	1640	1810	1980	2090	2140	
32	331	1782	273	1100	1250	1330	1450	1620	1780	1960	2100	2240	2300	2480
33	384	1977	295	1340	1420	1500	1600	1780	1980	2170	2360	2480	2530	2630
34	699	2141	315	1350	1460	1600	1730	1960	2150	2350	2540	2630	2720	2910
35	928	2365	333	1530	1710	1800	1960	2150	2365	2575	2780	2930	3040	3180
36	1384	2526	369	1590	1810	1900	2080	2300	2520	2780	2990	3120	3210	3380
37	1926	2731	364	1860	2000	2100	2260	2500	2730	2980	3200	3320	3380	3520
38	2260	2863	381	1910	2120	2230	2380	2610	2870	3110	3340	3490	3560	3760
39	749	2963	379	2130	2300	2360	2480	2700	2960	3190	3440	3600	3750	3920
40	399	3071	441	2090	2310	2350	2490	2780	3060	3340	3650	3820	3960	4160
41	52	2951	508				2120	2650	3035	3285	3550			
42	10	2889	362						2685					
43	4	2695	559						2670					
44	4	2490	833						2415					

From Roberts, C, & Lancaster, P., "National birthweight percentiles by gestational age for twins born in Australia", *Journal of Paediatrics and Child Health*, (1999) Vol 35, pp 278-282; tables 4 and 5, fig 2 and 3., Reproduced with permission.

Appendix 2a: Table 4. Birthweight percentile values (g) for female twins, Australia, 1991-1994

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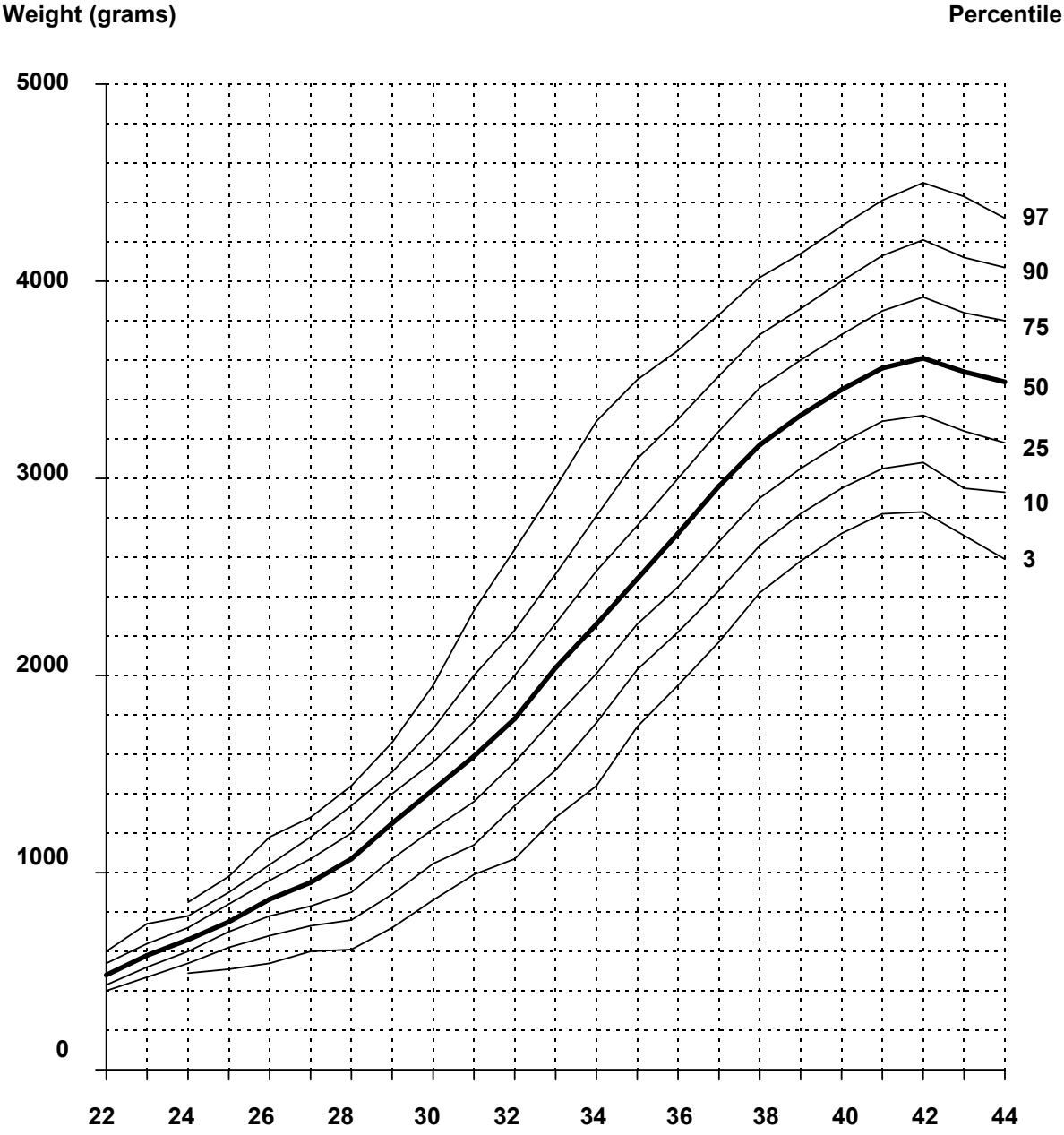
Gestation (weeks)	No. births	Mean (g)	Standard Deviation	Percentile (g) 1st	3rd	5th	10th	25th	50th	75th	90th	95th	97th	99th
20	8	314	48						310					
21	19	517	401						410					
22	14	441	85						455					
23	30	552	93					490	550	620				
24	40	606	126					530	570	680				
25	46	689	100					620	680	740				
26	67	838	140				680	750	830	910	1030			
27	70	894	205				575	790	940	1020	1135			
28	111	1092	161			780	860	1000	1110	1200	1280	1310		
29	86	1171	206			710	870	1080	1175	1310	1430	1500		
30	137	1386	225		960	970	1080	1250	1410	1530	1620	1720	1820	
31	207	1507	242		1000	1030	1170	1380	1520	1630	1800	1890	1900	
32	322	1673	273	980	1130	1200	1340	1520	1680	1850	2010	2090	2170	2370
33	400	1869	330	1020	1195	1300	1440	1675	1865	2080	2280	2400	2455	2705
34	625	2058	307	1240	1440	1530	1660	1870	2060	2260	2440	2550	2640	2810
35	907	2270	335	1520	1620	1710	1860	2050	2270	2470	2720	2840	2940	3070
36	1463	2430	348	1550	1760	1870	2010	2200	2430	2670	2860	2980	3090	3320
37	1910	2602	343	1790	1950	2050	2170	2380	2600	2820	3050	3170	3260	3430
38	2165	2731	359	1860	2050	2140	2270	2490	2740	2960	3190	3310	3400	3600
39	715	2850	373	2020	2130	2200	2380	2600	2850	3110	3340	3440	3550	3700
40	359	2920	410	2000	2100	2220	2390	2660	2920	3200	3420	3590	3750	3860
41	41	2826	469					2540	2880	3090				
42	14	2684	277						2660					
43	2	2830	0						2830					
44	2	2665	290						2665					

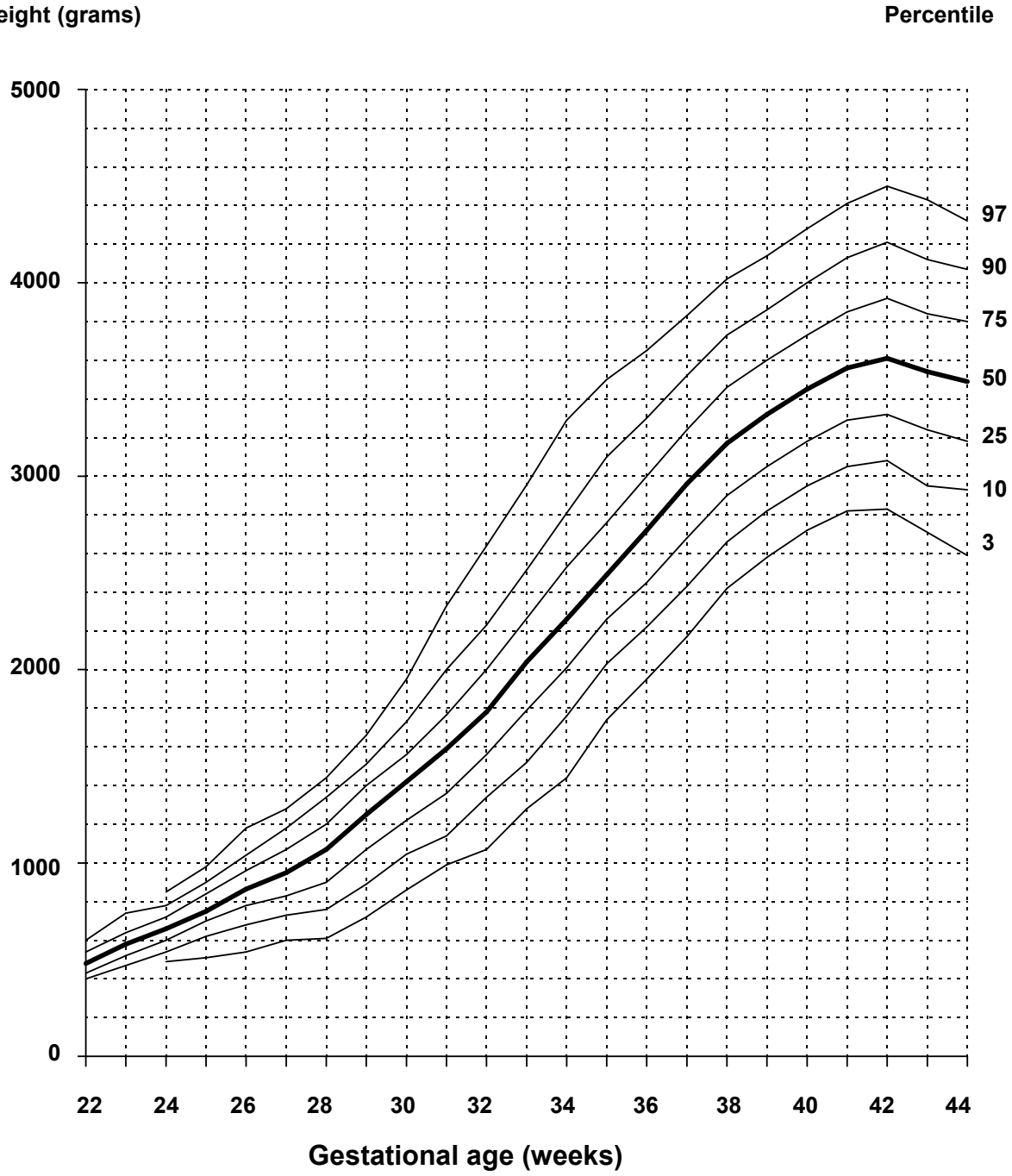
From Roberts, C, & Lancaster, P., "National birthweight percentiles by gestational age for twins born in Australia", *Journal of Paediatrics and Child Health*, (1999) Vol 35, pp 278-282; tables 4 and 5, fig 2 and 3., Reproduced with permission.

Appendix 2b: Figure 1 Australian birthweight percentiles for singleton boys



From: Roberts CL & Lancaster PAL. **Australian national birthweight percentiles by gestational age**. MJA 1999;170: 114-118. ©Copyright 1999. *The Medical Journal of Australia* - reproduced with permission

Appendix 2b: Figure 2 Australian birthweight percentiles for singleton girls



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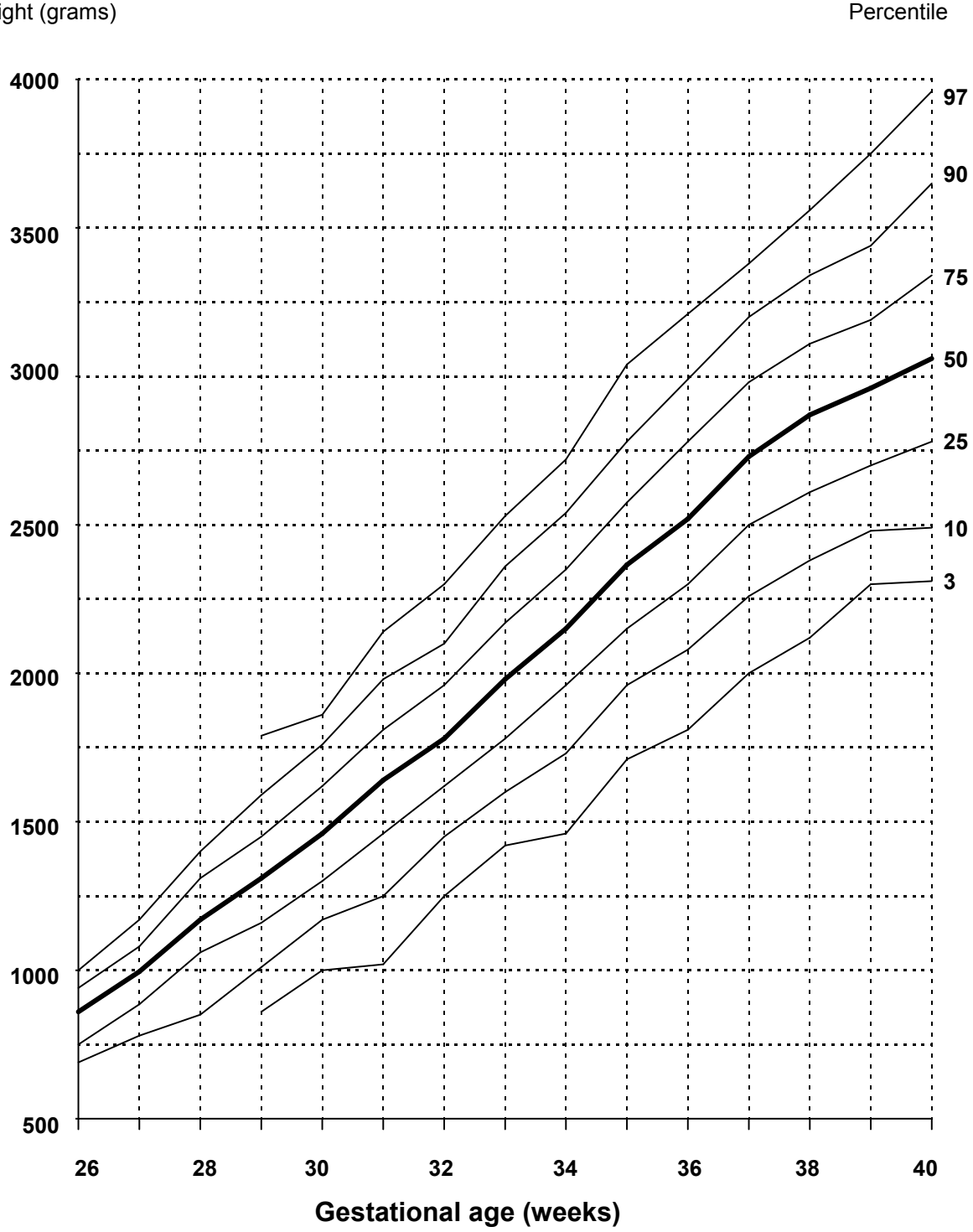
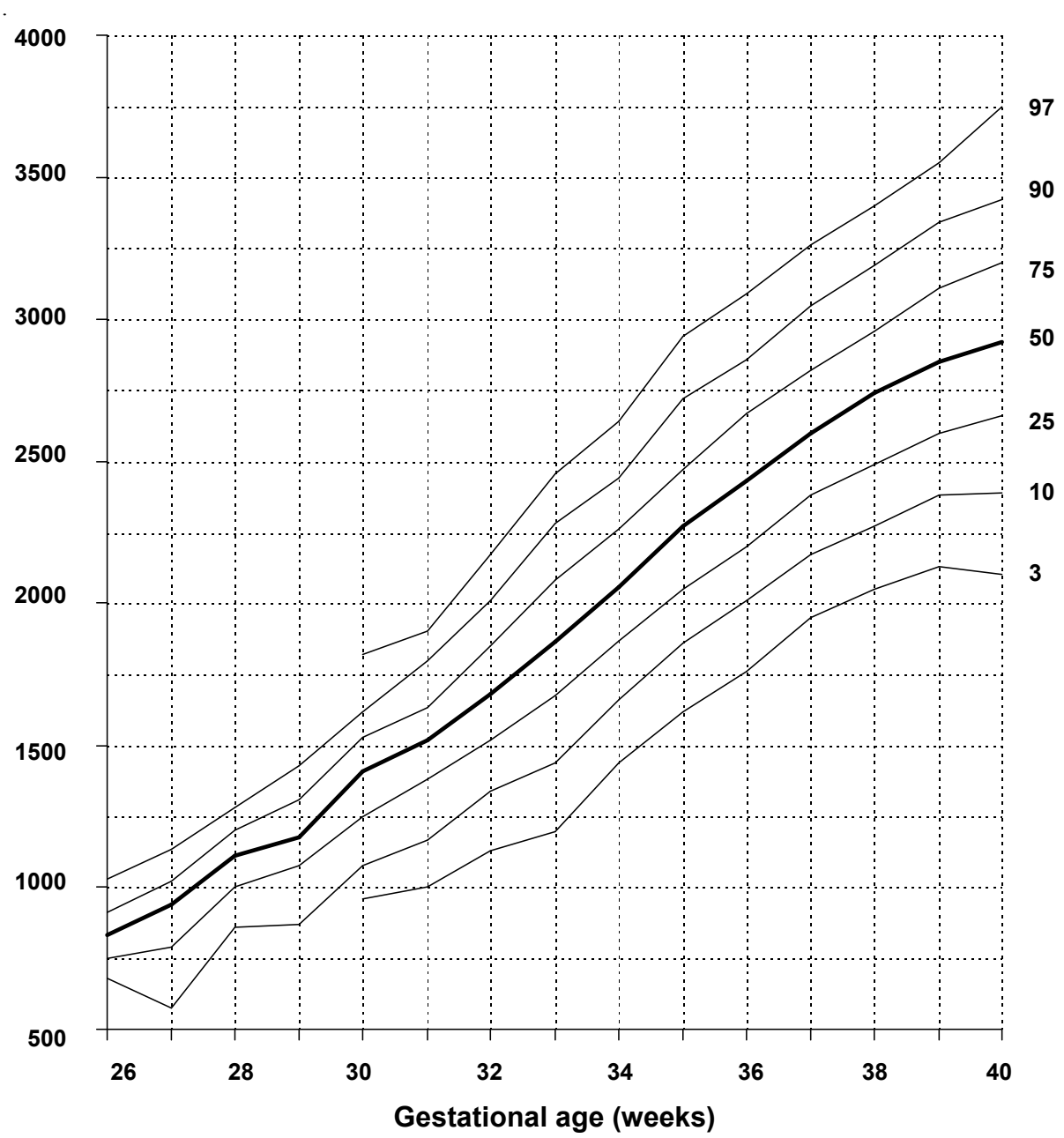
Appendix 2b: Figure 3 Birthweight percentiles for male twins, Australia



From Roberts, C, & Lancaster, P., "**National birthweight percentiles by gestational age for twins born in Australia"**, *Journal of Paediatrics and Child Health*, (1999) Vol 35, pp 278-282; Reproduced with permission

Appendix 2b: Figure 4 Birthweight percentiles for female twins, Australia



From Roberts, C, & Lancaster, P., "**National birthweight percentiles by gestational age for twins born in Australia**", Journal of Paediatrics and Child Health, (1999) Vol 35, pp 278-282; Reproduced with permission

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