

VICTORIAN PERINATAL AUTOPSY SERVICE (VPAS) GUIDELINES

(Version 1.2: February 2017)

(These guidelines are a live document, which will be updated on an ongoing basis and all changes made will be reflected at the end of the document)

These Guidelines have been adapted from the 2009 PSANZ Clinical Practice Guideline for Perinatal Mortality. We wish to acknowledge the research and work done by the Perinatal Society of Australia and New Zealand in providing these practical guidelines

Executive Summary

The Victorian Perinatal Autopsy Service (VPAS) provides a co-ordinated statewide service ensuring consistent standards of practice for the clinical investigations of perinatal deaths across Victoria. The aim of these guidelines is to promote standardisation and consistency of practice in relation to the care provided at the time of a perinatal death including investigation, audit and bereavement care for parents across Victoria.

The guidelines provide health-care professionals with information regarding the services VPAS can provide, and the processes and protocols in place to deal with perinatal deaths. In view of the resource-limitations that exist at various times and locations, the guidelines are based on agreed minimum standards. They have been adapted from the 2009 PSANZ Clinical Practice for Perinatal Mortality, and interpreted into the current Victorian context.

The Perinatal period is the period immediately before, during and after birth. Perinatal deaths are stillbirths and neonatal deaths that are defined as follows:

- A stillbirth is the birth of an infant of 20 or more completed weeks of gestation or if gestation is unknown weighing at least 400 grams or who shows no signs of life after birth
- A neonatal death is the death of a live born infant during the first 28 days of life

For the purposes of the guidelines the term post-mortem, post-mortem examination and autopsy are equivalent, with the term post-mortem being used throughout this document. Referral for a perinatal post mortem and associated examination of the placenta is indicated whenever a perinatal death occurs and must be offered to all parents. A post mortem examination is a step by step examination of the outside of the body and of the internal organs by a perinatal pathologist. Consent for a post mortem must be obtained before non-coronial perinatal post mortems are performed. Where consent to a post mortem is not given, limited examinations of the baby can be helpful to parents and clinicians in understanding why a death occurred and the implications of future pregnancies. The main reason a post mortem is undertaken is to ascertain why a baby died.

The perinatal post mortem is a highly specialised procedure that depends for its effectiveness on access to a range of technologies and equipment and sophisticated clinico-pathological integration. VPAS has been designed so that all perinatal post mortems and associated placental pathologies can be conducted in pathology departments co-located and functionally associated with tertiary obstetric services. These expert perinatal pathologists and services can be found at the Royal Women's Hospital, Monash Health and The Mercy Hospital for Women and their associated pathology providers – the Royal Children's Hospital and Austin Health.

The importance of communication not only between clinicians and the family, but also between members of the multidisciplinary team is vital to the effectiveness of this service. VPAS also offers access to a 24hour advice line for health services needing information about the best clinical investigations and practices following a perinatal death, including advice on perinatal post-mortems.

All registered perinatal deaths must be reported to the Consultative Council on Obstetric and Paediatric Mortality and Morbidity (CCOPMM). It is also the Department of Health and Human Services' policy that a Perinatal Morbidity and Mortality Committee review all perinatal deaths. The Perinatal Mortality and Morbidity Committee meetings should include multidisciplinary involvement, including those who are familiar with the circumstances of the death. This ensures a high quality of standard of care for all Victorian families.

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SECTION 1 OVERVIEW OF THE VICTORIAN PERINATAL AUTOPSY SERVICE

1.1 BACKGROUND

The Victorian Perinatal Autopsy Service (VPAS) provides a co-ordinated statewide service ensuring consistent standards of practice and expertise for the clinical investigations of perinatal deaths across Victoria. The three Victorian tertiary maternity hospitals providing these services are the Royal Women's Hospital (the Women's), Monash Health and Mercy Hospital for Women, and their associated pathology departments at the The Royal Children's Hospital and Austin Health.

The establishment of this service is an initiative of the Victorian Government to improve the quality and timeliness of investigations and advice following the death of a baby greater than 20 weeks gestation. The service is funded by the Department of Health and Human Services and involves no expense to parents. The VPAS is also available to private health services and pathology laboratories.

Information in these statewide guidelines is current at the time of publication.

The information given here provides a minimum recommended standard, acknowledging that there may be specific resource-limitations at some sites. It does not replace or remove clinical judgement or the professional care and duty necessary for each specific patient case.

The guidelines do not address all the elements of clinical practice and assumes that the individual clinicians will

- discuss options with parents in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes using an interpreter when required;
- advise parents about their choice and ensure informed consent is obtained
- provide services within the scope of practice, meet all legislative requirements and maintain standards of professional conduct
- document all services in accordance with mandatory and local requirements

1.2 PURPOSE OF PERINATAL POST-MORTEM EXAMINATION AND PLACENTAL EXAMINATION

The perinatal post mortem and placental examination remains the gold standard in diagnostic evaluation of the causes of perinatal death. For the purposes of the guidelines the term post-mortem, post-mortem examination and autopsy are equivalent, with the term post-mortem being used throughout this document.

The main purposes of post-mortem and placental examination are

- identification of an accurate cause of death, thereby excluding other causes,
- identification of disorders with implications for counselling and monitoring for future pregnancies;
- to assist in the grieving process by enhancing the parents' understanding of the events surrounding the death;
- for research purposes e.g. recognition of new disease entities and expansion of the body of knowledge on known diseases;
- to inform clinical audit of perinatal deaths including deaths due to iatrogenic conditions and confirmation of antenatally diagnosed or suspected fetal pathology;
- medico-legal reasons for e.g. in a coronial investigation or providing information in cases of litigation

- enhance the ability to undertake effective monitoring of strategies aimed at reducing perinatal deaths and contributing to the body of knowledge to further reduce perinatal death

1.3 INDICATIONS FOR REFERRAL FOR PERINATAL POST-MORTEM EXAMINATION

Families should be offered post-mortem and placental examination in all cases of perinatal death. VPAS is funded for registered perinatal deaths.

Registered perinatal deaths are stillbirths and neonatal deaths that can be defined as follows:

- a still birth is the birth of an infant of at least 20 weeks gestation or if gestation is unknown, weighing at least 400 grams, who shows no signs of life after birth; and
- a neonatal death is the death of a live born infant, less than 28 days after birth

The post-mortem should be performed as close as possible to the time of the fetal or neonatal death in order to increase the likelihood of yielding clinically significant information.

1.4 HOW TO ARRANGE A PERINATAL POST-MORTEM AND PLACENTAL EXAMINATION

Please refer to the VPAS website <http://thewomens.org.au/health-professionals/vpas> for referral recommendations.

All the paperwork required to perform a post mortem can be downloaded from the VPAS webpage.

To access perinatal post-mortem services (including placental pathology) the attending doctor, following consent and completion of necessary clinical documentation, should contact the anatomical pathology department of the relevant tertiary provider to inform them of an expected post mortem examination. Arrangements will also need to be made with a funeral director of the parents' choosing to transport the baby, paperwork and placenta.

The Women's will reimburse all regional transportation. Funeral directors should send their invoices to:

Director, Allied Health and Clinical Support Services
The Royal Women's Hospital
Locked bag 300
Parkville VIC 3052

On behalf of the parents, the baby will be released back to the funeral director upon completion of testing.

1.5 VPAS 24 HOUR URGENT ADVICE

Access to urgent 24 hour telephone advice is available for health services needing information about the best clinical investigations and practices should a baby die, including advice on perinatal post-mortem examinations. Please contact the appropriate tertiary centre to access this advice.

Department	Telephone	Urgent Hours After advice	Facsimile/Email
Austin Hospital	(03) 9496 5285	(03) 9496 5000 (via Switch)	(03) 9496 3437
Monash Medical Centre	0418 387 592 (Mortuary mobile)	(03) 9594 6666 (via Switch)	mortuary@monashhealth.org
Royal Women's Hospital	(03) 8345 2562	(03) 8345 2000 (via Switch)	(03) 8345 3585

1.6 DEATHS THAT SHOULD BE NOTIFIED TO THE CORONER

Coronial Admissions and Enquiries

24 hour line (toll free): 1300 309 519

+61 03 86880700

Reportable deaths

Below is a non-exhaustive list of deaths that should be notified to the coroner:

- Babies dead on arrival at hospital;
- Deaths that either occur during any sort of medical procedure OR following a procedure AND:
 - The death was causally linked to the medical procedure AND
 - The death was not reasonably expected by the doctor prior to the medical procedure (e.g. if a medical procedure is conducted as a 'life saving' measure these deaths are not typically considered to be reportable deaths);
- Deaths that are reasonably believed to be as a result of an accident or injury;
- Deaths of children believed to be under an order of the Department of Health and Human Services.
- Unnatural deaths or where there is a criminal investigation associated with the death, e.g. homicide, neglect, abuse, poisoning;
- Deaths reasonably believed to be caused by drugs, prescribed or not;
- Deaths in which a doctor is uncertain of the cause of death, and unable to confidently complete the death certificate; and
- Any unexpected death at the hospital.

A Coroner does not have jurisdiction to investigate stillbirths. A stillborn baby is not legally considered to have had an independent life of its own and therefore cannot be said to have died. Stillbirths should not be notified to the coroner unless they are unattended and there is some question as to whether the baby may have been born alive.

A Coroner is required to investigate reportable deaths, which may include directing that a post-mortem examination be carried out by a forensic pathologist to assist the coroner in making a finding as to the cause of death. A decision about whether a post-mortem is necessary will be made by the Coroner on the advice of a forensic pathologist, taking account of the views of the family. **If a case is notified to the Coroner, it is not appropriate to discuss consent for post-mortem with the family.** However, if the notifying doctor is aware of the family's feelings about a post-mortem examination being performed, this information is useful to the investigating coroner and should be conveyed to the Coronial Admissions and Enquiries (CA&E) staff at the Victorian Institute of Forensic Medicine (VIFM). This information should also be included in the e-Medical Deposition. The CA&E is responsible for receiving all notification of deaths on behalf of the Coroner and for coordinating the initial stages of the coronial investigation, including gathering information and liaising with the family about the decision-making around post-mortems.

Reviewable deaths

The Coroners Court must also investigate "reviewable deaths". A reviewable death is defined to mean 'the death of a second or subsequent child of a parent'. A reviewable death may also be reportable (as described above), but may not be. This means that where the doctor would ordinarily write a death certificate, if either of the deceased child's parents has previously lost another child or children, this second or subsequent death must be reported to the Coroner for investigation of the death and review of the health and wellbeing of the parents and any surviving siblings. The exception to this is perinatal deaths where the baby has been born in hospital and has never left the hospital.

Reportable and reviewable deaths can be notified directly to the Coronial Admissions and Enquiries (CA&E) 24 hour office on 1300 309 519 (toll free) or +61 03 8688 0700 by the doctor who had been treating the deceased baby or who was involved in the management of their care. The CA&E staff are able to assist where it may be unclear whether the death should be notified to the Coroner. Note that the reporting doctor will normally be required to complete an e-Medical Deposition form, which will be requested by the CA&E staff and can be completed on-line. At the Coroner's discretion, there may be circumstances where the coroner requests for the post-mortem examination to be performed by VPAS.

Please refer to Section 4 Attachments, 4.1 Reportable and Reviewable Deaths Flowchart [51].

1.7 PLACENTA, MEMBRANES AND CORD HISTOPATHOLOGY

Following a stillbirth, neonatal death in the delivery room or birth of a high risk infant, the placenta should be sent for examination by the perinatal/paediatric pathologist regardless of whether consent for a post-mortem examination has been gained.

Placental and cord investigations by clinician

At time of delivery, the clinician should undertake:

- A detailed macroscopic examination of the placenta and cord and document the findings;
- Placental swabs from the amnion and subchorionic space using aseptic technique for aerobic and anaerobic bacterial cultures; and
- Sampling of amnion and placental tissue for molecular karyotyping (microarray) is recommended for unknown deaths and malformations.

If a prenatal molecular karyotype has already been performed, a placental sample for karyotyping is not recommended.

Placental pathology provides important information to the post-mortem examination and, although not part of VPAS, is highly recommended. Ideally, all placentas should be retained for a few days after birth to allow subsequent retrieval should an infant deteriorate, such as may happen with sepsis, or a metabolic disorder. The placenta should be kept at 4 degrees Centigrade (ie refrigerated) NOT FROZEN. The placenta, membranes and cord should be sent to the pathologist fresh and unfixed for histopathological examination once samples have been collected for cytogenetics and microbiology. A perinatal/paediatric pathologist should undertake the examination, and will determine the ancillary testing required.

Placental examination by a perinatal pathologist should be performed for all stillbirths and high-risk neonates including the following:

- infants admitted to neonatal intensive care
- infants failing to respond to resuscitation;
- spontaneous preterm labour and birth
- planned delivery for fetal compromise including growth restriction
- severe cardiorespiratory depression at birth including resuscitated stillborn babies
- signs consistent with congenital infection
- severe growth restriction;
- hydropic infants
- suspected severe anaemia
- suspected or known major congenital abnormalities
- other circumstances where a liveborn infant dies shortly after birth in the delivery room.

1.8 THE POST-MORTEM PROCESS (NON-CORONIAL DEATHS)

1.8.1 Consent to post-mortem examination

All parents should be given the opportunity of discussing whether to have a post mortem examination of their baby. The possible benefits should be explained to them so that they can make an informed choice. Consent to post-mortem must be obtained before non-coronial perinatal post-mortem examination is performed. Whilst consent is a legal requirement before post-mortem can commence for any baby of more than 20 weeks' gestational age, weighing over 400 grams or live born, informed consent is a VPAS requirement before post-mortem examination is undertaken for babies of any gestation (refer to Section 4 Attachments, 4.2 Consent Form for Perinatal Post-Mortem). This consent form has a provision for 'Do not consent'. If a family are offered information regarding perinatal post-mortem, but choose not to proceed, it is recommended to complete this 'opt-out' portion of the form, and filing within the patient record of the treating health service, as this provides information about the perinatal post-mortem rate, assisting the development of VPAS.

Where possible, a senior clinician who has established a rapport and understanding with the parents should discuss the value of a post-mortem examination and offer the option of the procedure and should

- be familiar with the post-mortem process and be able to answer any questions posed by the family and
- discuss the options for a full, limited or external examination; the issue of retaining tissues; the value of the post-mortem examination and the possibility that the information gained may not benefit them but may be of benefit to others
- Note that the term 'limited post-mortem' applies to any limited examination where tissue is obtained from the baby, even if this is only a small biopsy, such as a skin or cord biopsy. Whilst one of the more common limitations is the exclusion of the brain from the post-

mortem examination, post-mortem needle biopsy; laparoscopic post-mortem and small incision access are other alternatives to a full post-mortem for focussed investigation of suspected abnormalities.

- External examination (which may include imaging studies and clinical photography, but not tissue biopsy from the baby) requires a post-mortem consent to be completed, clearly outlining consent for external examination only.
- all clinicians seeking consent should have an in-depth understanding of post-mortem procedures and preferably have witnessed several post-mortem examinations

Before obtaining consent, families should receive plain language, written advice that is culturally appropriate and explains the post-mortem and placental examination process in detail. No assumptions should be made about who will and will not consent to a post mortem on the basis of, for example, religion or ethnicity.

The Women’s website has information to assist families on ‘When a baby dies’. Please refer to the following link which also explains to families the post mortem examination procedure. <https://www.thewomens.org.au/health-information/pregnancy-and-birth/pregnancy-problems/when-a-baby-dies/>

When consent has been obtained for specific organ/s to be retained for further investigation, the parents should be offered the choice of either delaying the funeral until organs can be returned to the body or specifying their preferred method of organ disposal.

Consent for the post-mortem that clearly outlines the extent of the investigation should be recorded on the consent form. Full post-mortem examination is a very thorough investigation. However, to facilitate the pathologist being able to address specific areas of clinical concern, it is vital that any specific questions are outlined in the appropriate section of the ‘Clinical Information Form – Before Commencement of Post-Mortem Examination’ (attachment 4.3).

For further detailed information on how to obtain consent, please refer to the Perinatal Society of Australia and New Zealand (PSANZ) Improving Perinatal Mortality Review & Outcomes Via Education (IMPROVE) program. <https://sanda.psanz.com.au/clinical-practice/improve/>

1.8.2 Protocol for referral to Anatomical Pathology

Contact the relevant department of Anatomical Pathology as per geographical location and inform them that a body and/or placenta is being transported for examination

Department	Telephone	Urgent Hours	After advice	Facsimile/Email
Austin Hospital	(03) 9496 5285	(03) 9496 5000	(via Switch)	(03) 9496 3437
Monash Medical Centre	0418 387 592 (Mortuary mobile)	(03) 9594 6666	(via Switch)	mortuary@monashhealth.org.au
Royal Women’s Hospital	(03) 8345 2562	(03) 8345 2000	(via Switch)	(03) 8345 3585

1. Complete the required documentation as described in Section 1.9 below.
2. Fax or email the collated documentation to the relevant department of anatomical pathology
3. Organise transport to the relevant department of anatomical pathology via the referring hospital's transport service or a funeral company
4. Ensure the Medical Certificate of Cause of Perinatal Death is transferred with the baby

1.8.3 Transport guidelines

Please fax or email the correctly filled Transport Authorisation form to the Anatomical Pathology Department of the intended tertiary hub (Refer to Section 4, Attachment 4.5 for a copy of this form). The contact details of the Funeral provider must be clearly entered and the parent's name and signature authorising transport must be captured.

Follow these guidelines for any baby and/or placenta being transported to a department of anatomical pathology:

- the baby/placenta should be clearly labelled
- the baby should be wrapped in a shroud (sheet) and then in plastic
- a small baby may be transported dry in a bucket
- transport without fixative or other fluids
- include fresh placenta dry in sealed bag
- use a plastic esky with ice bricks (e.g. small containers of frozen water) carefully positioned around but separate from baby (or bucket) for cold storage transport
- it is important that baby is respectfully transported undistorted
- include relevant documentation as described above

The baby and placenta must be kept refrigerated and transported between Monday to Friday during working hours to the tertiary centre. DO NOT freeze the placenta or place in formalin. For after hours transport, please contact the pathology department to discuss arrangements.

1.9 REQUIRED DOCUMENTATION

Clinicians should ensure that all relevant clinical details are documented clearly and accurately in the medical record at the time of the event and that all relevant documentation is completed. The following forms are required to be provided to the department of anatomical pathology:

- Consent Form For Perinatal Post Mortem (Section 4, Attachment 4.2)
- Clinical Information Form-Before Commencement of a Post Mortem (Section 4, Attachment 4.3)
- Clinical Information Form-Before Commencement of Placental Pathology (Section 4, Attachment 4.4)
- Pathology request form-for examination of the placenta (Please use hospital-specific request forms, which are generic pathology forms, not specific for placenta)
- Transport authorisation form (Section 4, Attachment 4.5)

The Clinical Information Form-Before Commencement of a Post Mortem should be correctly filled out by the referring clinician, according to the details listed on the form.

The Clinical Information Form- Before Commencement of Placental pathology should also be correctly filled out by the referring clinician to include relevant clinical history

In addition the following must be provided to the department of anatomical pathology:

- The mauve copy of the medical certificate of cause of perinatal death must be completed and must arrive with the baby and be released with the baby.

A photocopy must be provided to anatomical pathology of:

- the obstetric summary; and
- the confidential medical report of perinatal death (NB The original is to be sent to the Births, Deaths and Marriages Registry by the referring hospital)
- Copies of all relevant antenatal & fetal imaging reports; and
- Copy of prenatal genetic testing including karyotyping results if available
- If available, include results of stillbirth/neonatal death associated blood tests and antenatal serology;

1.10 INVESTIGATION OF PERINATAL DEATH WHEN CONSENT FOR POST-MORTEM EXAMINATION IS NOT OBTAINED

Post-mortem and placental examination (where applicable) is the best method for investigating perinatal deaths. Where consent is not provided (even for a limited or external post-mortem), families may be willing to give consent for alternative investigations.

As outlined earlier, examination of the placenta and cord are highly recommended in all cases of perinatal death. In the absence of post-mortem examination, some supplementary laboratory investigations, such as cytogenetics and microbiology may be performed on placental tissues.

Radiological investigation for the baby, including skeletal survey, and sometimes magnetic resonance imaging (MRI) are sometimes performed. Maternal investigations would still be performed, as outlined elsewhere in the document (2.2, 4.12).

1.11 DISCUSSION AND FOLLOW-UP WITH THE FAMILY

Parents should be provided with verbal and written communication regarding their options for post-mortem examination. Sufficient time should be allocated to explain the options available, what the benefit of post-mortem examination may be in providing further useful information, and to answer any questions that parents may have. It is important that parents also understand that post-mortem may not discover any new findings. Parents should be informed that a decision is not required immediately and have access to information and support. It may be beneficial to the parents to have a support person present when the discussion is being held. A follow up appointment may be required if the parents are unable to decide during the initial meeting.

Parents need to be given the option to see and hold their baby after the post-mortem has been performed.

Parents need to know that it may take up to eight weeks for the results to become available to them. A follow-up consultation should be provided for all parents following a perinatal death where results of the post-mortem can be discussed. A detailed written, plain language, summary for the parents, of the clinical course and results is valued highly by many parents and should be offered.

In order to facilitate results being available for discussion at the follow-up appointment, it is recommended that the **date of the follow-up appointment** (which should be booked allowing for an eight week turn-around reporting time) is communicated to the pathology service providing the post-mortem.

1.12 POST-MORTEM REPORTS

The VPAS aims to send reports to the requesting maternity service within eight (8) weeks. For more complex post-mortem examinations, delivery of reports may take longer as they will require further specialised testing. Consistent with the Public Health and Wellbeing Act 2008, each VPAS tertiary centre will send copies of all perinatal post-mortem reports to the Consultative Council on Obstetric and Paediatric Mortality and Morbidity (CCOPMM).

The Consent for Perinatal Post Mortem form makes provision for a copy of the report to be provided to other doctors involved in the ongoing care of the family, such as the general practitioner. It is therefore important that current contact details for the general practitioner are provided on the consent form, to facilitate this communication.

A written preliminary post-mortem report should be authorised within 2 working days of the post-mortem taking place, in line with NPAAC requirements. This will allow the referring clinician to plan for clinical follow-up with the family [1].

1.13 REPORTING

The full post-mortem report will include:

- Name
- Time and Date of Delivery
- Duration of Pregnancy at Delivery
- Stillborn: estimated time from death to delivery
- Liveborn: Postnatal survival (m/h/d)
- Time and Date of death
- Cause of death (as recorded on the Death Certificate)
- Birth weight (as recorded on the Death Certificate)
- Time and Date of Post Mortem
- Gestation for reference values
- Referring Medical Officer
- Place of Delivery/Death (Hospital/ward/unit/location)
- Examination Performed by Date Time
(If performed by a registrar, the name of the supervising pathologist will be stated)
- Consent for post-mortem provided by (name and relationship to baby)
- Type of post-mortem :Full/Limited/External only
- Special Requests
- Clinical history to include maternal past history, past obstetric history and history of this pregnancy
- Morphometric assessment (Comparison with expected normal values for the stated gestation will be included. Whilst percentile charts are preferred, reference ranges are also acceptable. The reference below relates to an Australian population. Autopsy Standards for Fetal Lengths and Organ Weights of an Australian Perinatal Population. Phillips Jarrod, Billson Virginia, Forbes Andrews Pathology 2009)
- External Examination and Appearance (Please refer to 2.1.1 A) External Examination) Note that both the birth weight and weight at the time of post-mortem examination are recorded (as these may differ).
- Brain:liver ratio
- Internal Examination (Please refer to 2.1)

- Block Summary:
- Microscopic Description
- Special investigations(Please refer to 2.1)
- Clinical photography
- Placental pathology
- Microscopic findings: summary of major findings including sex and apparent gestation, estimated timing of death in stillborns, adequacy of growth and nutrition, presence/absence of congenital abnormalities, major pathological lesions, evidence of chronic stress or disease prior to death, placental examination;
- Summary of Post Mortem findings
- Comments: Including commentary addressing the clinical questions and significance of pathological findings. If findings are significantly different from the recorded cause of death (on the Death Certificate), this discrepancy should be addressed in this section, to highlight this issue for the treating clinician, who will see the family for a follow-up appointment. This section may also occasionally include recommendations for referral to appropriate health services, should this be required, for example, referral to a clinical geneticist.
- Reported by
- Date of report

The complexity level of post-mortem is not required in the post-mortem report, but is required by VPAS for service metrics.

Please refer to Section 4 Attachments, 4.6 Post-Mortem Report (minimum content to be reported), for the minimum content to be reported for Full, Limited and External post mortems.

1.13.1 Reporting to the Consultative Council on Obstetric and Paediatric Mortality and Morbidity (CCOPMM)

All maternity services will need to follow their hospital's procedures for local perinatal mortality review and it is also the Department of Health and Human Services' policy that all perinatal deaths are reviewed by a Regional Perinatal Morbidity and Mortality Committee.

Under the Public Health and Wellbeing Act 2008, all stillbirths from 20 weeks gestation and any baby born alive, regardless of the gestation, must be reported to the Consultative Council on Obstetric and Paediatric Mortality and Morbidity within the time period specified by the Council (usually within 28 days). A copy of the completed perinatal post-mortem report must be included in the report to CCOPMM and therefore, the three tertiary hospitals performing the post mortem examinations will send a copy of all post mortem reports to CCOPMM upon finalising the report. For more information on the reporting obligations by health service providers (including pathology services) to CCOPMM, please go to: <https://www2.health.vic.gov.au/hospitals-and-health-services/quality-safety-service/consultative-councils/council-obstetric-paediatric-mortality>

SECTION 2 GUIDELINES FOR POST-MORTEM INVESTIGATIONS FOR PERINATAL DEATH

Issues relating to consent for post-mortem (Section 1.8.2), the importance of placental pathology (Section 1.7 and Section 4, Attachments 4.4 & 4.8), and the minimum data set required in the post-mortem report (Section 4 Attachments 4.6 & 4.9) have been outlined elsewhere in this document.

The following section discusses other specific recommendations related to perinatal post-mortem.

2.1 PERINATAL AUTOPSY CONSIDERATIONS AND REQUIREMENTS

A. Histology

- At least one block of all major thoracic and abdominal organs (right and left lungs, heart, liver, kidney, thymus, adrenals, gonads and pancreas)
- Costo-chondral junction (over 24 weeks' gestation)
- Adequate sampling of brain (varies with case: minimum of one block from hind brain and one from cerebral hemispheres)
- Adequate sampling of placenta (cord, membranes, focal lesions, grossly normal parenchyma to include amnion and decidua).
- Assessment of the degree of autolysis/maceration in specific organs to correlate with widely available charts to estimate timing of death

B. Clinical Photography

Clinical photography should be performed in all cases of perinatal post-mortem examination. Standard full body frontal and sideview of face in all cases with selected additional close ups for specific abnormalities in dysmorphic babies with macroscopic abnormalities.

Even when full or limited post-mortem is refused, external examination of the baby, accompanied by clinical photography and imaging (Consent form option for external post-mortem) is useful. Clinical photography provides stored images for later review, which may be critical in establishing correct diagnosis in some cases. The clinical photographs are additional to the bereavement photographs, and should be clearly labelled and filed in the medical record. The use of digital imaging for this purpose is optimal, however issues regarding storage and patient confidentiality should be considered.

C. Imaging

Skeletal survey

X-ray is recommended for suspected skeletal dysplasia, multiple malformations and unexplained stillbirth, and in particular clinical settings such as suspected fetal growth restriction. Skeletal survey is often performed in conjunction with post-mortem, and may detect abnormalities (mainly skeletal) which may not be detected on an external examination. The Wisconsin Stillbirth Service Program has estimated that approximately 20% of unselected stillborns will have abnormalities which are detectable on X-Ray[2]. However, the yield of detecting abnormality on skeletal X-ray survey is low in the setting of a normally formed baby where there is a placental cause of demise.

Ultrasound scan

A detailed ultrasound examination of the infant at the time of confirmation of an intrauterine death or after the birth may identify fetal abnormalities which may not be identified by an external examination.

Although this is a distressing time, this assessment may be helpful in identifying a cause of the death particularly where a post-mortem examination is not performed. Even where post-mortem examination is to be performed, the information obtained assists the perinatal pathologist.

Magnetic Resonance Imaging (MRI)

There are important considerations with respect to role of MRI in the investigation of fetal death. If there has been diagnostic ante-mortem imaging, post-mortem imaging may be redundant. MRI is of greatest value in evaluating CNS abnormalities. If an antenatal fetal MRI was not performed, post mortem MRI should be a consideration with unexplained recent stillbirth because of the limitations of brain post-mortem in this setting. If this is performed in the post-mortem setting in the absence of a full or limited post-mortem examination, consent for an external post-mortem is required.

Magnetic Resonance Imaging (if available) may be offered to parents who decline an post-mortem investigation. The investigation should be undertaken as soon as possible after a stillbirth. Clinicians should explain to the parents that a full post-mortem remains the gold standard as the MRI does not supply tissue samples and therefore important information may be missed.

A recent comprehensive overview presented the advantages and disadvantages of the post-mortem MRI[3]. The major advantages of post-mortem MRI included the non-invasive nature of the examination and the detection of pathologies and malformations of the central nervous system. The disadvantages included the lack of tissue sampling; limitations in detection of complex cardiac malformations, and other abnormalities (e.g. tracheo-oesophageal fistula, bowel perforations) which are undetectable by post-mortem MRI; and lack of experience in perinatal post-mortem MRI. The authors concluded that a full post-mortem remains the gold standard; however, MRI may play an important role when a post-mortem examination is declined.

D. Other special procedures and investigations

- Bacteriology (blood/spleen/lung/CSF), if clinically indicated, with the caveat that CSF is difficult to sample in small babies.
- Virology, if clinically indicated
- Molecular Karyotype (microarray), if not performed antenatally and if clinically indicated.
- Store frozen small sample of costochondral junction tissue for potential future DNA (if consent for full autopsy)
- Tissue for fibroblast culture, if clinically indicated
- Tissue for electron microscopy (EM), if clinically indicated
- Biochemistry, if clinically indicated
- Haematology, if clinically indicated
- Neuropathology, if associated abnormalities detected on external examination suggest CNS abnormality or clinical or radiological evidence of CNS pathology
- Newborn Screening test (Guthrie)

E. Suspected Genetic Disorders

The multidisciplinary team approach is important, and input is sought from the clinical geneticist, who may, if possible attend the post-mortem examination. As this is not always possible, the importance of high quality clinical photography is highlighted (2.1, B), as the images will provide valuable information to the clinical geneticist in these cases.

Sample requirements for genomic testing:

Genetic testing cannot be performed upon formalin-fixed, paraffin-embedded tissue, and a sample must be collected from which DNA can be extracted. Freezing a portion of rib/cartilage at -80 degrees C provides a suitable sample, even in many cases of macerated stillbirth (see 2.1, D).

In some situations, e.g. constellations of anomalies indicating a rare or unique recessive syndrome a fibroblast cell line (e.g. from skin) is a consideration in **consultation with a clinical geneticist**.

Genome-wide Chromosome microarray analysis is a standard diagnostic test for chromosomal disorders and should be performed in all cases where a genetic disorder is suspected, if not already performed, to rule out chromosome copy number changes. Next generation genomic sequencing techniques are evolving rapidly. Gene panel testing and whole exome/whole genome sequencing (genome sequencing) is likely to replace traditional genetic testing on a gene-by-gene basis in the next 5 years. Next generation sequencing approaches may also replace traditional biochemical testing as the first tier investigation for genetic metabolic disorders and will play an increasingly important role in perinatal death related to myocardial disorders/ cardiac arrhythmia and neonatal seizure disorders.

For precise instructions regarding specimen collection, please refer Section 4, Attachments 4.10, Instructions for collection of Tissue for Chromosome Analysis by Microarray[4].

F. Suspected genetic metabolic disorders: investigation and post-mortem protocol recommendations

The predominant clinical or biochemical presentations of genetic metabolic disorders are as follows: Acute encephalopathy: hypoglycaemia, hyperammonemia, ketosis, disorders of acid-base balance, seizures as an early predominant feature; Acute hepatocellular disease; sudden death; severe hypotonia; non-immune hydrops fetalis; facial dysmorphism, with or without congenital malformations[5]. Although non-immune hydrops is included in the listed conditions, it is noted that there is a low yield of genetic metabolic disorder diagnosis in this group.

Newborn bloodspot screening protocol also help to identify many of these conditions in the presymptomatic stage.

To ensure a precise diagnosis, peri-mortem evaluation of infants suspected of having genetic metabolic disorders is required. Parental consent is required for a post-mortem examination and for tissue and blood samples to be taken prior to the death. Clinicians need to counsel parents sensitively about the importance of an accurate diagnosis for future genetic risks in this very distressing time.

Due to the complexity and number of different possible diseases, it is strongly recommended that clinicians discuss each individual case with the State Laboratory to identify the optimum tests to request. Should more expert guidance be required a clinical metabolic specialist should be consulted.

All tissue samples should be stored and transported to a Specialist Metabolic Laboratory for investigation as convenient. **Please see links below:**

Victorian State Metabolic Laboratory at the MCRI:

<http://www.rch.org.au/metabolic-medicine/>

and for the setting of suspected neuromuscular disorders at Alfred Health:

<http://pathology.alfred.org.au/health-professionals/victorian-neuromuscular-laboratory-service/>

In the setting of perinatal post-mortem, liaison with the perinatal pathologist and pathology department is important. Each tertiary referral centre will have their own local protocol for supply of testing kits, and arrangements regarding collection of time-critical samples. As the setting in which these conditions are considered is usually within NICU at a tertiary referral centre, these considerations would be rarely encountered in regional and metropolitan referrals to VPAS, and specific considerations are outlined in an attachment (Section 4 Attachments 4.11 Suspected genetic metabolic disorders: Investigation and Post mortem protocol recommendations)

Footnote: In future, next-generation sequencing (NGS) based gene panels for specific phenotypes will become standard of care, including metabolic panels of testing.

2.2 CORE INVESTIGATIONS FOR ALL STILLBIRTHS

Please refer to Section 4, Attachments, 4.12, Stillbirth investigation algorithm.

At diagnosis of a fetal death

- Comprehensive maternal and family history;
- Ultrasound scan to detect possible fetal abnormalities and to assess amniotic fluid volume;
- Amniocentesis (where available) for cytogenetic and infection investigation;
- Low vaginal and peri-anal swab to culture for anaerobic and aerobic organisms;
- Blood tests:
 - o Full blood examination;
 - o Serology for Cytomegalovirus, Toxoplasma, Parvovirus B19;
 - o Rubella and Syphilis if not already undertaken in this pregnancy;
 - o Blood group and antibody screen if not already undertaken in this pregnancy;
 - o Kleihauer-Betke test;
 - o Renal Function Tests including Uric Acid;
 - o Liver Function Tests including Bile acid;
 - o Thyroid Function Tests;
 - o HbA1c;
 - o Anticardiolipin antibodies;
 - o Lupus anticoagulant; and
 - o Activated protein C (APC) resistance.

Ultrasound scan At the time of ultrasound confirmation of an intra-uterine fetal death (IUFD), the ultrasound should include examination for possible fetal abnormalities, fetal biometry and assessment of amniotic fluid volume. Although this is a distressing time, this assessment may be helpful in identifying a cause for the death particularly where a post-mortem examination is not

performed. Even where post-mortem examination is to be performed, the information obtained assists the perinatal pathologist. Please also see section 2.1C regarding ultrasound scan.

Maternal history

A comprehensive maternal medical and social history should be taken following all perinatal deaths.

Amniocentesis for cytogenetic and infection investigation

This section is included as this testing has been regarded to be the gold standard, but it is acknowledged that resources are often limited, and the logistical difficulty encountered for the mother in obtaining this testing may outweigh the possible benefits.

Where possible, an amniocentesis should be performed for cytogenetic and infection investigation following diagnosis of an IUFD. It is estimated that 6.9%–20% of stillbirths have a fetal chromosomal abnormality, including a wide range of lethal conditions[6-8]. Caution should be exercised in utilising a selective approach for cytogenetic assessment as important diagnoses may be missed[8, 9]. Tissue samples of the amnion as well as placental villi may maximise the likelihood of a result if the fetus is macerated (personal communication with Mark Pertile[10]; Head Scientist, Murdoch Institute, Prenatal Diagnosis, Laboratory).

The rate of successful chromosome analysis using amniocentesis in cases of fetal death ranges from 82%–92%[6, 9]. In contrast, the success rate for placental chromosome analysis is approximately 60% and approximately 30% for skin[6]. The total time elapsed from fetal death until biopsies can be processed is often long, and the chances of succeeding with a chromosomal analysis diminishes progressively with time[6]. The Wisconsin Stillbirth Protocol Program (WiSSP) study series indicates that the success of karyotyping ranges from 80% in stillbirths without maceration to 30% in stillbirths with mild to advanced maceration[2]. Amniocentesis reduces the elapsed time between fetal death and sample collection, and the samples are easier to handle and for the laboratory to process[11].

Amniotic fluid collected by amniocentesis prior to the onset of labour can provide an uncontaminated specimen for microbiological assessment. It is the only sample where the detection of pathogens such as E-coli will be of value, especially if no post-mortem is performed. This is due to potential contamination during vaginal birth where findings from cultures of natural orifices and the placenta/membranes are often discredited[11].

Vaginal cultures: Low vaginal peri-anal culture for anaerobic and aerobic organisms.

McDonald et al (2000) identified that although 70% of women with mid-gestation spontaneous abortions were asymptomatic for infection, micro-organisms were identified from the placenta and/or fetus in 62% of women studied and histological chorioamnionitis was present in 69%. Among 51 women with intact membranes, 28 were culture-positive, with the most frequent isolate being Group B Streptococcus (GBS). In this study, GBS was the most significant pathogen associated with the fetal deaths, and was often the sole pathogen recovered[12]. The detection of GBS is optimised with the use of a peri-anal swab in conjunction with a low vaginal swab and the use of specific culture media[13].

Method for GBS culture: Using one single dry swab stick, first take a culture from the introitus and with the same swab stick, take a culture from the anorectal region. Place the swab in Stuarts transport medium and send to laboratory clearly labelled. Swabs may be self-collected by the patient[14].

Full blood examination

A full blood examination can assist in detection of: infection as a cause of the fetal death[15]; maternal anaemia which may indicate conditions such as thalassemia; low platelet levels - a marker for pre-eclampsia; autoimmune diseases such as systemic lupus erythematosus (SLE) and Idiopathic Thrombocytopenia Purpura (ITP)[16]; and elevated platelet levels may indicate thrombocythemia.

Serology for Cytomegalovirus, Toxoplasma, Parvovirus B19, Rubella and Syphilis

Serology for Cytomegalovirus, Toxoplasma and Parvovirus B19 should be undertaken following an IUFD. Rubella and Syphilis should also be included if they have not already been undertaken during the antenatal period. Where test results are positive, a microbiologist or infectious disease specialist should be consulted regarding further testing and treatment required.

Toxoplasmosis

Maternal-fetal transmission of Toxoplasmosis is dependent on the time of maternal infection. The earlier the fetus acquires the infection the more severe the consequences, however maternal-fetal transmission is more likely to occur later in pregnancy. Disseminated Toxoplasma may cause fetal death[17]

Parvovirus (B19)

Parvovirus (B19) causes severe fetal anaemia, nonimmune hydrops and fetal death[17, 18]. It was found to be the cause of death in 10% of all non-malformed fetal deaths occurring between 10 and 24 weeks of gestation referred for pathological examination[19]. 1%-3% of susceptible pregnant women will develop serologic evidence of infection in pregnancy, of which the transmission rate to the fetus is 17%-33% [20-22]. The spontaneous loss rate of fetuses affected by Parvovirus B19 after 20 weeks gestation is 2.3%[20, 21, 23, 24]

Rubella

Rubella is associated with a wide variety of fetal abnormalities and also infects the placenta, enhancing the risk of stillbirth[25, 26]. However due to widespread vaccination, congenital rubella infection in developed countries is extremely rare[17].

Cytomegalovirus (CMV)

Whether CMV actually causes stillbirth and, if so, the mechanism by which it does so is not clear. However, a prospective study of more than 10,000 women found an increase in fetal loss associated with infection in early pregnancy[27].

Blood group and antibody screen

A blood group and antibody screen should be performed to exclude haemolytic disease due to maternal sensitisation to red cell antigens, for example Rh D and Kell[28].

Fetomaternal haemorrhage test (FMH)

A test to detect and quantify fetomaternal haemorrhage (Kleihauer-Betke test or flow cytometric test) should be performed following the diagnosis of an IUFD preferably prior to delivery[29, 30]. Limited evidence suggests that post delivery Kleihauer may still be useful[31].

The incidence of massive feto-maternal haemorrhage is <0.1%[32]. However the incidence in otherwise unexplained cases of fetal death has been estimated to be as high as 14%[33]. The diagnosis of a significant feto-maternal haemorrhage is confirmed by quantification of fetal erythrocytes in maternal blood performed by an FMH test. The general consensus is that 50ml constitutes a significant haemorrhage, with various studies using limits ranging from 30-150ml[33,

34]. However, as the impact of a haemorrhage of a given volume will be dependent on the fetal age, weight and total blood volume, individual assessments need to be calculated[11, 35].

The time period over which the haemorrhage occurs will have a direct impact upon the mortality associated with it, according to whether the fetus was able to compensate for the loss in blood volume. However, as it is not currently possible to assess this, a loss of 20% of total fetal blood volume should be considered severe enough to cause fetal mortality[9].

Renal Function Tests including Uric Acid

Elevated uric acid levels early in the third trimester in pre-eclamptic women have been associated with perinatal death and it is therefore recommended to evaluate the contribution of pre-eclampsia to the death. Abnormal renal function is an indicator of possible SLE[36] which is associated with a significant increase in fetal morbidity and mortality[37]. Uric acid is the most sensitive laboratory indicator of pre-eclampsia[38] and is a better predictor of perinatal outcome than blood pressure[39].

Liver Function Tests and Bile acid

Mild liver test abnormalities are a possible marker for obstetric cholestasis. Obstetric cholestasis is associated with a significant increase in the perinatal mortality rate, ranging from 3%-20% as well as a five-fold increased incidence intrapartum fetal distress and pre-term labour[40, 41]. Abnormalities in liver function are also a marker for viral hepatitis, cytomegalovirus, and toxoplasmosis. Abnormal liver function has also been associated with acute fatty liver of pregnancy and HELLP syndrome (Haemolysis, Elevated Liver function, Low Platelets)[42].

Thyroid Function Test

Pregnancy is associated with physiological changes in the thyroid function which may result in thyroid disorders. Thyroid disorders during pregnancy have been associated with adverse health outcomes for both the mother and child, including increased risk of miscarriage, gestational hypertension, low birth weight and fetal death[43].

HbA1c

The increased risk of fetal morbidity and mortality with maternal diabetes is well known. A stillbirth rate of 35 per 1000 births to type 2 diabetic mothers has been reported[44]. Gestational diabetes mellitus (GDM) is defined as carbohydrate intolerance of variable severity with the onset or first recognition during pregnancy. There is some evidence to indicate that uncontrolled GDM is associated with increased perinatal mortality[45]. *HbA1c* monitors glycaemia over the previous 3 months by reflecting the average glucose concentration over the life of the red cells[46] and therefore may provide information to aid in the consideration of the contribution of diabetes to the fetal death. If the *HbA1c* level is raised, a fasting blood glucose should be undertaken and if abnormal a Glucose Tolerance Test performed 6-8 weeks postnatally. Please refer to the Australasian Diabetes in Pregnancy Society GDM management guidelines for further details[45, 47].

Investigation for Thrombophilia

Anticardiolipin antibodies, Lupus anticoagulant and APC resistance are recommended for all women at the time of IUFD.

Infant blood samples for investigation of infection, chromosomal analysis and Guthrie test screening

A blood sample should be collected from the infant for investigation of the presence of infection, to assess other haematological parameters for karyotyping (if not already performed) and a routine Guthrie test.

A cord blood sample should be collected after delivery where possible. This blood sample will provide a potentially uncontaminated sample for microbiological culture and assessment of fetal inflammatory response. If a sample of blood is obtained it should also be sent for chromosomal analysis, and haematological assessment (full blood count, nucleated red cell count, group and antibody screen). If the fetus is macerated samples from the amnion and placenta should also be sent to cytogenetics for chromosomal analysis.

Acquired and hereditary thrombophilia

There is convincing evidence of an association between antiphospholipid antibodies (APLAs) and increased risk of recurrent and late pregnancy loss. The link between these antibodies and other placenta-mediated complications remains controversial as most of the data that support an association are derived from small methodologically-limited case control studies. Testing for APLAs includes anti-cardiolipin IgG, lupus inhibitor and anti-Beta2glycoprotein 1 IgG.

The past enthusiasm for testing for hereditary thrombophilia after pregnancy loss is waning. Inherited thrombophilia is common in the population and is probably a rare cause of fetal demise. A meta-analysis of prospective cohort studies showed that Factor V Leiden (FVL) was weakly associated with late pregnancy loss but that neither FVL or the Prothrombin gene mutation were associated with pre-eclampsia or small for gestational age infants[48].

Furthermore, a recent meta-analysis of low-molecular weight heparin (LMWH) to prevent pregnancy loss in women with inherited thrombophilia showed no significant difference in live-birth rates with the use of LMWH or no LMWH, suggesting no benefit of LMWH in preventing recurrent pregnancy loss in women with inherited thrombophilia[49].

No specific recommendations can be made in relation to testing, other than to consider testing in selected cases. The timing of testing is best deferred until other investigation results are available. Delayed testing at 6-8 weeks after birth allows for any changes related to pregnancy to normalise and avoids unnecessary repeat testing.

Testing for hereditary thrombophilia may include measuring levels of Protein C, Protein S, Antithrombin, Activated protein C resistance and if low the Factor V Leiden mutation, and Prothrombin 20210A mutation.

2.3 CORE INVESTIGATIONS RECOMMENDED AT BIRTH FOR BABIES AT HIGH RISK OF NEONATAL DEATH

- History documented in medical record by obstetric staff detailing a comprehensive maternal medical, social and antenatal history including the results of investigations
- Cord - venous and arterial - blood gas analysis
- Placental and cord macroscopic examination with documentation of the findings in the medical record by the obstetric staff; and
- Placenta, cord and membranes sent fresh and unfixed to pathology for histopathological examination. Baby external examination (by a neonatologist or paediatrician where possible) with detailed documentation of the findings in the medical record;
- FBC from baby
- Newborn screening test at appropriate time as for all babies.

“High risk” includes the following:

- Admission to neonatal intensive care;
- Preterm birth less than 32 weeks gestation;
- Suspected fetal compromise including growth restriction;
- Severe cardiorespiratory depression at birth;
- Signs consistent with congenital infection;
- Severe growth restriction;
- Hydrops
- Suspected severe anaemia;
- major congenital abnormalities (suspected or known); and
- other circumstances where a live born baby dies shortly after birth in the delivery room.

Please refer to Section 4, Attachments 4.13 High Risk Newborn investigation checklist.

Macrosomic infant

Undiagnosed maternal diabetes should be excluded. If not previously undertaken, measure:

- Maternal HbA1c level (as soon as possible after delivery); and
- If the HbA1c level is raised, fasting blood glucose should be undertaken and if abnormal a Glucose Tolerance Test performed 6-8 weeks postnatally.

Sudden unexpected neonatal death

The investigation of a sudden unexpected or unexplained neonatal death requires

- a thorough maternal and infant medical history
- investigation of the various scenes where incidents leading to the death might have occurred including the infants sleeping environment
- investigation for genetic metabolic disorders
- a full post-mortem examination by a forensic pathologist skilled in perinatal post-mortem examination or a forensic pathologist in conjunction with a perinatal pathologist.

It is important that all unexpected deaths are investigated fully prior to designation to the category of SIDS or Sudden Unexplained Death in Infancy (SUDI). The PSANZ classification now includes a category for unclassified sudden death where no cause for the death was identified and where inadequate investigation was undertaken.

The Royal College of Pathologists and The Royal College of Paediatrics and Child Health have published a comprehensive protocol for care and investigation for sudden unexpected deaths in infancy. Please refer to this document for further details[50].

For further details on the classification of SIDS, please refer to the *PSANZ Clinical Practice Guideline for Perinatal Mortality (Second Edition Version 2.2, 2009)*, Section 7.

SECTION 3 INSTITUTIONAL PERINATAL MORTALITY REVIEW

3.1 INTRODUCTION

The purpose of this section is to provide guidance for clinicians at maternity hospitals in the conduct of high quality audit of perinatal deaths to determine an accurate cause of death and issues surrounding the death for the purposes of discussion with the parents; planning of future pregnancies; practice improvement; and to improve the quality of data available for monitoring and research activities aimed at reducing perinatal death. Practice recommendations are supplemented by data collection forms and checklists in the Perinatal Mortality Audit Package to assist clinicians in implementing the guideline recommendations. *The PSANZ Perinatal Mortality Audit Package (Section 2; Appendix 1)* is recommended for data collection and perinatal mortality review.

3.2 IMPLEMENTATION OF THE GUIDELINE

The *PSANZ Clinical Practice Guideline for Perinatal Mortality (Second Edition Version 2.2, 2009)* should be implemented in all institutions where births occur.

Strategies to assist in the uptake of the guideline into practice at the hospital level should be implemented. These strategies may include: identifying and addressing local barriers to uptake; ongoing structured and unstructured education for all clinicians providing maternity care and lead executives; and implementing an audit and feedback mechanism on compliance with guideline recommendations.

3.3 PERINATAL MORTALITY REVIEW COMMITTEES

3.3.1 Format

In 2016, DHHS established six regional Perinatal Mortality and Morbidity Review Committees that included all public maternity services in these regions. Some services on the urban fringe joined the perinatal review committees of a nearby metropolitan maternity service.

Combined perinatal mortality and morbidity review between regional and rural services supports a consistent coordinated regional approach, provides access to independent clinical expertise, and enhances learning between clinicians to improve clinical care.

All perinatal deaths in Victoria should be reviewed by the Perinatal Mortality and Morbidity Committee, including deaths of infants born within the service but who died elsewhere.

3.3.2 Purpose

The functions of the Regional Perinatal Mortality and Morbidity Committees should include:

- review of all stillbirths and neonatal deaths;
- classification of perinatal deaths according to the PSANZ -Perinatal Death Classification (PDC) and Neonatal Death Classification (NDC);
- evaluation of the circumstances surrounding the death including a consideration of contributing factors; and
- the development of recommendations for improving processes to support clinical care,
- support timely feedback to the clinicians involved and family;
- implementation of action required based on these recommendations; for example specific education to enhance skills
- provision of a confidential case summary to the relevant agency within the jurisdiction's Health Department; and

- coordination of care for parents following a perinatal death including follow-up.

3.3.3 Membership

The Regional Perinatal Mortality and Morbidity Committee meetings should include multidisciplinary involvement, including those who are familiar with the circumstances of the death.

Membership of the Regional Perinatal Mortality and Morbidity Committees should include representatives from: obstetrics, neonatology/paediatrics, pathology (preferably a perinatal/paediatric pathologist), other relevant medical specialists, midwifery, neonatal nursing, social workers and other allied health professionals.

It is the responsibility of each institution's management to ensure that committee members and their deliberations are indemnified while undertaking this kind of audit on their behalf and that the principles of confidentiality and impartiality apply.

Please refer to Section 4, Attachments 4.14 Regional Perinatal Mortality and Morbidity Committees (RPMCMC)

3.4 REVIEW OF A PERINATAL DEATH

The review should take place as soon as possible after the death, once results of core investigations are available.

The main cause of death and associated maternal/fetal/neonatal conditions, if present, should be classified according to PSANZ-PDC for all perinatal deaths and in addition for all neonatal deaths the PSANZ-NDC⁽⁵⁰⁾.

The review of each perinatal death should include consideration to the presence of potentially contributing factors in three main areas:

- maternal/social i.e. factors relating to the woman including her social situation;
- infrastructure/service organisation i.e. factors related to the setting in which the care was provided; and
- professional care delivery i.e. factors relating to the clinical care provided;
- human factors involved.

At the review of each perinatal death, consideration should be given to the adequacy of communication with parents and between health care professionals and the investigations undertaken.

3.5 DATA COLLECTION, DOCUMENTATION AND REPORTING

Clinicians should ensure that all relevant clinical details are documented clearly and accurately in the medical record at the time of the event and that all relevant documentation is completed according to local policy.

The Medical Certificate of Perinatal Death should be completed by, or under the supervision of, the Consultant responsible for care with due consideration to presence and significance of all perinatal conditions and complications. A revised Medical Certificate of Perinatal Death should be submitted, following review by the Perinatal Mortality Committee, where required.

A comprehensive confidential clinical summary should be completed for every perinatal death to facilitate local audit and, if required, forwarded to the relevant agency within the jurisdiction's Health Department.

A standardised data set should be collected for all perinatal deaths. 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 histopathology and autopsy.

The PSANZ Perinatal Mortality Audit Package (Section 2; Appendix 1) is recommended for data collection and perinatal mortality review.

3.6 COMMUNICATION AND FEEDBACK

Notification of the death to the General Practitioner and other relevant care providers should be undertaken as soon as possible after the death. This should be followed by a comprehensive clinical summary promptly after review of the death.

A process of feedback to clinicians needs to be in place so that individual practices and hospital policy can be improved as a result of the review process. This includes standards in relation to perinatal mortality investigation, documentation and communication.

A follow-up consultation service should be provided for all parents following a perinatal death.

Please also refer to sections 1.11 and 1.2 of the guidelines, relating to communication.

SECTION 4 ATTACHMENTS

- 4.1 Reportable and Reviewable Deaths Flowchart**
- 4.2 Consent Form for Perinatal Post Mortem**
- 4.3 Clinical Information Form- Before Commencement of Post Mortem**
- 4.4 Clinical Information Form-Before commencement of Placental Pathology**
- 4.5 Transport Authorisation form**
- 4.6 Post-Mortem Report (minimum content to be reported)**
- 4.7 VPAS Coversheet (Internal)**
- 4.8 VPAS Placenta Proforma (Internal)**
- 4.9 Perinatal Post Mortem Data Sheet (Internal)**
- 4.10 Instructions for Collection of Tissue for Chromosome Analysis by Microarray**
- 4.11 Suspected genetic metabolic disorders: Investigation and Post Mortem protocol recommendations**
- 4.12 Stillbirth Investigations algorithm**
- 4.13 High Risk Newborn investigation checklist**
- 4.14 Regional Perinatal Mortality and Morbidity Committees (RPMMC)**

4.1 Reportable and Reviewable Deaths Flowchart



**Coroners Court
of Victoria**

All reasonable care has been taken in summarizing these sections of the Act. No guarantee is made as to the accuracy of these relevant sections. When referring to the Coroners Act 2008, users should consult the official copy of the Act. To purchase the Act contact Information Victoria on 1300 366 356.

Determining Whether a Death is Reportable or Reviewable

When to prepare a death certificate

Where the death is not reportable to the coroner, the registered medical practitioner should prepare one of the following forms to provide to the Registrar of Births, Deaths and Marriages:

- Medical Certificate of Cause of Death (MCCD 28+) – of a person aged 28 days or over
- Medical Certificate of Cause of Perinatal Death (MCCD Perinatal) – used in relation to a death of a child aged less than 28 days or a still-birth

Who is authorised to complete the certificate?

A medical practitioner who was responsible for a person's medical care immediately before the death or who examines the body of a deceased person after death. The form must be submitted to the Registry of Births, Deaths & Marriages within 48 hours of the death.

Please note: It is an offence to complete a medical certificate if the death should be reported to the coroner. (12 Penalty Units)*

*One Penalty Unit = \$122.14 (as of 1/7/2011)

When to report to the coroner

If the death is a reportable or a reviewable death, a medical practitioner or any person must report the death to the coroner.

Obligation to report reportable & reviewable deaths

- A registered medical practitioner who is present at or after the death of a person must report the death without delay to a coroner if the death is a reportable death. (20 Penalty Units*)
- A registered medical practitioner who is present at or after the death of a child (being the death of a second or subsequent child of a parent) must report the death without delay to the State Coroner if the death is a reviewable death. (20 Penalty Units*)
- If there are two or more medical practitioners present at or after a death and one of them reports the death, the other practitioners need not report the death.
- Any person who has reasonable grounds to believe that a reportable or reviewable death has not been reported must report it without delay. (20 Penalty Units*)

What is a reportable death?

A death is 'reportable' if the death is connected with Victoria and comes within one of the following categories.

Categories of reportable deaths

(Please refer to section 4 of the Coroners Act 2008 – for a complete listing)

Where the deceased was:

- held in care e.g. in the care of Dept. of Health / DHS
- held in custody or in the process of being detained
- admitted or committed to an assessment centre for treatment
- or the person was a mental health patient in an 'approved mental health service within the meaning of the Mental Health Act 1986'

Where the death appears to have been unexpected, unnatural or violent or to have resulted, directly or indirectly, from accident or injury.

Where the person's identity was unknown.

Where the death occurs during a medical procedure¹, or following a medical procedure which is causally linked to the death (Criteria One) AND a medical practitioner would not immediately before the procedure was undertaken, have reasonably expected the death (Criteria Two).

¹Medical procedure means a procedure performed by or under the general supervision of a medical practitioner and includes imaging, internal examination and surgical procedure.

In determining whether the death meets **Criteria One**, the medical practitioner should consider the following questions:

- Would the person have died at about the same time if the medical procedure was not undertaken?
- Was the medical procedure necessary for the person's recovery?

If 'no' to any of the above (and the death meets criteria two) - the death is reportable.

In determining whether the death meets **Criteria Two**, the medical practitioner should consider the following question:

- Before the medical procedure was performed, was the person's condition such that death was foreseen as more likely than not to occur?

If 'no' to the above question (and the death meets criteria one) - the death is reportable.

What is a reviewable death?

A death is 'reviewable' if it is the death of a second or subsequent child of a parent.

A death will not be considered 'reviewable' if:

- the death occurs in a hospital and
- the child was born at a hospital and has always been an 'in patient' of a hospital and
- the death is not a reportable death

An 'in-patient' of a hospital includes a child whose only period spent outside a hospital was during a transfer from one hospital to another.

Includes:

- All homicides, suicides and accidental deaths, e.g. workplace and road accidents, falls and fractures.
- Deaths are reportable under this category even if there is a prolonged interval between the incident and death.*

Excludes:

- 'Natural' death, for example: carcinoma of the lung resulting from tobacco abuse; cirrhosis of the liver as a result of alcohol abuse; etc.
- Septicaemia and toxemia unless caused by an unnatural event, i.e. an injury or trauma.

Notifying 'reportable' or 'reviewable' deaths to the Coroners Court of Victoria

After ascertaining that a death is reportable or reviewable, a medical practitioner (or other person) should report the death by telephone (1300 309 519). Coronial Admissions and Enquiries staff will then request written confirmation of that report from the medical practitioner in a medical deposition form.

Assistance to the Coroner in an investigation

A person who reported a reportable death or a reviewable death and the medical practitioner (who was responsible for a person's medical care immediately before that person's death, or was present at or after the person's death) – must give any information or assistance that the Coroner requests for the purposes of the investigation. (20 penalty units)

Are still-births considered to be a reportable or reviewable death?

- A coroner does not have jurisdiction to investigate a still-birth.
- A still-born child means a child of at least 20 weeks' gestation or, if it cannot be reliably established whether the period of gestation is more or less than 20 weeks, with a body mass of at least 400 grams at birth, which exhibits no sign of respiration or heartbeat, or other sign of life, after birth.

To report a death or for further advice (24 hrs / 7 days a week), call 1300 309 519 and ask for Coronial Admissions and Enquiries.

4.2 Consent Form for Perinatal Post Mortem

<p>CONSENT FOR PERINATAL POST MORTEM EXAMINATION</p> <p>Registered Birth (Baby shows signs of life at birth, regardless of gestation or does not show signs of life at birth and is at least 20 weeks gestation or weighs at least 400g at birth)</p>	<p>UR number: _____</p> <p>Surname: _____</p> <p>Given name/s: _____</p> <p>Date of birth: _____ Gender: ____</p> <p>(AFFIX MOTHER'S LABEL)</p>
<p>Interpreter required: Yes/No</p> <p>If Yes, Language:</p> <p>Interpreter's Name (print):</p> <p>Date:</p> <p>Interpreter's translation provided via phone or in person:</p>	<p>UR number: _____</p> <p>Surname: _____</p> <p>Given name/s: _____</p> <p>Date of Birth: _____ Gender: ____</p> <p>(AFFIX BABY'S LABEL)</p>
<p>The following checklist is provided to ensure that you have received adequate information.</p> <p>The post mortem will only proceed if YES has been answered to all questions</p> <ul style="list-style-type: none"> • I understand the options and reasons for performing the post mortem <input type="checkbox"/> Yes <input type="checkbox"/> No • I have received and/or read information about the options of post mortem <input type="checkbox"/> Yes <input type="checkbox"/> No • I have received satisfactory answers to my questions <input type="checkbox"/> Yes <input type="checkbox"/> No • I understand that as part of a thorough post mortem examination, sometimes specific organs may need to be temporarily kept for further testing which may delay the burial or cremation <input type="checkbox"/> Yes <input type="checkbox"/> No • I understand that full and limited post-mortems involve taking and keeping small tissue samples and bodily fluids for testing and by law must be kept for at least 25 years <input type="checkbox"/> Yes <input type="checkbox"/> No • I understand that the tissue samples taken may be used by researchers; however tissue samples cannot be used without approval by the hospital's Ethics Committee <input type="checkbox"/> Yes <input type="checkbox"/> No • I understand that no whole organs will be kept by the hospital without my consent <input type="checkbox"/> Yes <input type="checkbox"/> No 	

Decision regarding Post Mortem examination (please tick one box)

(Full, limited and external examinations may include imaging and clinical photography that assist in assessment of physical abnormalities)

- I consent to a Full Post Mortem examination
- I consent to a Limited Post Mortem examination
Limited to examining (please specify organs/tissues/genetic testing/cell culture)

-
- I consent to an External Post Mortem examination (this may include imaging and clinical photography that may assist in assessment of physical abnormalities)
- I do not consent to any type of Post Mortem examination

Decision regarding retained tissue/organs during a post mortem examination

Whilst in the majority of cases, only small tissue samples are retained for testing, occasionally specific organs that need to be temporarily kept for further testing are unable to be returned prior to release to the funeral providers. In this instance, please indicate what you would like the hospital to do when the examination is completed (please tick one box)

- The hospital is to make arrangements for the lawful cremation or disposal of the organs
- The hospital may retain the organs for teaching and ethically approved research purposes

Identification of parent/legal guardian being requested to make a decision regarding post mortem examination (only one signature is required)

I have received sufficient information to give informed consent and have been given adequate time to make the decision	I have received sufficient information to give informed consent and have been given adequate time to make the decision
Parent/legal guardian name granting consent:	Parent/legal guardian name granting consent:
Relationship to baby:	Relationship to baby:
Signature:	Signature:
Date:	Date:

Witness Statement:

I have explained the nature and extent of the post mortem examination and believe that the parent/legal guardian making the decision has understood the explanation

I have provided a copy of this form to the parent/legal guardian

Doctor's Name (Print): _____ Doctor's Signature: _____ Date: __/__/__

I request that a copy of the post-mortem report be provided to

Doctor: _____

Address: _____

Please provide original consent form to VPAS Anatomical Pathology and a copy to be filed in medical records

4.3 Clinical Information Form- Before Commencement of Post Mortem

<p>Clinical Information Form Before Commencement of Post Mortem Examination (for referring clinicians)</p>	<p>UR number: _____</p> <p>Surname: _____</p> <p>Given name/s: _____</p> <p>Date of birth: _____ Gender: _____</p> <p style="text-align: center;">(AFFIX PATIENT LABEL)</p>
<p>Please clarify what clinical questions need to be answered by the post mortem examination:</p> <ul style="list-style-type: none"> • • • • 	
<p>Ancillary investigations require a separate request slip.</p>	
<p>Copy for report to Unit/Doctor</p>	
<p>Name:</p>	<p>Time and Date of delivery:</p>
<p>Duration of pregnancy at delivery:</p>	<p>Stillborn Est'd time from death to delivery: OR Liveborn: post natal survival (m/h/d):</p>
<p>Time and date of death: ____:-____(24 hour clock) ____/____/____ (DD/MM/YY)</p>	<p>Birth Weight (recorded on death certificate)</p>
<p>Place of Delivery/Death (Hospital/Ward/Unit/Location):</p>	
<p>Maternal History</p>	
<p>Maternal medical history (including diabetes mellitus, hypertension, medications, etc)</p>	
<p>Maternal past obstetric history (including brief summary of course and outcome of previous pregnancies); parity (gravida, para)</p>	
<p>Present pregnancy LNMP EDD (Dates) EDD (Ultrasound – if different)</p>	<p>Multiple pregnancy Chorionicity (if known): Complications:</p>
<p>Antenatal screen: Blood group & Rh Maternal serum screen TORCH screen Hepatitis B&C Syphilis HIV</p>	<p>Other maternal investigations: Kleihauer test Auto antibodies Coagulation profile Group B Strep. Parvovirus</p>
<p>Other antenatal investigations/procedures: Ultrasound(s) findings (including abnormal/normal anatomy, placenta); Amniocentesis/chorionic villus sampling (FISH/Karyotyping); Fetal surgery</p>	<p>Please include copies of reports</p>
<p>Antenatal course (including premature rupture of membranes, bleeding, fever, hypertension, etc)</p>	

4.4 Clinical Information Form-Before Commencement of Placental Pathology

<p>Clinical Information Form – Before Commencement of Placental Pathology (for referring clinicians)</p>	<p>UR number: _____</p> <p>Surname: _____</p> <p>Given name/s: _____</p> <p>Date of birth: _____ Gender: _____</p> <p style="text-align: center;">(AFFIX PATIENT LABEL)</p>																																														
<p>Please fill this form and include a signed placenta pathology request form</p>																																															
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 2px;">Consultant/Team:</td> <td style="width: 50%; padding: 2px;">Copies to:</td> </tr> </table>		Consultant/Team:	Copies to:																																												
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Signature : Designation: Date:	Print Name:																																														

4.5 Transport Authorisation form

TRANSPORT AUTHORISATION FORM

To:

Fax No:

From:

Contact No:

CC:

Date:

**Number of pages including
cover page:**

Re: TRANSPORT AUTHORIZATION FROM ANATOMICAL PATHOLOGY

The following information is intended for the addressee only and is **CONFIDENTIAL**.

The parents authorize baby _____ can be released into the care of
Funeral Providers _____, for the purposes of
transportation

SIGNED BY PARENT/LEGAL GAURDIAN: _____

Name of Parent/Legal Guardian: _____

Date: ____/____/____

FUNERAL DIRECTORS: _____

Address: _____

Contact Details:

Phone: _____ Fax: _____

GARMENTS AND MEMENTOES

I/we have provided garments and mementoes: No

Yes List items _____

4.6 Post-Mortem Report (minimum content to be reported)

EXTERNAL POST MORTEM REPORT (Minimum content that needs to be reported)

Name:

Time and Date of Delivery:

Duration of Pregnancy at Delivery:

Stillborn: Est'd time from death to delivery

Liveborn: Post natal survival (m/h/d):

Time and Date of death:

Birth weight (recorded on the death certificate):

Time and Date of Post Mortem:

Gestation for reference values:

Referring Medical Officer:

Place of Delivery/Death:

(Hospital/ward/unit/location)

Examination Performed by

Date:

Time:

(If performed by a registrar, state the name of the supervising pathologist)

Consent for Autopsy provided by (name and relationship to baby):

Full/Limited/External only - Limited to:

Special Requests:

Clinical history:

- Maternal Past History:
- Past Obstetric History:
- History of This Pregnancy:

It is particularly important to know if there is a history of maternal diabetes– gestational/Type 1 /Type 2)

Morphometric assessment:

External Examination (Information is recorded as outlined in the VPAS guidelines): Note that both the birth weight and weight at the time of post-mortem examination are recorded (as these may differ).

In the morphometric assessment, comparison with expected normal values for the stated gestation should be included. Whilst percentile charts are preferred, reference ranges are also acceptable. The reference below relates to an Australian population.

Autopsy Standards for Fetal Lengths and Organ Weights of an Australian Perinatal Population. Phillips Jarrod, Billson Virginia, Forbes Andrews Pathology 2009

External Appearance:

Special investigations:

Clinical photography (performed according to the guidelines):

Placenta and Membranes:

- Microscopic findings

Summary of Post Mortem findings:

Comments:

Reported by:

Date of report:

Please note: A form of acknowledgement (to the referring clinician) that the post-mortem has taken place (including the date of the examination) should be made. This will allow the referring clinician to plan for clinical follow-up with the family. The mechanism by which this occurs (preliminary report, telephone call, letter) is not stipulated by VPAS.

FULL/LIMITED POST MORTEM REPORT (Minimum content that needs to be reported)

Name:

Time and Date of Delivery:

Duration of Pregnancy at Delivery:

Stillborn: Est'd time from death to delivery

Liveborn: Post natal survival (m/h/d):

Time and Date of death:

Birth weight (recorded on the death certificate):

Time and Date of Post Mortem:

Gestation for reference values:

Referring Medical Officer:

Place of Delivery/Death:

(Hospital/ward/unit/location)

Examination Performed by

Date:

Time:

(If performed by a registrar, state the name of the supervising pathologist)

Consent for Autopsy provided by (name and relationship to baby):

Full/Limited/External only - Limited to:

Special Requests:

Clinical history:

- Maternal Past History:
- Past Obstetric History:
- History of This Pregnancy:

(It is particularly important to know if there is a history of maternal diabetes– gestational/Type 1 /Type 2)

Morphometric assessment:

External Examination (Information is recorded as outlined in the guidelines): Note that both the birth weight and weight at the time of post-mortem examination are recorded (as these may differ).

In the morphometric assessment, comparison with expected normal values for the stated gestation should be included. Whilst percentile charts are preferred, reference ranges are also acceptable. The reference below relates to an Australian population.

Autopsy Standards for Fetal Lengths and Organ Weights of an Australian Perinatal Population. Phillips Jarrod, Billson Virginia, Forbes Andrews Pathology 2009

The brain:liver ratio should be included

External Appearance:

Internal Examination (as per the VPAS guidelines):

Block Summary:

Microscopic Description:

Special investigations:

Clinical photography (performed according to the VPAS guidelines):

Placenta and Membranes:

- Microscopic findings

Summary of Post Mortem findings:

Comments:

Reported by:

Date of report:

Please note: A form of acknowledgement (to the referring clinician) that the post-mortem has taken place (including the date of the examination) should be made. This will allow the referring clinician to plan for clinical follow-up with the family. The mechanism by which this occurs (preliminary report, telephone call, letter) is not stipulated by VPAS.

4.7 VPAS Coversheet (Internal)

<p>VPAS COVERSHEET REGISTERED BIRTH ≥20 WEEKS/LIVEBORN/≥400G (For internal use only)</p>	UR number: _____ Surname: _____ Given name/s: _____ Date of birth: _____ Gender: _____ (AFFIX PATIENT LABEL)
---	--

Registration and Document Distribution Details:			
MOTHER SURNAME:	NAME	DATE OF DELIVERY/DEATH:	DATE RECEIVED: TIME RECEIVED AM/PM
BABY SURNAME:		SCIENTIST:	REGISTRAR/PATHOLOGIST INITIALS /
BABY NAME		BODY ID CORRESPONDS TO DOCS: DATE: INITIAL:	
FATHER SURNAME:	NAME:	COPIES TO: 1.	
UNIT/WARD/DR:		2.	
HOSPITAL:		3.	

1. DOCUMENTATION RECEIVED	Date:	2. ACTION
Death Certificate – photocopy for laboratory		Post mortem to be performed - Full, Limited or External or None If limited, limited to:
Confidential Medical Report on Perinatal Death - photocopy for laboratory		Investigations Performed by Anatomical Pathology (AP): (✓) Microbiology <input type="checkbox"/> Karyotype <input type="checkbox"/> Other Virology <input type="checkbox"/> Frozen Karyotype <input type="checkbox"/> Skeletal survey <input type="checkbox"/> MRI <input type="checkbox"/> AP Photos x _____ Placenta: YES/NO Bx #: Copy of report to CCOPMM added YES/NO
Post Mortem Consent Form		
Transport Authorization		
UR/notes/history from external source		Organ retention: No/Yes (List _____) Restore to body <input type="checkbox"/> Respectful disposal <input type="checkbox"/>
Services coordinated by AP Professional Photos Request for Viewing		Post mortem completed (date & time) Baby rejoined (date & time/by whom)
Contact on Completion (Funeral Provider, Hospital etc): Name:		Contact No:

3. RELEASE

Intention of Arrangements Transport Authorization Form
Ready for release _____ Release Date: _____ By: _____

PAPERWORK (Where Applicable)	Initials
Photocopy Transport Authorization x 2 - Forward original to Medical Records.	
M&M meeting: Send copies of the Death Certificate and Confidential Medical Report on Perinatal Death	
Death Certificate: Green copy filed in History; Yellow/blue copy to Medical Records to be forwarded to Registry of BDM.	
Confidential Medical Report on Perinatal Death: Photocopy sent to Medical Records for patient history. Original copy is sent to Registry of BDM by Medical Records.	
Funeral Director: On release, give 1. Mauve copy of Death Certificate 2. Photocopy x 1 Transport Authorization	
Registrar's File: (Photocopies of) Post Mortem Consent form Intention of Arrangement Death Certificate and Confidential Medical Report on Perinatal Death Clinical Notes	

4.8 VPAS Placenta Proforma (Internal)

PLACENTA PROFORMA (Singleton)		UR number: _____ Surname: _____ Given name/s: _____ Date of birth: _____ Gender: _____ (AFFIX PATIENT LABEL)
Anatomical Pathology Staff Member:		Date:
Lab Number:		
Clinical Notes:		
Checklist Before Commencement of Placental Pathology form Received:	YES / NO	
Pot Labelled:	Placenta/Undesignated	
Additional Testing:	No / Yes: Microbiology <input type="checkbox"/> Karyotyping <input type="checkbox"/> Virology <input type="checkbox"/>	
Photographs Taken:	YES / NO	
Shape of Disc:	Discoid Oval Bi-lobed Irregular Complete Fragmented	
Dimensions:	(mm)	
Umbilical Cord:	Insertion: Central <input type="checkbox"/> Eccentric <input type="checkbox"/> Marginal <input type="checkbox"/> Velamentous <input type="checkbox"/>	
Length:	(mm)	
Diameter:	(mm)	
Number of Vessels:		
Number of Coils:	Normal Decreased Increased	
Focal lesions:		
<i>Remove umbilical cord completely from disc</i>		
Fetal Surface:	Grey/Blue <input type="checkbox"/> Brown <input type="checkbox"/> Green <input type="checkbox"/> Subchorionic pale areas <input type="checkbox"/> <i>(if subchorionic pale areas, measure & state % of surface involved)</i>	
Membranes:	Complete <input type="checkbox"/> Incomplete <input type="checkbox"/> Uncertain <input type="checkbox"/>	
	Appearance: Opaque <input type="checkbox"/> Translucent <input type="checkbox"/> Semi-translucent/opaque <input type="checkbox"/>	
	Colour: Green <input type="checkbox"/> Brown <input type="checkbox"/> Green-tinged <input type="checkbox"/> <i>(only state if colour is not normal)</i>	
	Insertion: Normal <input type="checkbox"/> Circumvallate <input type="checkbox"/> Circummarginate <input type="checkbox"/>	
Distance between rupture and placental margin:	(mm)	
<i>Remove membranes completely from disc</i>		
Trimmed placental weight:	(g) (___ percentile for ___ weeks gestation)	
Maternal surface:	Smooth <input type="checkbox"/> Rough <input type="checkbox"/> Complete <input type="checkbox"/> Incomplete <input type="checkbox"/> Disrupted <input type="checkbox"/> Indented <input type="checkbox"/> Clot – Marginal Retroplacental % or loose in container Volume (mm) or Weight (g)	
Placental parenchyma:	Consistency: Spongy <input type="checkbox"/> Firm <input type="checkbox"/> Mildly <input type="checkbox"/> Firm <input type="checkbox"/> Gritty <input type="checkbox"/> Colour: Normal <input type="checkbox"/> Pale <input type="checkbox"/> Focal Lesions: Size: (mm), %of parenchyma involved: % Colour: Central <input type="checkbox"/> Peripheral <input type="checkbox"/>	
Blocks:	Cord, Membrane roll, normal central Parenchyma, Lesions from Placenta, Umbilical cord and membrane	

**PLACENTA PROFORMA – TWIN
(and other multiples)**

Anatomical Pathology Staff Member:	
Date:	
Lab Number:	
Patient Name:	
D.O.B:	
Clinical Notes:	
Clinical Information form- Before Commencement of Placental Pathology Received:	YES / NO
Pot labelled:	Placenta/Undesignated
Additional Testing:	Microbiology / Karyotyping / Virology
Photographs Taken:	YES / NO
Type:	Twin – fused or separate Cords clamped / sutured / not individually identified Twin 1 with single clamp/suture and Twin 2 with two clamps/sutures
Shape (if fused):	Discoid <input type="checkbox"/> Oval <input type="checkbox"/> Bi-lobed <input type="checkbox"/> Irregular <input type="checkbox"/> Complete <input type="checkbox"/> Fragmented
Dimensions (if fused):	(mm) <input type="checkbox"/>
Dividing Membrane:	Insertion: Fibrinous ridge <input type="checkbox"/> Smooth <input type="checkbox"/> Translucent <input type="checkbox"/> Opaque <input type="checkbox"/> Green-tinged <input type="checkbox"/> Divides placenta (into two equal halves / estimate proportions as fractions)
Colour differential:	Absent / Present (please describe)
Presence of interconnecting vessels:	Absent / Present (please describe)
Trimmed placental weight if fused:	(g) (___ percentile for ___ weeks gestation)
<u>Twin 1 / A</u>	
Shape (if separate):	Discoid <input type="checkbox"/> Oval <input type="checkbox"/> Bi-lobed <input type="checkbox"/> Irregular <input type="checkbox"/> Complete <input type="checkbox"/> Fragmented <input type="checkbox"/>
Dimensions (if separate):	(mm)
Umbilical Cord:	Insertion: Central <input type="checkbox"/> Eccentric <input type="checkbox"/> Marginal <input type="checkbox"/> Velamentous <input type="checkbox"/> Length: ___(mm) Diameter: ___(mm) Vessels: Coils: Normal <input type="checkbox"/> Decreased <input type="checkbox"/> Increased <input type="checkbox"/> Focal lesions:
Fetal Surface:	Grey/Blue <input type="checkbox"/> Brown <input type="checkbox"/> Green <input type="checkbox"/> Subchorionic pale areas <input type="checkbox"/> (if subchorionic pale areas, measure & state % of surface involved)
Membranes:	Complete <input type="checkbox"/> Incomplete <input type="checkbox"/> Uncertain <input type="checkbox"/> Appearance: Opaque <input type="checkbox"/> Translucent <input type="checkbox"/> Semi translucent/opaque <input type="checkbox"/> Colour: Green <input type="checkbox"/> Brown <input type="checkbox"/> Green-tinged <input type="checkbox"/>

	(only state if colour is not normal) Insertion: Normal <input type="checkbox"/> Circumvallate <input type="checkbox"/> Circummarginate <input type="checkbox"/>
Distance between rupture and placental margin:	(mm)
Trimmed placental weight if separate:	(g)
Maternal surface:	Smooth <input type="checkbox"/> Rough <input type="checkbox"/> Complete <input type="checkbox"/> Incomplete <input type="checkbox"/> Disrupted <input type="checkbox"/> Indented Clot: Marginal <input type="checkbox"/> Retroplacental <input type="checkbox"/> ____% or loose in container Volume: ____ (mm) or Weight ____ (g)
Placental parenchyma:	Consistency: Spongy <input type="checkbox"/> Firm <input type="checkbox"/> Mildly <input type="checkbox"/> Firm <input type="checkbox"/> Gritty <input type="checkbox"/> Colour: Normal <input type="checkbox"/> Pale <input type="checkbox"/> Focal Lesions: Size: ____ (mm), ____ % of parenchyma involved: ____ % Colour: Central <input type="checkbox"/> Peripheral <input type="checkbox"/>
Twin 2 / B	
Shape (if separate):	Discoid <input type="checkbox"/> Oval <input type="checkbox"/> Bi-lobed <input type="checkbox"/> Irregular <input type="checkbox"/> Complete <input type="checkbox"/> Fragmented <input type="checkbox"/>
Dimensions (if separate):	(mm) <input type="checkbox"/>
Umbilical Cord:	Insertion: Central <input type="checkbox"/> Eccentric <input type="checkbox"/> Marginal <input type="checkbox"/> Velamentous <input type="checkbox"/> Length: ____ (mm) Diameter: ____ (mm) Vessels: Coils: Normal <input type="checkbox"/> Decreased <input type="checkbox"/> Increased <input type="checkbox"/> Focal lesions:
Fetal Surface:	Grey/Blue <input type="checkbox"/> Brown <input type="checkbox"/> Green <input type="checkbox"/> Subchorionic pale <input type="checkbox"/> areas (if subchorionic pale areas, measure & state % of surface involved)
Membranes:	Complete <input type="checkbox"/> Incomplete <input type="checkbox"/> Uncertain <input type="checkbox"/> Appearance: Opaque <input type="checkbox"/> Translucent <input type="checkbox"/> Semi translucent/opaque <input type="checkbox"/> Colour: Green <input type="checkbox"/> Brown <input type="checkbox"/> Green-tinged <input type="checkbox"/> (only state if colour is not normal) Insertion: Normal <input type="checkbox"/> Circumvallate <input type="checkbox"/> Circummarginate <input type="checkbox"/>
Distance between rupture and placental margin:	(mm)
Trimmed placental weight if separate:	(g)
Maternal surface:	Smooth <input type="checkbox"/> Rough <input type="checkbox"/> Complete <input type="checkbox"/> Incomplete <input type="checkbox"/> Disrupted <input type="checkbox"/> Indented <input type="checkbox"/> Clot: Marginal <input type="checkbox"/> Retroplacental <input type="checkbox"/> ____% or loose in container Volume: ____ (mm) or Weight ____ (g)
Placental parenchyma:	Consistency: Spongy <input type="checkbox"/> Firm <input type="checkbox"/> Mildly <input type="checkbox"/> Firm <input type="checkbox"/> Gritty <input type="checkbox"/> Colour: Normal <input type="checkbox"/> Pale <input type="checkbox"/> Focal Lesions: Size: ____ (mm), ____ % of parenchyma involved: ____ % Colour: Central <input type="checkbox"/> Peripheral <input type="checkbox"/>
Trimmed placental weight if separate:	(g) (____ percentile for ____ weeks gestation)
Blocks:	Twin 1- cord and membranes, peripheral section, central sections including lesions Dividing membrane/T junction. Twin 2- cord and membranes, peripheral section, central sections including lesions
Additional Information (if required)	

4.9 Perinatal Post Mortem Data Sheet (Internal)

<p>PERINATAL POST MORTEM EXAMINATION DATA SHEET</p>	<p>UR number: _____</p> <p>Surname: _____</p> <p>Given name/s: _____</p> <p>Date of birth: _____ Gender: _____</p> <p style="text-align: center;">(AFFIX PATIENT LABEL)</p>																																				
<p>POST MORTEM/BIOPSY NO:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%;">Age (Gestation)</td> <td style="width: 30%;">Weeks Sex</td> </tr> <tr> <td colspan="2">Consultant:</td> </tr> <tr> <td colspan="2">Hospital:</td> </tr> <tr> <td colspan="2">Date of Delivery/Death:</td> </tr> <tr> <td colspan="2">Date of Post Mortem:</td> </tr> <tr> <td colspan="2">Performed by Dr.:</td> </tr> </table>	Age (Gestation)	Weeks Sex	Consultant:		Hospital:		Date of Delivery/Death:		Date of Post Mortem:		Performed by Dr.:		<p>Conditions of Post-Mortem Consent</p> <p>Full post mortem <input type="checkbox"/></p> <p>Limited post mortem <input type="checkbox"/></p> <p>External post mortem <input type="checkbox"/></p> <p>Permission for organ retention Yes <input type="checkbox"/> NO <input type="checkbox"/></p> <p>Special Conditions:</p>																								
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<p>Body Weight _____g</p> <p>Head Circumference _____mm</p> <p>Crown –heel _____mm</p> <p>Crown-rump _____mm</p> <p>Chest Circumference _____mm</p> <p>Foot Length _____mm</p>	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">ORGAN WEIGHTS</td> <td style="width: 20%; text-align: center;"><i>Histology</i></td> <td style="width: 20%; text-align: center;"><i>Retained*</i></td> </tr> <tr> <td>Brain _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Heart _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>L Lung _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>R Lung _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Liver _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>L Kidney _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>R Kidney _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Adrenals _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Thymus _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Spleen _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>Pancreas _____g</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table> <p>*In addition to routine histology</p> <p>Other tissue/organ sampled</p> <p>Muscle <input type="checkbox"/> <input type="checkbox"/></p> <p>Bone <input type="checkbox"/> <input type="checkbox"/></p> <p>Genital organ <input type="checkbox"/> <input type="checkbox"/></p> <p>Brain:Liver ratio:</p> <p>Other tissue retained (additional to histology)</p>	ORGAN WEIGHTS	<i>Histology</i>	<i>Retained*</i>	Brain _____g	<input type="checkbox"/>	<input type="checkbox"/>	Heart _____g	<input type="checkbox"/>	<input type="checkbox"/>	L Lung _____g	<input type="checkbox"/>	<input type="checkbox"/>	R Lung _____g	<input type="checkbox"/>	<input type="checkbox"/>	Liver _____g	<input type="checkbox"/>	<input type="checkbox"/>	L Kidney _____g	<input type="checkbox"/>	<input type="checkbox"/>	R Kidney _____g	<input type="checkbox"/>	<input type="checkbox"/>	Adrenals _____g	<input type="checkbox"/>	<input type="checkbox"/>	Thymus _____g	<input type="checkbox"/>	<input type="checkbox"/>	Spleen _____g	<input type="checkbox"/>	<input type="checkbox"/>	Pancreas _____g	<input type="checkbox"/>	<input type="checkbox"/>
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<p>INVESTIGATIONS</p> <p>Photography <input type="checkbox"/></p> <p>Radiology Skeletal Survey <input type="checkbox"/> MRI <input type="checkbox"/> Other <input type="checkbox"/></p> <p>Karyotype Fetal <input type="checkbox"/> Placental <input type="checkbox"/> Frozen <input type="checkbox"/></p> <p>Bacterial Lung <input type="checkbox"/> Liver <input type="checkbox"/> Spleen <input type="checkbox"/></p> <p>Virology Placenta <input type="checkbox"/> Other <input type="checkbox"/></p> <p>Fibroblasts culture <input type="checkbox"/></p> <p>Other <input type="checkbox"/></p> <p>(Please Specify)</p>																																					

4.10 Instructions for Collection of Tissue for Chromosome Analysis* by Microarray [4]

*Chromosome analysis [also known as karyotyping, molecular karyotyping, array CGH, microarray analysis]

Specimen Requirements

1. The sample should be fresh. Do **NOT** place the sample in formalin. Ideally, solid tissue biopsies should be at least 3-4 mm³ in size while other samples (e.g. placental membranes) should be large enough to cover a 5c or 10c coin. Larger samples are encouraged and enable backup in case of technical failure. Post mortem tissues can include fetal skin, muscle or cartilage.
2. For early miscarriages, an attempt should be made to isolate **chorionic villi**. If unsure, isolate sufficient material and our staff will attempt to dissect out villi. It is not always possible to identify suitable tissue, particularly from very early gestation samples. In later gestation pregnancies, other placental tissues of fetal origin (e.g. **placental membranes, umbilical cord**) are acceptable. If fetal parts are available (e.g. **skin**), these can be biopsied.
3. Clearly label the sample type e.g. "POC - placental tissue", "POC - cord", "fetal skin" etc. Only describe the sample as fetal (e.g. fetal skin) if you are certain this tissue has been biopsied.
4. Place sample into an appropriate leak proof container (preferably a sterile screw cap jar or sterile tube depending on size). Include a small volume of transport media (or isotonic saline) to keep the sample from dehydrating if there is insufficient fluid with the sample. If more than one tissue is being sent, place the tissues into separate collection vessels and label the samples accordingly.
5. Transport the sample at room temperature but avoid excessive heat. If transporting the sample over long distances (or if delays are expected) keep cool using an ice brick. Tissue culture medium ideally should include antibiotics if the biopsied tissue is non-sterile.
6. Note that microarray analysis is a DNA based test and does not require live cells. DNA of sufficient quality can usually be obtained even after prolonged FDIU. The tissue does not need to be viable.
7. Reports are generally issued within 3-4 weeks but may take longer during periods of unusually heavy workload.

Specimen storage and delivery

1. Specimens are accepted between 0900 and 1730 Monday to Friday. A valid, signed request form must accompany all specimens and should provide sufficient details of the patient history to facilitate analysis.
2. If a sample is collected out of hours, refrigerate (including over the weekend and public holidays). If a sample needs to be formalin fixed, isolate fresh tissue first, and then refrigerate the fresh sample.

4.11 Suspected genetic metabolic disorders: Investigation and Post Mortem protocol recommendations

To ensure a precise diagnosis, peri-mortem evaluation of infants suspected of having genetic metabolic disorders is required. Parental consent is required for a post-mortem examination and for tissue and blood samples to be taken prior to the death. Clinicians need to counsel parents sensitively about the importance of an accurate diagnosis for future genetic risks in this very distressing time.

Due to the complexity and number of different possible diseases, it is strongly recommended that clinicians discuss each individual case with the State Laboratory to identify the optimum tests to request. Should more expert guidance be required a clinical metabolic specialist should be consulted.

All tissue samples should be stored and transported to a Specialist Metabolic Laboratory for investigation as convenient.

Peri-mortem investigation by the clinician should include the following:

- *Prior to death:*
 - o Seek consent from the parents for a metabolic autopsy;
 - o Consult metabolic physician or histopathologist before collection of samples;
 - o Blood sample (0.8ml) in a lithium heparin tube and refrigerate;
 - o Urine sample (5-10 ml);
 - o Skin biopsy (3 x 2 mm punch biopsies): It is not necessary for the baby to be taken from the nursery for this procedure. The process, which can be undertaken by a registrar, should only take 15-20 minutes, is minimally invasive, with the sites being covered by a small dressing.
- *Immediately following the death:*
 - o Obtain blood sample by cardiac puncture if blood sample not already taken and only if parental consent has been obtained.
 - o Liver and muscle biopsies (for electron microscopy, histopathology and enzymology (for the latter wrap in aluminium foil, snap freeze and store at -70 °C). Collect within 4 h (preferably 2 h) of death.
 - o Contact the laboratory to request that all unused portions of blood or urine specimens are retained. If neonatal screening test has been performed, any unused portions of the blood spots can be requested from the state laboratory. Tandem mass spectrometry can identify selected disorders of fatty acid oxidation and amino acid metabolism in dried blood samples.

A recent publication by Christodoulou and Wilcken in *Seminars in Neonatology* highlighted the need for an increased index of suspicion for genetic metabolic disorders (inborn errors of metabolism) in neonatal care. The authors describe predominant clinical or biochemical presentations of genetic metabolic disorders in the neonatal period and recommend a protocol for screening for these disorders and also for a genetic autopsy.

The predominant clinical or biochemical presentations of genetic metabolic disorders are as follows: Acute encephalopathy: hypoglycaemia, hyperammonemia, ketosis, disorders of acid-base balance, seizures as an early predominant feature; Acute hepatocellular disease; sudden death; severe hypotonia; non-immune hydrops fetalis; facial dysmorphism, with or without congenital malformations.

Screening for genetic metabolic disorders Extract from: Christodoulou J, Wilcken B. Perimortem

Laboratory investigation of genetic metabolic disorders. Seminars in Neonatology 2004;9(4):275-280.

Screening investigations that should be performed in an acutely ill neonate suspected of having a genetic metabolic disorder

Urine

- Odour
- Dipstick
- Dipstick tests for ketones, pH, sulphite (a)
- Reducing substances (testing for both glucose and non-glucose reducing substances)
- Amino, organic acid screens (including acylglycines)

Blood

- Full blood count/film
- Urea, electrolytes, anion gap, creatinine
- Glucose
- Calcium
- Blood gases
- Liver enzymes
- Uric acid
- Ammonium
- Lactate and pyruvate
- Amino acids (b)
- Carnitine and acylcarnitines (b)

Cerebrospinal Fluid

- Lactate and pyruvate
- Glucose
- Amino acids (b)

In the case of hypoglycaemia collect blood for the following when the child is hypoglycaemic

- Growth hormone
- Cortisol
- Insulin
- Free fatty acids
- β – Hydroxybutyrate
- Acylcarnitine profile
- Urine should always be collected at the time of hypoglycaemia

(a) Sulphite is very labile. A negative test result does not exclude sulphite oxidase deficiency or the molybdenum cofactor defect.

(b) These tests should only be ordered after consultation with a biomedical geneticist or metabolic physician.

Components of the genetic autopsy for investigation of metabolic disorders

Extract from: Christodoulou J, Wilcken B. Perimortem laboratory investigation of genetic metabolic disorders. *Seminars in Neonatology* 2004;9(4):275-280. Components of the Genetic Autopsy
Components of the Genetic Autopsy

- Careful family history, including three generation pedigree
- Invite a clinical geneticist with expertise in dysmorphic syndromes to inspect the infant
- Clinical photographs
- Full skeletal survey
- Parental investigations for a haemoglobinopathy
- Maternal investigations for a thrombophilic disorder

Samples to collect from the baby

Blood

- Dried blood spots on filter paper (newborn screening cards, at least two to three cards stored at room temperature but NOT in a plastic bag (for acylcarnitine profile analysis and is a source of DNA))
- Whole blood (5ml in lithium heparin tube (for carnitine, quantitative amino acids, very long chain fatty acids; separated within 20 mins of collection and stored at -70 °C); AND 5ml in EDTA tube (for DNA extraction; can be stored at 4 °C for 48 h) AND 5ml in lithium heparin tube (for chromosome analysis; must be commenced within 4 h of sample collection))

Urine

- Freeze and store (5ml or more if possible, stored at -70 °C; (for amino acid and organic acid profiles, acylglycines, orotic acid))

Cerebrospinal Fluid

- Freeze and store (1ml stored at -70 °C (for amino acid profile))

Skin

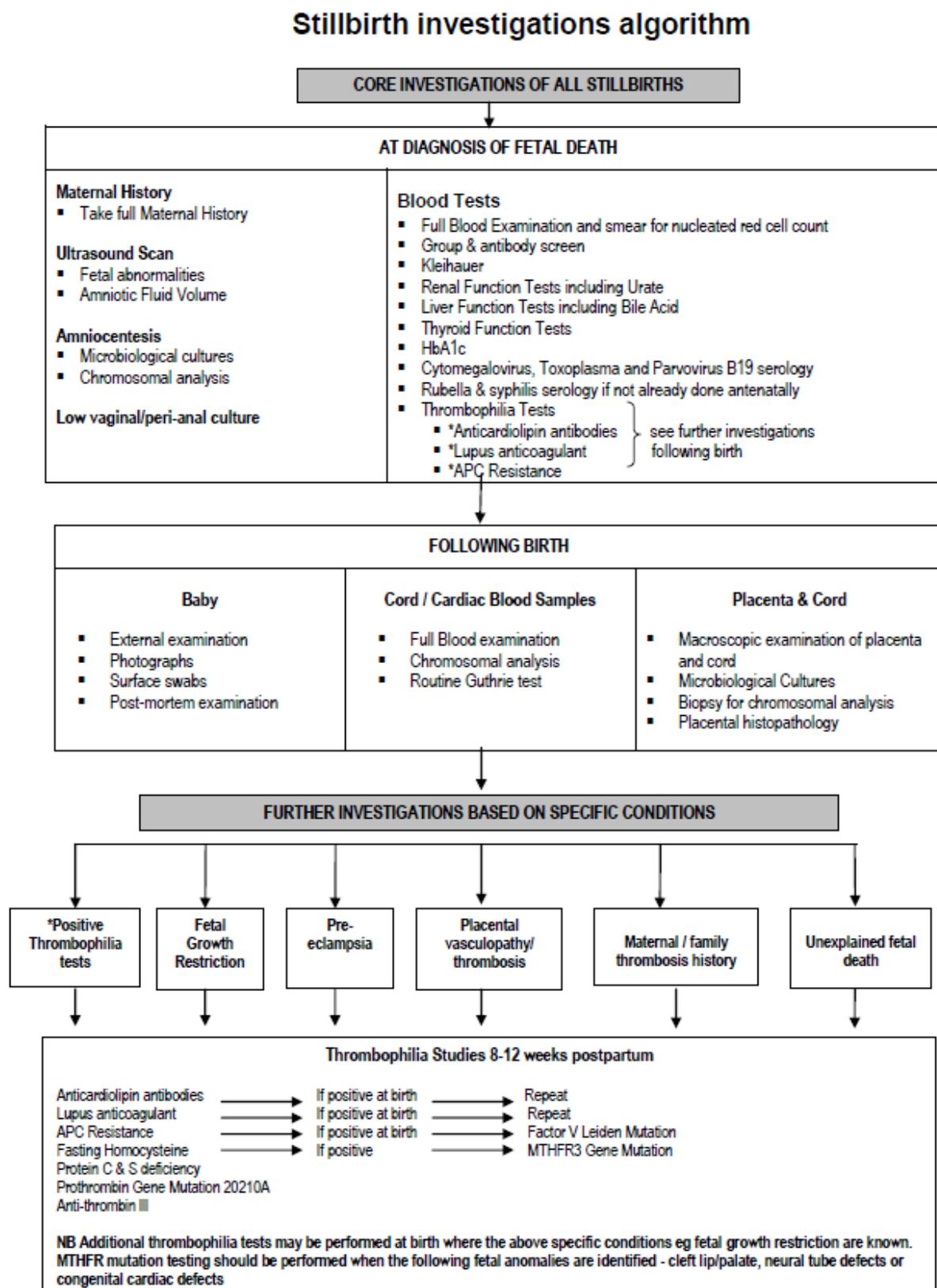
- Biopsy (3x2mm full thickness collected under sterile conditions (DO NOT use iodine-containing preparations) into culture or viral transport, or saline soaked gauze. Store at 4 °C. Best collected within 12 h of death. Cartilage may be taken for culture if there has been a prolonged period after death before biopsies can be taken. Send as soon as possible to a cytogenetics or biochemical genetics laboratory as appropriate. To be cultured for archiving in liquid nitrogen)

Other biopsies

- Liver and muscle biopsies (for electron microscopy, histopathology and enzymology (for the latter wrap in aluminium foil, snap freeze and store at -70 °C). Collect within 4 h (preferably 2 h) of death. Consult metabolic physician or histopathologist before collection of samples)
- Other tissue biopsies if specific diagnoses are under consideration.

Footnote: Regarding chromosome analysis, array CGH (comparative genomic hybridization) can be done on the DNA sample, and will provide a much greater resolution for aneuploidy and deletions/duplication, but will miss some structural rearrangements. (Information provided by DR J Christodoulou).

4.12 Stillbirth investigations algorithm



Reproduced from the PSANZ Clinical Practice Guidelines for Perinatal Mortality, Second Edition, Version 2.2

4.13 High Risk Newborn investigation checklist

		clinical scenario						
	investigations	Preterm	suspected infection (including clinical chorioamnionitis)	cardio-respiratory depression	severe growth restriction	hydrops	suspected congenital anomalies	suspected metabolic disorder
baby	group, DAT	+	+/-	+	+/-	+	+/-	+
	ear, throat swabs (at birth)	+	+	+	+/-	+/-		+
	blood culture/CRP	+	+	+	+/-	+	+/-	
	babygram	+/-		+/-	+/-	+/-	+/-	+/-
	MRI [#]	+/-		+	+	+	+	+
	molecular karyotype			+/-	+	+	+	+
	genetic autopsy			+/-	+/-	+/-	+/-	+
	urine				+/-			+/-
placenta	culture	+	+	+	+	+/-	+	
	viral biopsy		+/-	+/-	+/-	+/-		
	cytogenetics		+/-		+/-	+/-	+	+
mother	vaginal culture	+	+	+	+	+		
	TORCH serology	+	+	+	+	+	+	
	thrombophilia screen*				+	+/-		
	HbA1C [^]					+	+/-	

if available

*also in pre-eclampsia/hypertension

[^]also in macrosomia

[§]also transferrin isoforms for Carbohydrate deficient glycoprotein disorders (CDG)

Reproduced from the PSANZ Clinical Practice Guidelines for Perinatal Mortality, Second Edition, Version 2.2

4.14 Regional Perinatal Mortality and Morbidity Committees (RPMMC)

REGIONAL PERINATAL MORTALITY AND MORBIDITY COMMITTEES (RPMMC)



the women's
the royal women's hospital
victoria australia

Project overview

In 2016, all rural health services will become part of a larger perinatal mortality and morbidity review committee process in their region.

What are the current arrangements for perinatal mortality and morbidity review?

Best practice is that birthing services have specific processes and structures to audit and review perinatal passing. Some rural services don't have a current process to support perinatal mortality and morbidity review. In July 2015, public maternity services were advised that they need to have an arrangement to review all maternal and perinatal deaths. This process is to align with the Perinatal Society of Australia and New Zealand *Clinical practice guideline for perinatal mortality*¹ (PSANZ).

How will this be achieved?

In November 2015, the Department of Health & Human Services (DHHS) further advised that the circumstances for rural health services necessitate a regional approach.

Six regional health services have been asked to establish a regional perinatal mortality and morbidity review committee that includes all public maternity services in their region². Some services on the urban fringe have been asked to join the perinatal review committees of a nearby metropolitan maternity service. This process will not replace initial review conducted by maternity care clinicians in individual services.

DHHS has engaged the Royal Women's Hospital to provide support to regional hospitals for the establishment of regional perinatal morbidity and mortality committees that assist in building the capability of health services to learn from perinatal mortality and morbidity review. The committees will also be promoting consistency in the application of the PSANZ guideline more broadly through engagement with clinicians and existing review committees.

Why are regional structures important?

Combined perinatal mortality and morbidity review between regional and rural services will support a consistent coordinated regional approach, provide access to independent clinical expertise and enhance learning between maternity care clinicians to improve maternity care.

How is this different?

The regional perinatal mortality and morbidity review committees are not clinical network events nor will they replace a health service's obligation to undertake local review of incidents or outcomes at its service or mandatory reporting

When will these changes occur?

The new regional processes will start in early 2016. Their establishment will depend on the existing relationships and structures between service providers.

Note: Meetings of existing committees that have been scheduled should continue until the regional process is established.

The next steps



Early in 2016 members of the RPMMC team from The Women's will contact services to progress the project. For further information please contact Bree Bulle.

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¹Perinatal Society of Australia and New Zealand *Clinical practice guideline for perinatal mortality* Version 2.2, 2009

²The Department of Health and Human Services Policy and Funding Guidelines 2015-16 and the 2015-16 Victorian Health Service Performance Framework



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Version 1.0 Accepted by VPAS Clinical Advisory and Steering committees May 2016, and submitted to PSANZ May 2016, with minor editing changes up to August 2016.

Version 1.1 September 2016. This version incorporates updated information to be included in the post-mortem report, on the basis of consensus at the September 2016 Clinical Advisory and Steering committee meetings. This includes inclusion of the Death Certificate cause of death information into the post-mortem report, a case commentary to provide over-arching discussion of the case, including any discrepancy between the certified cause of death and final post-mortem findings. This is to align to the reporting of VPAS performance measures. This version also includes the requirement that a written preliminary post-mortem report should be authorised within two working days, in line with NPAAC requirements.

Version 1.2 February 2017. Slight changes to the wording for VPAS referral pathways, some testing listed as recommended rather than mandatory (Section 2.1), and wording for the status of the placenta in post-mortem examination (section 1.7). The PSANZ IMPROVE webpage was included to reflect the current situation of IMPROVE courses being held in Victoria (section 1.8.1).