
Extreme prematurity guideline

Clinical guidance





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Authorised and published by the Victorian Government, 1 Treasury Place, Melbourne.

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ISBN 978-1-76096-179-4 (online)

Available at www.safercare.vic.gov.au



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Introduction

In Victoria, there is wide variation in approach to care of women at high risk of giving birth extremely prematurely (at 22⁺⁰ to 24⁺⁶ weeks' gestation). This results in different outcomes for babies born this early, both in terms of survival and long-term neurosensory disability risk.

ABOUT THIS GUIDELINE

This guideline provides evidence-based guidance for managing labour and immediate care of the newborn infant at 22⁺⁰ to 24⁺⁶ weeks' gestation. It includes active management and palliative care, and addresses decision making in the **zone of parental discretion**.

When using this guideline, please consider each woman's individual circumstances and risk factors when making decisions about the birth and care of the newborn infant.

Key messages

- Decision making for births at 22⁺⁰ to 24⁺⁶ weeks' gestation presents clinical and ethical challenges.
- Babies born between 22⁺⁰ and 23⁺⁶ may fall within the **zone of parental discretion** where parental wishes may determine the level of care provided. You should also consider individual maternal and fetal risk factors and the resources available for active management at the time of their birth.
- Shared decision making is a fundamental principle. It should be individualised with the emphasis on parental preference and the presence or absence of critical risk factors.
- In addition to gestational age, consider other important determinants of outcome including:
 - place of birth (tertiary versus non-tertiary)
 - antenatal corticosteroid exposure
 - birthweight
 - plurality
 - sex.
- Consider active management following live birth (resuscitation, neonatal intensive care admission) from 22 weeks – but only in ideal circumstances, such as for babies born in a tertiary (Level 6) perinatal centre, and for babies free of adverse perinatal risk factors.

SUPPORTING RESOURCES

Management flowcharts

To be used in conjunction with this guidance, you can download:

- [Management of threatened extremely preterm labour – flow chart](#)
- [Active management of the extremely preterm newborn – flow chart](#)

Parent information sheets

Parents facing the unexpected birth of their baby at extremely preterm gestations often find it difficult to recall everything covered during counselling sessions, given this is an extremely stressful situation.

Our [information sheets for parents of babies born at 22, 23 and 24 weeks' gestation](#) are designed to provide parents with written information following counselling about management options for their baby. They are not designed to be given to parents without counselling from their healthcare team in the first instance.

BACKGROUND

Over the past four decades, the gestational age at which active management and neonatal intensive care is considered appropriate has steadily decreased. Advances in antenatal and postnatal care have led to increased survival rates and improved long-term outcomes for infants who receive intensive care. These advancements require us to regularly review and update our perinatal guidelines.

Currently there is no standard approach to managing births at 22⁺⁰ to 24⁺⁶ weeks' gestation, not only in Victoria but also globally.⁴ This leads to wide variation in reported survival rates and long-term neurodevelopmental outcomes in surviving children.^{5, 6}

Decision making for births at 22⁺⁰ to 24⁺⁶ weeks' gestation presents clinical and ethical challenges, particularly when outcomes for the most immature infants are uncertain.

In Victoria, currently half of babies born at 23 weeks' gestation and two thirds born at 24 weeks' gestation survive if offered active management.⁵ In some countries, including Australia, a select group of babies born at 22 weeks are being actively managed, demonstrating survival is possible, and not always associated with severe disability.⁷

Provide parents with accurate information on:

- options for active management and up-to-date data on the likely outcome for the baby to enable them to make informed and shared decisions about the care of their baby
- the possible risks to the mother for both the current and future pregnancies.

Terms and abbreviations

Active management	The aim of obstetric and neonatal management is directed toward providing life-saving perinatal interventions to optimise the baby's survival chances
Baby, infant, newborn	The infant after birth
C/S	Caesarean section
CTG	Cardiotocography
ECG	Electrocardiogram
Extremely preterm (EP)	Extremely preterm, <28 weeks' gestation, but for the purpose of this guideline, 'EP' refers to a baby born at 22 ⁺⁰ to 24 ⁺⁶ weeks' gestation
Fetus	The unborn infant
fFN	Fetal fibronectin
HR	Heart rate
IV	Intravenous
MgSO₄	Magnesium sulfate
NICU	Neonatal intensive care unit
Palliative care	Obstetric and neonatal management that is not directed toward providing life-saving perinatal interventions for the baby. The agreed plan is to provide comfort care for the baby after birth
PEEP	Positive end expiratory pressure
PIPER	Paediatric Infant Perinatal Emergency Retrieval
PPROM	Preterm pre-labour rupture of the membranes
PTL	Preterm labour
Stillbirth (fetal death in-utero)	The death of a fetus prior to birth, at least 20 or more weeks' gestation or at least 400 g birth weight if gestational age is unknown
UVC	Umbilical venous catheter
Zone of parental discretion (ZPD)	The ethically protected space where parents can legitimately make decisions for their child even if their decisions are not in line with the management preferences of the treating team, as long as the outcome of the decision will not cause the child harm

1. The zone of parental discretion for decision making

The **zone of parental discretion (ZPD)** refers to scenarios where it is ethically legitimate for parents to make decisions for the care of their child. This includes decisions that are not in line with the preferences of the treating team, as long as those decisions will not – on balance – cause significant harm to the child.^{8,9}

Making decisions about what care is most appropriate for a baby born extremely preterm (EP) is very stressful for families. Consider and support the wellbeing of the family at all stages of the decision-making process.

WHEN DOES THE ZPD APPLY?

When deciding if active management lies in the ZPD:

- assess the likely mortality and morbidity risk for the baby
- consider gestational age and other factors affecting fetal and maternal health.

If the risk of dying or of surviving with severe disability is so significant (i.e. the overall likelihood is >90 per cent) that it constitutes harm, active management is not considered to be in the best interest of the baby.

Outside the ZPD

Babies born **before 22 weeks'** gestation are currently considered outside of the ZPD as their likelihood of dying or surviving with severe disability is >90 per cent.

Babies born <22 weeks' gestation should receive palliative care, even if that decision does not align with the parents' wishes.

Inside the ZPD

Babies born between 22⁺⁰ and 23⁺⁶ weeks' gestation **may** fall in the ZPD. Consider their individual risk factors and the resources available for active management at the time of their birth.

Decision making should be shared between the treating team and the parents. The strength of recommendation towards either active management or palliative care may vary depending on family goals and values, and individual risk factors for the baby.

Where there is significant medical uncertainty, the ZPD will be widest. Counselling should be balanced and least directive but recognise and incorporate the parents' values and wishes.

CONTINUUM OF SHARED DECISION MAKING

The strength of medical recommendation in the ZPD will occur across a decision-making continuum, outlined below (**Figure 1**).¹⁰

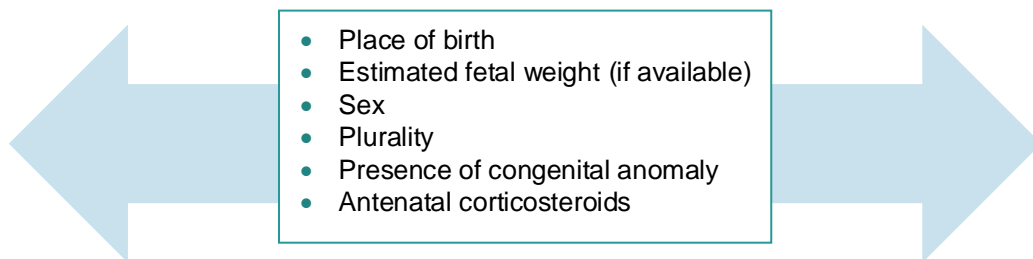
At the lower limits (22⁺⁰ to 22⁺⁶) and upper limits (23⁺⁰ to 23⁺⁶) of the ZPD, you may give strong recommendations or directive communication that incorporates the family’s values and beliefs.

Infants <22 weeks or ≥24⁺⁰ weeks’ gestation will usually have a prognosis that puts them outside the ZPD. Consequently, decisions about providing or withholding resuscitation will usually not be determined by parents’ values and wishes.

Figure 1. Continuum of shared decision making in the ZPD

	Zone of Parental Discretion		
<22⁺⁰ weeks Life sustaining interventions not supported	22⁺⁰–22⁺⁶ weeks Palliative care recommended but parental views respected unless significant adverse risk factors	23⁺⁰–23⁺⁶ weeks Active management recommended but parental views respected	≥24⁺⁰ weeks Active management unless significant adverse risk factors

Shared decision-making
Family values and beliefs are respected and incorporated into management plan
 However
Realistic assessment of individual factors will direct strength of recommendations:



ACTIVE MANAGEMENT IN THE ZPD

There are limited Australian data for outcomes of babies born between 22⁺⁰ weeks and 22⁺⁶ weeks' gestation who have received active resuscitation.⁷ International data are available for babies born in countries where a proactive approach to these babies is evident.

It is estimated that in ideal circumstances the expected survival rate would be 30 per cent for births at Victorian tertiary perinatal centres.⁶

Parents considering active management, including resuscitation, should be informed about the medical uncertainty regarding long-term outcomes of these babies in Australia.

Due to the limited experience of active resuscitation and life-sustaining treatments for babies born between 22⁺⁰ weeks and 22⁺⁶ weeks in Victoria, consider active management only for babies free of significant adverse risk factors and only in optimal circumstances.

Optimal circumstances include:

- birth in a tertiary perinatal centre
- exposure to complete antenatal corticosteroids and magnesium sulfate
- not severely growth restricted
- not born in the setting of prolonged rupture of membranes or with evidence of clinical chorioamnionitis.

Inadequate time for shared decision making or gestational age is uncertain

Where birth is imminent, and there is little or no time to discuss options and parental wishes, active management is recommended in the first instance – unless there are known adverse maternal or fetal risk factors that remove the decision from the ZPD.

For example, adverse fetal factors include (but are not limited to) outborn infants <23 weeks' gestation. Palliative care would be recommended in such circumstances.

The underlying principle is that clinicians should act in the interests of the newborn infant and the mother. Decisions about ongoing life-sustaining therapies can be reviewed once the parental wishes can be obtained.

Where a decision for palliative care has been made and interventions have not been employed to optimise outcomes for the baby, families should be supported in their decision making. The family's wishes and further assessment of whether life-sustaining interventions are in the baby's best interests may be reassessed in the neonatal intensive care unit (NICU).

If the pregnancy continues, the management plan should be reviewed and changed as appropriate.

Making decisions about what level of care is most appropriate for a baby born EP is very stressful for families, particularly when birth is imminent. Consider and support the wellbeing of the family at all stages of the decision-making process as resources and time reasonably allows.

PERSONAL VALUES AND MORAL DISTRESS

Assessments regarding the best interests of the baby (or whether a baby will be harmed by a management plan) are influenced by personal beliefs and values. These may contribute to disagreements about the best pathway in the treating team or with the family.

Moral distress may occur when a clinician has made a moral judgment about what is in the patient's interests but is prevented from acting accordingly due to factors outside their control, for example resource limitations or parental wishes.^{10 11} Moral distress is more common when care is being provided at the outer limits of the ZPD.

It is not always possible to remove all moral distress. Clinicians should be careful not to try and resolve their own moral distress by forcing their own views onto others.¹

Strategies for managing moral distress

- When a woman presents with threatened preterm labour (PTL) outside of a tertiary perinatal centre, consult early with Paediatric Infant Perinatal Emergency Retrieval (PIPER) to support counselling and decision making.
- Perinatal healthcare providers should provide a supportive environment where clinicians are empowered to ask questions respectfully, raise concerns and seek peer support in shared decision making.
- Address questions with transparent and informed responses. Acknowledge any uncertainty.
- Encourage clinicians to self reflect. This may promote constructive conversations and identify where differences in beliefs and values lie.

These questions may help you reflect on moral distress

(Adapted from 'The use and misuse of moral distress in neonatology'¹)

- What is it about this situation that is causing me moral distress? For example, is it because the baby is unreasonably suffering or is receiving disproportionate care? Do I believe that the family is not fully informed or doesn't understand?
- Do the interests of the baby and the family appear to be at odds?
- Do I believe the family lacks the capacity to care for this baby (for logistical or social reasons)?
- Am I unreasonably ascribing a previous negative outcome on to this situation?
- Could this situation be viewed in another way? Does everybody think the way I do? If not, what are the arguments of those who think differently?
- Are my concerns arising from personal or professional values? Does my distress reflect a moral concern, or rather the tragic circumstances surrounding the scenario?
- How can I voice my concerns in the most constructive manner? Can the factors leading to moral distress be modified?
- How can I best care for and show compassion to this baby and their family? How can I be courageous and continue to act for good rather than withdraw from the situation?

Clinicians experiencing unresolved moral distress should be directed to additional local supports, including your employee assistance program.

2. Parent counselling and shared decision making

Parental counselling often occurs in time-pressured and stressful circumstances. Please adapt the following considerations according to the available time and individual circumstances.

EXPLORING THE PARENTS' INFORMATION NEEDS

The information parents value most may not be the same as that valued by a healthcare professional.

Exploring the information needs of the parents will help guide counselling, making sure it is individualised and effectively supports their decision making. Families may have previous experience of prematurity or disability that will influence their expectations as well as:

- how they accept different outcomes
- what they consider an acceptable quality of life.

Parents facing the imminent birth of an EP infant should be provided with informed counselling. This gives them an opportunity to discuss the risks and benefits of the different management options with experienced obstetric and neonatal clinicians.

Counselling should be provided by the most senior clinician available, ideally in conjunction with the PIPER neonatologist (if possible) for parents in non-tertiary hospitals. Consider using telehealth for counselling if available.

Preparing for counselling

- Seek expert advice (e.g. from the PIPER neonatologist on-call) if required.
- Ascertain any available information that may influence counselling, such as:
 - maternal history (obstetric/medical)
 - fetal diagnoses or risk factors
 - ultrasound scans or results of other investigations
 - perspectives or treatment plans from other members of the treating team, e.g. obstetrics.
- Begin counselling at the earliest possible opportunity. Information may need to be revisited or revised but should not be delayed.
- Acknowledge degree of prognostic uncertainty.
- Assess parental knowledge, expectations and capacity for discussions.
- Use translation services if either parent requires.
- Consider the family's cultural background and health literacy.

Counselling principles

- Explore the parents' hopes and fears, values and information priorities so that you can tailor counselling to their needs.
- Try to provide counselling in a private, quiet and comfortable space.
- Aim to involve both parents and other supports as appropriate or when desired by the family.
- Acknowledge and validate emotional reactions.
- Joint obstetric and neonatal counselling facilitates transparent and consistent information and may improve parental satisfaction.
- Acknowledge the uncertainty of outcomes and challenges in providing an individual prognosis.
- Facts and statistics can be overwhelming, so avoid focusing solely on these during counselling.¹² Note that clinicians are often drawn to outcome statistics while parents may not place as much importance on these when making decisions around treatment options.¹²
- Frame outcomes by stating both the positive and negative outcome together, for example chance of survival along with chance of death.
- Written information may be helpful for parents so they can revisit the information provided. Download our [information sheets for parents of babies born at 22, 23 and 24 weeks' gestation](#).
- Where relevant, clearly identify where there is a decision to be made between different treatment options (e.g. between providing active management – neonatal resuscitation and ongoing life-sustaining interventions – and palliative care).
- Provide adequate time for families to discuss and consider their options (when feasible).
- Acknowledge that a clear decision may be very difficult to make and should not be forced. Parents may require multiple counselling sessions (time permitting) before reaching a decision.

SHARED DECISION MAKING

Decisions about the preferred management plan should be shared between the treating team and the parents. This can reduce parental grief responses in end of life decision making.¹³⁻¹⁵

Shared decision making requires you to ascertain the family's preferences to be involved in making a decision, and to provide balanced and transparent information to them. This is so the management plan best reflects the interests of the baby and their family.

Providing up-to-date information that reflects local outcomes (as far as is practical) is essential. Present chance of survival, death or disability as neutrally as possible as the way this information is presented can unduly influence parental decisions. For example, stating that 'there is a 30 per cent chance of survival, which means that three in 10 babies will survive but that seven in 10 babies will die', equally emphasises chance of survival as well as the likelihood of death.

Health professionals should be aware of their own biases in communicating outcomes. Some studies report that clinicians are likely to underestimate survival and overestimate major disability risk in cases of extreme preterm birth.¹⁶⁻¹⁸

Clinicians can use '[NIC-PREDICT](#)' to estimate potential outcomes for EP infants based on individual risk factors.

Reaching a decision

Ask parents to explain their understanding of the facts and their options to check they have understood the information provided and the choices they are required to make.

The concept of 'hope' can be respected when exploring both life-sustaining treatment and palliative care. For example, the importance of forming memories, holding their baby while alive or simply having time together may be examples of parent's 'hopes' when choosing palliative care.

It is important to explain that a decision to resuscitate and provide intensive care immediately following birth does not mean a commitment to ongoing life-sustaining treatment. As the baby's condition and response to treatment evolves, there may be opportunities to discuss and refine the management plan.

Parents need to feel reassured that the healthcare team will support them whether they choose active management or palliative care. Parents may worry that they will be 'abandoned' by the healthcare team if they choose palliative care.

Key practice points

Decisions should ideally be made in consultation with both parents and members of the obstetric and neonatal team simultaneously.

In the ZPD, where outcomes of medical treatment are uncertain, parental decisions about active management versus palliative care of their baby prevail over the clinician's preferences.

Births at 22⁺⁰ to 24⁺⁶ may fall in the ZPD.

If the parents want active management, then birth conditions should be optimised from 22⁺⁰ weeks' gestation onward.

If a decision has been made to provide active management, every effort should be made to optimise the infant's chances of survival and to reduce morbidity before the baby is born.

3. Management of the woman in preterm labour at 22⁺⁰ to 24⁺⁶ weeks' gestation

Principles and context

- There is clear evidence that outcomes for extremely premature infants are significantly better if they are born in a centre capable of meeting their care needs (i.e. a tertiary perinatal centre with a NICU).^{2,3}
- Every effort should be made to transfer women at significant risk of EP birth at 22⁺⁰ to 24⁺⁶ weeks to a tertiary perinatal centre before the birth of the baby if the parents want active management or are uncertain.
- The gestational age window in which in-utero transfer should be considered **may** be as low as 22⁺⁰ weeks. The same applies to interventions such as antenatal corticosteroids and magnesium sulfate.
- Active management of births <23 weeks' gestation in non-tertiary hospitals falls outside the ZPD and is not recommended.
- Refer to our [Management of threatened extremely preterm labour: Flow chart](#)

PREDICTION AND PREVENTION OF EP BIRTH

Many babies born extremely preterm arise from pregnancies without any overt risk factors for this outcome. The most predictive risk factor is a history of a prior PTL and birth.¹⁹

At booking, screen all pregnant women for risk factors for preterm birth. This should include assessments for asymptomatic bacteriuria and chlamydia infection where indicated.

Consider referring women who have had previous preterm births, or who have other risk factors such as a history of excisional cervical surgery, to a specialist or service that can undertake cervical surveillance.²⁰ Interventions such as vaginal progesterone therapy and cervical cerclage may reduce the risk of EP birth in certain patients.²¹

Women who are found to have a short cervix on the mid-trimester morphology ultrasound should be referred to a practitioner or service with experience in interpreting these results and initiating appropriate surveillance and therapy. Where such services are not available locally, develop care pathways to facilitate the consistent and timely referral of these patients to an appropriately resourced centre.

Cervical surveillance should be individualised, but generally incorporates fortnightly transvaginal sonographic assessment of the cervix between 16 and 26 weeks, with cervicovaginal swabs for M/C/S to identify potentially pathogenic organisms.

There is evolving evidence to support routine sonographic assessment of the cervix at the mid-trimester morphology scan, although this examination may not yet be available in all settings.²²

Predictive algorithms are available to help estimate the likelihood of preterm birth, such as the [QUIPP app](#), or the [Fetal Medicine Foundation](#) algorithm.

Refer to [RANZCOG guidelines](#) for current national guidance on preterm birth prevention strategies.

DIAGNOSING PRETERM LABOUR WITH OR WITHOUT RUPTURE OF THE MEMBRANES

Refer to [SCV maternity ehandbook – Preterm labour](#)

History

- Symptoms may be vague at gestations less than 26 weeks or may be attributed to other pathologies.
- Interpret the presenting symptoms in the context of the patient's overall risk for preterm birth, particularly in women with a history of preterm birth.
- Assess for symptoms of potential antecedents to preterm birth, e.g. dysuria/frequency (urinary tract infection), abdominal distension (polyhydramnios), ruptured membranes and antepartum haemorrhage.

General examination

- Full maternal observations are essential to identify features of an infective antecedent to PTL (fever, tachycardia, etc.).
- Such infections may be directly related to the pregnancy (e.g. chorioamnionitis) or elsewhere (e.g. pyelonephritis, sepsis).

Palpation

- To determine if uterine activity is present, and if so, the timing, strength and duration of contractions.
- Confirm presence of the fetal heartbeat using hand-held Doppler or bedside real-time ultrasound.

Speculum examination

- Allows for assessment of cervical effacement/dilatation and presence/absence of liquor or evidence of infection.
- Permits the taking of swabs for M/C/S (+/- other infections, e.g. chlamydia), point of care testing for rupture of membranes (e.g. AmniSure™) and fetal fibronectin (fFN).
- Preferable to digital vaginal examination, to avoid introduction of infection.
- Preterm pre-labour rupture of membranes (PPROM) is a relative contraindication to digital vaginal examination unless the patient is in established labour.

Role of fetal fibronectin (fFN)

- Quantitative fFN is the standard of care in stratifying risk of preterm birth.
 - Highly sensitive, with an excellent negative predictive value.
 - Can be combined with other maternal factors for a more accurate assessment of risk of preterm birth.
 - Should be performed prior to any transvaginal ultrasound or digital cervical examination.

Investigations for a cause as guided by the clinical presentation

- Infection screen (e.g. mid-stream urine for M/C/S, vaginal swabs for M/C/S, blood cultures).
- Ultrasound to assess for a cause of the threatened PTL (e.g. polyhydramnios).
- Blood tests to assess for evidence of infection/inflammation (e.g. full blood examination to assess for markers of infection in the context of PPROM).

Preterm pre-labour rupture of the membranes (PPROM)

Refer to [SCV maternity ehandbook – Preterm pre-labour rupture of membranes](#)

- Confirmed by sterile speculum examination and visualisation of amniotic fluid +/- use of a bedside test such as AmniSure™.
- Sonographic estimation of liquor volume may add to a clinical picture of PPROM, but is not diagnostic in itself.
- Administer antibiotic therapy in accordance with the SCV PPROM guideline.
- When there is uncertainty regarding the diagnosis of PPROM, consider admission to hospital for observation and pad checks.

MANAGEMENT OF (THREATENED) PRETERM LABOUR

Counselling

Input from a multidisciplinary team is essential, ideally in a 'joint consultation' model, to ensure consistent information is provided to patients and their families. Seek input from obstetric, neonatal and anaesthetic clinicians as required.

In-utero transfer to a tertiary (Level 6) perinatal centre with a NICU

- Mortality^{23, 24} and serious morbidity²⁵ rates are significantly increased for EP infants born outside of tertiary perinatal centres.
- The in-utero transfer evaluation process is a medical emergency. Health services should have a policy (suggest an 'in-utero transfer MET call') that ensures immediate escalation to the most senior clinician available to undertake/directly oversee the assessment and minimise delays in referral to PIPER and Ambulance Victoria to discuss transfer where appropriate. A target of 30 minutes is suggested from the time of arrival of the patient at the hospital to contacting Ambulance Victoria. This includes consultant assessment and discussion with PIPER.
- In-utero transfer is still appropriate if the parents are undecided about the decision to provide active management or palliative care for their baby.
- A collaborative discussion should be held between the referring consultant, the PIPER perinatal consultant and Ambulance Victoria to determine the safety and feasibility of in-utero transfer.
- In-utero transfer should only occur if the mother is stable for transfer and birth en route is deemed unlikely.
- If it is agreed that the risk of birthing en route precludes immediate transfer, PIPER will discuss the appropriateness of mobilising a neonatal retrieval team. Interventions to stabilise the mother and

suppress PTL should continue if appropriate, with regular reassessment of suitability to transfer, even before the neonatal retrieval team arrives.

Role of transfer to aid decision-making process regarding active versus palliative care

Counselling parents in this context is a highly complex process. In some circumstances it is reasonable for clinicians in non-tertiary hospitals to advise in-utero transfer to a Level 6 maternity service to facilitate counselling by an experienced multidisciplinary team and informed, shared decision making.

Telehealth from a tertiary unit may be used to assist with onsite obstetric and neonatal counselling. However, if active management is being considered, telehealth is not an alternative to face-to-face counselling in a tertiary perinatal centre. Take care to ensure that the use of telehealth does not unduly delay transfer and inadvertently deny parents the benefits of having their infant inborn in a tertiary centre.

Unless parents have expressed an unequivocal decision not to pursue resuscitation, transfer to a tertiary perinatal centre is an appropriate option to discuss management. This gives the parents a further opportunity to be counselled by experienced clinicians, and to optimise the neonatal outcome should the eventual decision be to actively manage the newborn.

Tocolysis

- Oral immediate-release nifedipine is the preferred agent: 20 mg PO every 20 minutes for three doses, followed by 20 mg PO every eight hours for 48 hours maximum, or tocolytic of choice if nifedipine is unavailable.
- The aim of tocolysis is to allow time for maternal transfer to a tertiary perinatal centre or for fetal lung maturation with corticosteroids.
- Long-term tocolysis is ineffective and not recommended.²⁶

Antenatal corticosteroids

- A single course of corticosteroids (11.4 mg betamethasone IM **or** 12 mg dexamethasone IM, both repeated 24/24 later) should be offered to women at high risk of preterm birth in the next 48 hours from 22⁺⁰ weeks onwards, if active management is planned or is being considered.
- The earliest gestation at which administering steroids for fetal lung maturation could be considered is 21⁺⁵ weeks, and again, only if active management is planned or is being considered.
- Corticosteroids should be administered even if a woman is in established labour and/or birth is thought to be imminent, as benefit can still be derived with a very short interval between administration and birth.
- Administration **does not** commit parents to active resuscitation of the newborn.
- Consider a repeat single dose of steroids in one week if undelivered but still at risk, to a maximum of three repeat doses.²⁷

Magnesium sulfate

- Should be administered for fetal neuroprotection where birth is likely.
- 4 g IV over 20 mins, then 1 g/hr for 24 hrs or until birth.
- Magnesium sulfate cannot be given in transit (i.e. In-utero transfer by ambulance) and given the potential for significant maternal hypotension when combined with nifedipine, it should only be administered once the woman has reached the receiving hospital.
- When transit is deemed inappropriate because labour is too advanced or the mother is too unwell, and the decision has been made for active management of the neonate, consider administering magnesium sulfate at the peripheral hospital while awaiting PIPER.

Antibiotics

Administer as per [SCV maternity ehandbook – Preterm labour](#)

Fetal monitoring in labour

Cardiotocography (CTG) prior to 26 weeks' gestation is difficult to interpret because of autonomic immaturity. There is no evidence that it improves outcomes above those obtained with intermittent auscultation.

The decision to employ CTG should only be made when active management of the neonate is intended, and when it has been agreed that birth would be expedited based on fetal heart rate (FHR) abnormalities. This decision should form part of the multidisciplinary counselling outlined above.

When CTG is employed, a higher baseline with reduced variability can be expected at EP gestations, with an additional impact from medications such as magnesium sulfate. The key indicator of fetal compromise in these circumstances is persistent decelerations.

Escalate difficulties in interpreting CTG to a perinatal specialist with experience in managing labour at extremely premature gestations. Consulting with a PIPER obstetric consultant may be necessary if such expertise is not available at the hospital in which a woman is labouring.

Where appropriate, health services should develop their own policies and guidelines with respect to cardiotocographic monitoring in this gestational range.

Mode of birth

- Caesarean section (C/S) should only be considered if active resuscitation is intended, unless delivery is indicated on maternal grounds and vaginal delivery not possible or unsafe.
- Most EP births occur in the context of spontaneous labour, with an uncomplicated vaginal birth the likeliest outcome.
- C/S at EP gestations are often technically challenging, can generally only be performed by a classical (vertical uterine) incision, and do not avert all risks of fetal trauma.
- Head entrapment affects about 9.3 per cent of breech vaginal births at 24–27 weeks, and 5.6 per cent of those delivered by C/S.²⁸ There is no clear neonatal benefit of birth by C/S for breech presentation at 22⁺⁰ to 24⁺⁶ weeks. The evidence that does exist is of limited quality, and the neonatal outcome is likely to be determined by factors other than mode of birth at this gestation.
- As a consequence, C/S at these gestations should be an exceptional event that is rarely undertaken.
- If C/S is the planned mode of birth, it should only be performed when labour is clearly established and progressing. Labour may arrest even at advanced cervical dilatations.
- Unnecessarily early intervention may deny the fetus the benefit of additional gestation, especially if a course of antenatal corticosteroids has not been completed.
- Conversely, even where a decision has been made that delivery may be preferable by C/S, the family and treating team need to be aware that EP labour may progress so rapidly that there is insufficient time to perform a C/S.
- C/S in the absence of labour is generally for maternal indications only, such as pre-eclampsia or chorioamnionitis. Planned birth is rarely indicated on fetal grounds prior to 26 weeks' gestation and should only occur following specialised multidisciplinary counselling in a tertiary perinatal centre.

Counselling

- Regardless of presentation, the decision to perform a C/S needs to be individualised, and only performed following multidisciplinary counselling, including senior obstetric input regarding the short- and long-term maternal consequences.
- Counselling needs to incorporate potential benefits and risks of the procedure, including risks for a future pregnancy following a classical incision (particularly uterine rupture, placental adhesive disorders and preterm birth).

Timing of cord clamping

- Immediate resuscitation is indicated for infants with bradycardia, poor tone, and/or apnoea despite stimulation. (See 'Care of the newborn infant'.)
- In infants who do not require immediate resuscitation, cord clamping should **ideally** be deferred for at least 60 seconds.²⁹
- The maternal condition may require earlier cord clamping to permit required interventions (e.g. in the case of post-partum haemorrhage).

OBSTETRIC MANAGEMENT WHEN PARENTS HAVE ELECTED FOR PALLIATIVE CARE

- Neonatal condition at birth is a poor indicator of the infant's short- and long-term prognosis.³⁰
- Parents should be counselled that decisions about active intervention should be made on other grounds, such as:
 - gestation
 - estimated fetal size
 - likelihood of birth in a tertiary perinatal centre.
- Where possible, the decision for active management versus palliative care should be made prior to birth, and in turn should inform decisions regarding interventions in labour.

4. Management of the newborn infant at 22⁺⁰ to 24⁺⁶ weeks' gestation

Key practice points

- Active management at birth should be provided according to [Australian Resuscitation Council](#) guidelines.
- Active management of births <23 weeks' gestation in non-tertiary hospitals falls outside the ZPD and is not recommended. Unless there are exceptional circumstances PIPER will not mobilise a neonatal team for babies born <23 weeks outside of a Level 6 perinatal centre.
- From 24 weeks' gestation onward, active management will be routinely provided unless there are individual risk factors that make survival of the infant unlikely (e.g. lethal congenital malformations, hydrops fetalis).
- When birth is imminent, and there is little time to discuss options and parental wishes, active management can be provided in the first instance unless there are known adverse maternal or fetal risk factors. Palliative care would be recommended in such circumstances.
- Clinicians should act in the interests of the newborn infant. Decisions about ongoing life-sustaining therapies can be reviewed once the parent's wishes can be obtained.
- Where gestational age is uncertain but believed likely to fall in the ZPD, proceed with active management until a more accurate assessment of gestational age, birth weight and risk factors can be made.
- In non-tertiary (Levels 1–5) maternity services, early referral to PIPER is essential where active management is indicated.
- Other clinical priorities include deferred cord clamping, temperature control and assessment, and provision of breathing support with facemask positive pressure ventilation and/or positive end expiratory pressure (PEEP).
- When palliative care is provided, the main priorities are maintaining infant comfort and supporting the family in caring for their baby.
- Clinicians in non-tertiary (Levels 1–5) maternity services can seek advice from PIPER in appropriate provision of palliative care as required.
- Refer to our [Active management of the extremely preterm newborn: Flow chart](#)

ACTIVE MANAGEMENT

Provide active management at birth according to Australian Resuscitation Council (ARC) guidelines.

Detailed resuscitation guidance is not in the scope of this document, but the following resources have more information:

- ARC guidelines – [Section 13 neonatal guidelines](#)
- [SCV neonatal ehandbook – Resuscitation of neonates](#)
- Victorian Newborn Resuscitation Project – [neoResus](#).

Staffing

- The birth should be attended by the most experienced medical staff available (consultant neonatologist/paediatrician/general practitioner) and nursing staff (neonatal nurse or midwife), who are trained in neonatal resuscitation.
- At least two (but ideally three to four) staff are required to assist with resuscitation of the newborn.
- Consider involving other teams with relevant expertise early (anaesthetics, PIPER) if available.

Cord clamping

- Cord clamping should **ideally** be deferred for 60 seconds for all infants who do not require immediate resuscitation.²⁹
- Immediate resuscitation is indicated for infants with:
 - bradycardia
 - poor muscle tone
 - apnoea despite stimulation.
- Initiate temperature control measures and assessment (below) during deferred cord clamping.

Temperature control

- EP infants are at high risk of hypothermia.
- Place the infant in a polyethylene bag or wrap immediately at birth (while still wet and warm).
- Dry the infant's head and place a woollen hat or corner of a warm towel over the head.
- Place the infant in the bag under a radiant warmer.

Assessment

Initial assessment will include:

Tone and response to stimulation

- An infant with good tone (flexed posture, moving the limbs) is unlikely to be severely compromised.
- Brisk but gentle tactile stimulation can be provided through the polyethylene bag/wrap if needed.
- An infant with poor muscle tone ('floppy') and not moving requires immediate resuscitation.

Breathing

- Assess whether breathing is present and if it is regular or irregular.
- Apnoea or irregular breathing despite stimulation is an indicator for positive pressure ventilation.

Heart rate (HR)

- The recommended mode of assessment is auscultation by stethoscope.
- If available, Electrocardiogram (ECG) monitoring can rapidly provide an assessment of HR (but only if small ECG dots are available).
- Pulse oximetry (see below) will provide continuous HR monitoring after approximately 30 seconds.
- HR persistently <100 bpm is an indicator for positive pressure ventilation.

Oxygenation

- Assessment of colour is a poor indicator of oxygenation.
- Oxygenation should ideally be assessed with a pulse oximeter. The neonatal sensor should be placed on the infant's right hand or wrist.

AIRWAY AND BREATHING

Mask ventilation

- Place the infant's head in a neutral position to open the airway.
- Prioritise breathing support – suction is rarely required.
- Use recommended positive end expiratory pressure (PEEP of 5–8 cm H₂O for all infants 22⁺⁰ to 24⁺⁶ weeks' gestation provided suitable equipment is available (T-piece device or similar).
- Provide positive pressure ventilation at an initial pressure of 25 cm H₂O. Increase the pressure if there is no increase in HR.
- Obtaining an adequate seal may be difficult if the face mask is too big. Consider having a 35 mm round mask available for EP infants.
- Provide supplemental oxygen at 30 per cent (FiO₂ 0.3) initially and adjust to target saturations of 70 to 90 per cent at three minutes and 80 to 90 per cent at five minutes after birth.
- Initial positive pressure support should be provided via facemask.
- Continuous positive airway pressure support can be applied via facemask, or nasal interface if available.

Emergent intubation

- Reserved for infants with HR <100 bpm despite effective respiratory support, or those persistently unable to achieve target saturations in 100 per cent O₂ (FiO₂ 1.00).
- While many infants 22⁺⁰ to 24⁺⁶ will require intubation in early life, initial focus should be on achieving effective lung aeration and cardiorespiratory transition with facemask or nasal respiratory support rather than immediately resorting to intubation.
- If intubation is unsuccessful, not feasible, or not within the scope of practice of the clinician, the focus should be on providing effective positive pressure ventilation with an appropriate size face mask.

CIRCULATION

Current evidence for the use of circulatory support at birth in infants born at 22⁺⁰ to 24⁺⁶ weeks' gestation does not convincingly show either benefit or harm.³¹

Follow ARC resuscitation guidelines for the newly born infant, including circulatory support. In individual cases clinicians or parents may decide that circulatory support is not appropriate.

Chest compressions

- It is reasonable to provide chest compressions if HR remains <60 BPM despite effective respiratory support.
- Increase the supplemental oxygen to 100 per cent if chest compressions are required.

Adrenaline

- If HR remains <60 bpm despite chest compressions, vascular access (umbilical venous catheter (UVC) or peripheral IV) may be attempted if the attending clinician is appropriately trained.
- If administering adrenaline, the ARC recommends an intravenous dose of 10–30 micrograms/kg (0.1–0.3ml/kg) of 1:10,000 solution via UVC.
- If vascular access cannot be obtained, consider endotracheal administration of adrenaline.²⁹ The endotracheal dose is 50–100 micrograms/kg (0.5–1.0 ml/kg) of a 1:10,000 solution.

Volume expanders

If blood loss is suspected, volume expansion with 0.9 per cent saline and/or O negative blood may be administered in 20 ml/kg IV aliquots.

DISCONTINUING RESUSCITATION

It is reasonable to stop resuscitation if the HR is undetectable after 10 minutes of effective resuscitation.²⁹ This decision should be led by the senior clinician, in conjunction with PIPER for births in non-tertiary maternity hospitals.

Ongoing care

(See also priorities when birth occurs in a non-tertiary hospital below)

- Ensure temperature control using a radiant warmer or incubator.
- Elective intubation is indicated for infants with persistent hypoxia/need for surfactant treatment, persistent apnoea, or circulatory compromise. IV access and use of premedication is recommended unless the clinical condition does not allow.
- Endotracheal surfactant treatment (200 mg/kg) is recommended for all ventilated infants 22⁺⁰ to 24⁺⁶ weeks' gestation.
- IV access (peripheral or umbilical) is required for fluid and medication administration.
- Early glucose monitoring and administration of IV dextrose are essential, aiming for a blood glucose level ≥ 2.6 mmol/L.
- Early caffeine citrate loading dose (20 mg/kg IV) is recommended, if available.
- The majority of infants born <26 weeks are at risk of sepsis, therefore a blood culture sample and administration of IV antibiotics are indicated (unless birth is by C/S for maternal indication without rupture of membranes).
- Administer prophylactic Vitamin K.
- Provide the infant's family with an update on care at the earliest available opportunity.

ACTIVE MANAGEMENT

Priorities when birth occurs in a non-tertiary hospital

- Active management of births <23 weeks' gestation in non-tertiary hospitals falls outside the ZPD and is **not** recommended. Unless there are exceptional circumstances PIPER will not mobilise a neonatal team for babies born <23 weeks outside of a Level 6 perinatal centre.
- Non-tertiary (Levels 1–5) maternity services and non-obstetric hospitals will have varying capabilities and may not have capacity to provide all measures described above.
- Urgent PIPER referral is required for the likely birth of any infant at 23⁺⁰ to 24⁺⁶ weeks in a non-tertiary hospital – ideally in advance to request PIPER attendance at birth.
- A birth at 23⁺⁰ to 24⁺⁶ weeks should trigger a local escalation process that includes seeking additional trained staff to assist.

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- If all management steps above cannot be achieved, the highest priority steps are:
 - deferred cord clamping
 - temperature control
 - assessment – with focus on the HR
 - breathing support with facemask positive pressure ventilation and/or PEEP
 - if available, allocate one member of staff to communicate with PIPER by telephone during initial active management. PIPER staff will advise on ongoing care.

Additional resources

Related SCV neonatal ehandbook guidelines:

- [Nasal continuous positive airway pressure \(NCPAP\) for neonates](#)
- [Surfactant replacement therapy for neonates](#)
- [Umbilical vein catheterisation for neonates](#)
- [Umbilical artery catheterisation for neonates](#)

[ANZCOR](#) (2016) Newborn Guideline 13.1:

Recommended equipment and drugs for resuscitation of the newborn infant

5. Palliative care

Refer to [SCV neonatal ehandbook: Palliative \(end of life\) neonatal care](#)

Anticipatory discussion

When a decision has been made to provide palliative care at birth, a discussion with the parents should take place to plan the care approach according to their wishes, including the factors detailed below.

Immediate care

- Dry and wrap the infant in warm towels or blankets with skin-to-skin care if wished.
- Offer the parents the opportunity to remain with the infant immediately after birth, although some may choose not to do so.

Comfort

Ensure the infant is comfortable and free of pain. Appropriate measures may include:

- keeping the infant warm by skin-to-skin care, wrapping and/or cuddles
- analgesia for pain or discomfort.

Expectations

Parents should be made aware of what to expect when their infant dies. This may include time course (although difficult to predict, some infants may survive for several hours, or rarely days), and changes such as gasping or a change in colour.

Location

Parents may wish to have their baby stay with them on the postnatal ward or may have other preferences, which should be accommodated if possible. The chosen location should be quiet and provide comfort and privacy.

Family

Parents may wish for family members to be present.

Pastoral care

Parents may wish to have a naming ceremony, baptism, or involvement of a religious or cultural representative.

Creating memories

- Offer the opportunity to take photographs. A free photography service can be requested from [Heartfelt](#).
- Families may also value the creation of a memory box or memory book.

Post mortem examination

Offer the opportunity for post mortem examination. This should be done sensitively by a senior clinician, with consideration given to appropriate timing (see [PSANZ Perinatal post mortem examination](#)).

Regardless of the parental decision regarding post mortem, the placenta should be sent for histopathological +/- cytogenetic analysis wherever possible.

Maternal care

Where indicated, offer the mother lactation suppression, and monitor her for conditions such as pre-eclampsia or sepsis should these be identified at the time of birth.

Refer the mother and her family for bereavement care and mental health support services as appropriate. This is particularly important when they make funeral and other arrangements for their baby.

Follow up

Arrange a follow-up appointment with the family after discharge to provide them the opportunity to ask questions and access counselling, support, or healthcare services if required. This may be arranged to coincide with results of an autopsy examination if applicable. If possible, joint obstetric and neonatal follow up is valuable.

Administration

Provide clinical staff access to guidance on completing the appropriate administrative procedures after death.

Non-tertiary maternity services can seek advice from PIPER on the above issues as required.

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Online resources

[Safer Care Victoria neonatal ehandbook: Palliative \(end of life\) neonatal care guideline](#)

[Ambulance Victoria Clinical Practice Guidelines for management of preterm labour in the pre-hospital environment \(paramedic practice\) - CPG MO303 \(page 308\)](#)

[Australian Resuscitation Council Guideline: Section 13: Neonatal guidelines](#)

[Victorian Newborn Resuscitation Project: NeoResus](#)

[CRE Stillbirth and PSANZ Clinical Practice Guideline for care around stillbirth and neonatal death](#)

[British Association of Perinatal Medicine \(BAPM\): Perinatal management of extreme preterm birth before 27 weeks of gestation \(2019\). A BAPM Framework for Practice](#)

