THAMES VALLEY & WESSEX NEONATAL OPERATIONAL DELIVERY NETWORK

Perinatal Optimisation Guideline: Improving the Prediction and Prevention of Preterm Birth and Optimising Perinatal Care When Preterm Birth Cannot be Prevented	
Approved by/on	Thames Valley & Wessex Neonatal ODN Governance Group (21st September 2023)
Date of publication	September 2023
Last reviewed	New guideline
Review date (Max 3 years)	September 2026
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Distribution	Thames Valley and Wessex Neonatal Clinical Forums Thames Valley and Wessex Neonatal Network website Thames Valley and Wessex Neonatal Network e-bulletin
Related documents / References	**Related documents:** Antenatal Corticosteroids For Fetal Lung Maturation Guideline https://www.patientsafetyoxford.org/wp-content/uploads/2022/12/Antenatal-corticosteroids-for-fetal-lung-maturation-evidence-behind-guideline-V1-FINAL-24-11-2022-Oxford-AHSN-Maternity-Network.pdf Optimal Cord Management https://neonatalnetworkssoutheast.nhs.uk/professionals/guidelines/tvw-guidelines/optimal-cord-management/ **References:** ASHN Network (2018) *PReCePT. PRevention of Cerebral Palsy in PreTerm Labour. Magnesium Sulphate for Neuroprotection.Quality Improvement Toolkit*. Available at: https://www.ahsnnetwork.com/wp-content/uploads/2019/07/PReCePT-QI-Toolkit-2.3.pdf [Accessed 13th July 2023] BAPM (2020) *Antenatal Optimisation for Preterm Infants <34 Weeks Gestation: A Quality Improvement Toolkit.* Available at: hubble-live-assets.s3.amazonaws.com/bapm/redactor2_assets/files/843/AO_Toolkit_FULLTOOLKIT_11-2-21.docx.pdf [Accessed 15th June 2023] BAPM (2020) *Optimising Early Maternal Breast Milk for Preterm Infants. A Quality Improvement ToolKit*. Available at: https://www.bapm.org/pages/196-maternal-breast-milk-toolkit [Accessed 21st July 2023] BAPM (2022) *Service and Quality Standards for Provision of Neonatal Care in the UK*. Avaialble at: https://hubble-live-assets.s3.eu-west-1.amazonaws.com/bapm/file_asset/file/1494/BAPM_Service_Quality_Standards_FINAL.pdf [Accessed 26th July 2023]

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Implications of race, equality & other diversity duties for this document	This guideline must be implemented fairly and without prejudice whether on the grounds of race, gender, sexual orientation or religion.

Version Control:

Version	Date	Details	Author(s)	Comments
1	Aug 2023	First draft of new guideline	JH & MLS	No comments received. Final draft ratified Sept 2023
Review Date:	**Sept 2026**			

Perinatal Optimisation Guideline

Contents

1.0 Introduction

Perinatal optimisation (PO) is an approach to care that concentrates on improving preterm outcomes by reliably delivering evidence-based interventions in the antenatal, intrapartum and neonatal period (BAPM, 2020). The NHS Long Term Plan (2019) sets out the national ambition to reduce neonatal morbidity and mortality by 50% by 2025 by focusing on preterm birth. Key stakeholders, such as the British Association of Perinatal Medicine (BAPM) and Neonatal National Audit Programme (NNAP) are working collaboratively to deliver a PO quality improvement initiative which aligns with national workstreams, including the Maternity and Neonatal Safety Improvement Programme (MatNeoSIP) (NHS England 2023a) and Saving Babies Lives Care Bundle (SBLCB) (NHS England 2023b) PO pathways. These PO pathways have become a major driver to support providers in the delivery of evidence-based elements of PO known to improve neonatal outcomes.

There are several approaches to PO, the main approaches utilised within the Thames Valley and Wessex Neonatal Operational Delivery Network (TVW NODN) are demonstrated in Table 1:

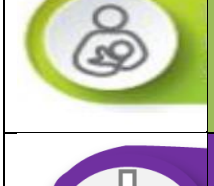
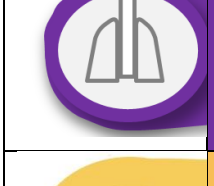
Table 1: Elements included with each approach

Intervention	PREM 7	PREM 7+	PERI Prem	PERI Prem +
Correct Place of Birth	√	√	√	√
Antenatal Corticosteroids (ANC)				
Magnesium Sulphate				
Antenatal Antibiotics				
Optimal Cord Management (OCM)				
Thermoregulation				
Early Breast milk / colostrum				
Birthday Cuddle	x	x	x	
Postnatal hydrocortisone	x	x	√	
Caffeine	x	√		
Probiotics	x	x		
Volume targeted ventilation	x	√		
Less invasive Surfactant administration (LISA)	x	x	x	

In TVW NODN, the initial focus has been on the implementation of the first 7 elements of PO identified by BAPM (2020) and PREM 7, however, the additional elements of Caffeine and Volume Targeted Ventilation are now included, as recommended by the SBLCBv3 (NHS England 2023b). As a network, it is acknowledged that some trusts have already implemented additional elements included by PERIPrem and these units will be supported to continue with this work. It is essential to remember that whichever approach (branding) chosen for adoption within your trust, the aim is the same, to reduce morbidity and mortality by ensuring evidence-based elements of PO are implemented and adhered to in order to improve preterm outcomes and achieve the national ambition.

The term PREM 7+ has thus been chosen. The elements of optimisation being endorsed by TVW NODN are laid out in Table 2.

Table 2: PREM7+ Elements of Perinatal Optimisation

	Perinatal Optimisation Pathway		
	PO Element (What)	**Evidence Summary (Why)**	**Criteria (Who)**
	Place of Birth	Extreme preterm birth in a tertiary unit setting significantly improves survival and neurodevelopmental outcomes	Singleton infants less than 27 weeks gestational age, multiples less than 28 weeks gestational age and any gestation with an estimated fetal birth weight of less than 800g should be born in a maternity service on the same site as a neonatal intensive care unit (NICU)
	Antenatal Corticosteroids (ANC)	Optimal antenatal steroids significantly improve survival (by 40%), reduces the risk of severe IVH (by 45%) and the risk of CLD and NEC	All women giving birth at less than 34 weeks of gestation, should receive a full course of antenatal corticosteroids within 1 week prior to birth
	Magnesium Sulphate	Use of magnesium sulphate before preterm delivery reduces risk of cerebral palsy by 30%	All women giving birth at less than 30 weeks of gestation, should receive magnesium sulphate within the 24 hours prior to birth
	Intrapartum Antibiotics	The use of antibiotics 4 hours before birth significantly improves outcomes by reducing the risk of Group B Streptococcus sepsis (GBS)	All women in preterm labour at less than 34 weeks of gestation should receive intravenous intrapartum antibiotics prophylaxis to prevent early onset neonatal GBS infection irrespective of whether they have ruptured membranes
	Optimal Cord Management (OCM)	OCM (waiting at least 60 seconds after birth before clamping the umbilical cord) significantly improves survival by 30%	Babies born at less than 34 weeks gestation should have their umbilical cord clamped at or after 1 minute after birth
	Normothermia	Early hypothermia (<36.5^{oC}) increases the risk of mortality, brain haemorrhage, NEC and sepsis. Emerging evidence links early hyperthermia (>38^{o}C to adverse outcomes	Babies born at less than 34 weeks gestational age should have a first admission temperature which is between 36.5-37.5^{o}C and measured within one hour of birth
	Early Maternal Breast Milk (MBM)	MBM reduces the risk of retinopathy of prematurity; CLD and NEC; and can improve long term neurological outcomes	Babies born below 34 weeks gestational age should receive their own mother's breast milk, ideally within 6 hours, but always aiming for within 24 hours of birth
	Volume Targeted Ventilation	Reduces the chance of death, CLD and IVH when compared to pressure limited ventilation	Babies born below 34 weeks gestational age who required invasive ventilation. Used in combination with synchronised ventilation as primary mode of ventilation.
	Caffeine	Reduces chance of death or disability	All babies born less than 30 weeks gestational age or less than 1500 grams at birth

(MatNeoSIP, 2023; NHS England, 2023b)

2.0 Aim of Guideline

The guideline aims to provide information on the drivers behind perinatal optimisation (PO), the evidence under pinning each element of PO and resources that can be used to support the implementation and ongoing delivery of each of the elements.

3.0 Scope of Guidelines

The guideline applies to all neonates who are born in neonatal units and maternity units covered by Thames Valley & Wessex Neonatal Operational Delivery Network (TVW ODN), including midwifery, obstetric and neonatal/ paediatric teams. This includes the following hospitals:

Thames Valley		
TRUST	Hospital	Designation
Oxford University Hospitals NHS Foundation Trust	- John Radcliffe Hospital, Oxford	NICU
Buckinghamshire Healthcare NHS Trust	- Stoke Mandeville Hospital, Aylesbury	LNU
Frimley Health NHS Foundation Trust	- Wexham Park Hospital, Slough	LNU
Milton Keynes University Hospital NHS Foundation Trust	- Milton Keynes General Hospital	LNU
Royal Berkshire NHS Foundation Trust	- Reading	LNU

Wessex		
TRUST	Hospital	Designation
University Hospital Southampton NHS Foundation Trust	- Princess Anne Hospital	NICU
Portsmouth Hospitals University NHS Trust	- Queen Alexandra Hospital	NICU
Dorset County Hospital NHS Foundation Trust	- Dorset County Hospital, Dorchester	SCU
Hampshire Hospitals NHS Foundation Trust	- Basingstoke and North Hampshire Hospital	LNU
Hampshire Hospitals NHS Foundation Trust	- Royal Hampshire County Hospital, Winchester	LNU
Isle of Wight NHS Trust	- St Mary's Hospital	SCU
University Hospitals Dorset NHS Foundation Trust	- Poole Hospital	LNU
Salisbury NHS Foundation Trust	- Salisbury District Hospital	LNU
University Hospitals Sussex NHS Foundation Trust	- St Richard's Hospital, Chichester	SCU

4.0 Abbreviations and definitions

4.1 Abbreviations

AHSN	Academic Health Science Networks
ANC	Antenatal corticosteroids
BAPM	British association of perinatal medicine
BPD	Bronchopulmonary dysplasia
CLD	Chronic lung disease
GBS	Group B Streptococcus
IAP	Intrapartum antibiotic prophylaxis
ILCOR	International Liaison Committee on Resuscitation
IVH	Intraventricular haemorrhage
HFOV	High-frequency oscillatory ventilation

LISA	Less invasive surfactant administration
NEC	Necrotising enterocolitis
NIHR	National Institute of Health and Care Research
NICE	National Institute of Clinical Excellence
NICU	Neonatal intensive care unit
NNAP	National neonatal audit programme
OCM	Optimal cord management
PEEP	Positive end expiratory pressure
PERIPrem	Perinatal excellence to reduce injury in premature birth
PERIPrem+	Perinatal excellence to reduce injury in premature birth package plus extra element
PO	Perinatal optimisation
PREM7	Preterm perinatal optimisation – 7 elements
PREM7+	Preterm perinatal optimisation – 7 elements + extra elements added June 2023
PTB	Preterm birth
QUiPP	Quantitative innovation in predicting preterm birth
RCOG	Royal College of Obstetrics and Gynaecology
ROP	Retinopathy of prematurity
SBLCB	Saving babies lives care bundle
TVW ODN	Thames Valley and Wessex neonatal Operational Delivery Network
VG	Volume-guarantee

4.2 Definitions

- **Barotrauma** is tissue damage from a pressure difference causing shearing or overstretching of tissues.
- **Cerebral palsy** is a physical disability referring to a group of disorders affecting a person's ability to move.
- **Hypocarbia** is a decrease in alveolar and blood carbon dioxide levels below normal
- **In utero transfer** refers to the hospital-to-hospital movement of a pregnant woman
- **Hypothermia** is a temperature below 36.5 degrees centigrade
- **Magnesium sulphate** is given to women who are very preterm (30 weeks gestation or below) or fetus is low birth weight (less than 1500g) to reduce the risks of cerebral palsy
- **Neopuff** is a neonatal resuscitator that allows the Peak Inspiratory Pressure (PIP) and Positive End Expiratory Pressure (PEEP) to be set.
- **Pre-term birth** is being born live before 37+0 weeks gestation.
- **Pre-term labour** is onset of labour before 37+0 weeks gestation. It occurs in about 8% of all live births (NHSE, 2023b).
- **Quantitative fetal fibronectin** is an adhesive glycoprotein that holds the membranes of the uterus, to the fetal membranes. After 35 weeks of pregnancy, it begins to break down naturally and is detectable in vaginal secretions. Fetal fibronectin detected between 22 and 35 weeks of pregnancy is an indicator of preterm birth risk.
- **QUiPP App** is a tool which can be used to estimate the individual probability of preterm delivery using predictive modelling.
- **Respiratory Distress Syndrome (RDS)** occurs when the fetal lungs have not fully developed and cannot provide enough oxygen causing breathing difficulties. Long term symptoms are called **Chronic Lung Disease** and **Bronchopulmonary Dysplasia**.
- **Survival focused care** is where the obstetric and neonatal management aims to sustain the life for the baby
- **Tocolytics** are drugs used to suppress uterine contractions, administered to allow time to give corticosteroids and/or to achieve in utero transfer.
- **Vapotherm** is a high velocity oxygen therapy delivered via a nasal catheter

5.0 Guideline Framework

Perinatal optimisation (PO) is an approach to care that concentrates on improving preterm outcomes by reliably delivering evidence-based interventions in the antenatal, intrapartum and neonatal period (BAPM 2020).

The following elements of PO will now be addressed individually using a **WHO, WHY, WHAT** and Appendix approach:

1. Place of Birth (to include information on prediction of preterm birth)
2. Antenatal Corticosteroids (ANC)
3. Magnesium Sulphate
4. Intrapartum Antibiotics
5. Optimal Cord Management (OCM)
6. Thermoregulation
7. Early maternal breast milk
8. Volume Targeted Ventilation
9. Caffeine

WHO: The target population for perinatal optimisation i.e. which women or babies should receive the element of PO. This section will be headed in blue at the beginning of each element.

WHY: A brief summary of the supporting evidence as to why the element is recommended and the effect on outcomes.

WHAT: What to give or what to do to achieve the element.

Appendices: Each element will have a supporting appendix that will include further resources/tools/links/information to support professionals in achieving compliance with the element.

5.1 Place of Birth

All women should deliver in a maternity centre with an onsite Neonatal Intensive Care Unit if:

<27 weeks gestations

Estimated fetal weight <800 grams

<28 weeks gestation in the event of multiple birth

WHY

There is mounting evidence to demonstrate that babies who are born in maternity centres with an onsite neonatal intensive care unit (NICU) are at a significantly reduced risk of morbidity and mortality. If not born in a tertiary centre, there is a:

- 2-3x higher risk of severe brain injury
- 1.3x higher risk of death (BAPM 2020)

WHAT

Whilst the prevention of preterm birth (PTB) is outside the scope of this guideline, it is worth considering that the use of acute tocolytic medications should be considered, if any short-term delay gained, might allow for the administration of antenatal corticosteroids, magnesium sulphate or in-utero transfer (NHSE, 2023b).

Accurate prediction of PTB is essential in order to ensure women receive appropriate and timely optimisation and transfer to a NICU. This includes those in threatened preterm labour and those requiring intervention because of maternal or fetal indications.

There are several tools available to help predict PTB and BAPM (2023a) recommends the use of the QUiPP app and fetal fibronectin (see Appendix 12.1). Such tools can help decrease the number of unnecessary admissions and transfers and reduce exposure to optimisation medications that are not without potential side effects (BAPM, 2023a).

Any decision not to transfer a woman to a NICU, who goes on to deliver (at less than 27weeks; less than 800 grams; or less than 28 weeks if a multiple birth) in a non-NICU, must be exception reported (Ockenden ,2022; BAPM, 2023b). There should be clear and established pathways to ensure exception reporting is done in a prompt manner.

If in established preterm labour:-

- Utilise other guidelines to support decision making around care (see Appendix 12.1)
- See section 6.11 on antenatal counselling
- Locate a cot using PERIDASH/ SONET (see Appendix 12.1)
- If undertaking active care, start perinatal optimisation process pre-transfer (see Appendix 12.14 for an example proforma)
- Ensure documentation/ Badgernet is accurate and up to date, including conversations with parents around process and likely outcomes (Ockenden, 2022; NHSE, 2023b)

For further information and resources see Appendix 12.1; Appendix 12.11; Appendix 12.14

5.2 Antenatal Corticosteroids (ANC)

All women giving birth 22+0 - 33+6 weeks gestation

Should receive a full course of steroids within 1 week prior to birth

WHY

Antenatal corticosteroid use has been supported by research evidence for many years. A recent Cochrane review by McGoldrick et al (2020) continues to support the use of a single course of ANC, demonstrating that ANC accelerate fetal lung maturation in women at risk of PTB. The evidence not only supports the acceleration of fetal lung maturation but has also demonstrated a 30% reduction in death, a 50% reduction in necrotising enterocolitis and a 45% reduction in severe intraventricular haemorrhage (BAPM 2020).

For every 8 -10 women treated with ANC at less than 26 weeks, there will be 1 more surviving baby (BAPM, 2020).

The evidence supporting use in extreme preterm babies <24 weeks is still being established, however, if antenatal counselling leads to the decision for active, survival focused care then ANC should be offered to the woman (NICE, 2022).

WHAT

ANC administration should be optimally timed, in order to have the most benefit to the fetus. This links back to section 6.1 and the use of tools such as the QUiPP app and fetal fibronectin to help accurately predict the likelihood of PTB and subsequently support decision making on management of the woman.

The RCOG (2022) recommend the administration of 12mg of Dexamethasone or Betamethasone, 24 hours apart. The greatest benefit is observed when 2 doses are given, 12-24 hours apart, at least 24 hours prior to delivery and less than 7 days from the start of treatment.

Some benefit remains if given < 24 hours, if birth is imminent (BAPM, 2020; Norman et al, 2017; RCOG, 2022).

ANC should be administered if indicated/predicted PTB is within 7 days AND no steroids have been administered within the last 2 weeks.

The administration of repeat courses of ANC remains controversial. A meta-analysis by Crowther et al (2019) recommended that whilst repeat courses of ANC to women at ongoing risk of PTB did reduce the need for respiratory support, the risk of serious health outcomes were not reduced with multiple courses and birth weight was reduced. NICE (2022) advise a single repeat dose of ANC for women <34 weeks gestation, who had received the initial course more than 7 days ago and are at risk of delivering in the next 24 hours. However, no more than 2 courses of ANC should be given for preterm birth. Any decision to give a repeat dose of ANC should be made by a senior clinician.

ANC are not contraindicated in women with known diabetes (gestational, type 1 or type 2) who are in / suspected preterm labour, however you should consult with the diabetes team prior to administration (NICE, 2020) as alterations to insulin therapy may be required.

https://www.patientsafetyoxford.org/wp-content/uploads/2022/12/Antenatal-corticosteroids-for-fetal-lung-maturation-evidence-behind-guideline-V1-FINAL-24-11-2022-Oxford-AHSN-Maternity-Network.pdf

For further information and resources see Appendix 12.2.

5.3 Magnesium Sulphate

All women giving birth between 22+0 - 29+6 weeks of gestation

[Consider for 30+0 - 33+6 (NHSE, 2023b)]

In established labour or planned delivery within 24 hours

Loading dose, plus, a minimum of 4-hour infusion, within the 24 hours prior to birth

WHY

In babies, premature birth is the main cause of neurological impairment, including but not exclusively: cerebral palsy (CP), cognitive dysfunction and substantial disability (NIHR, 2023). 25% of all cases of cerebral palsy are in infants born at less than 34 weeks of gestation (ASHN Network, 2018)
.

The neuro-protective role of antenatal magnesium sulphate was first recognised in the 1990's (Doyle et al 2009). BAPM (2020) acknowledge that appropriately timed antenatal magnesium sulphate is linked to a 30% reduction in the risk of CP. Further, NICE (2022) recommends the use of antenatal magnesium sulphate for women in established preterm labour or with a preterm delivery planned within the following 24 hours (as stated above).

WHAT

NICE (2022) advise the administration of 4 grams magnesium sulphate as an intravenous bolus over 15 minutes. This should then be followed by an infusion of 1 gram per hour until the baby is delivered or until 24 hours of administration (whichever comes first).

Women should be monitored for magnesium toxicity, including observations every 4 hours: heart rate, respiratory rate, blood pressure and deep tendon reflexes. If there are signs of oliguria or renal failure, observations should be more frequent and consideration to reducing or stopping the infusion.

Unlike ANC the potential effect occurs within a short amount of time from initial administration and whilst a minimum of 4 hours pre delivery is preferred, it is acknowledged that administration of only the loading dose (if time permits), is likely to confer some benefit (ASHN Network, 2018; BAPM, 2020). However, urgent delivery should not be delayed in order to administer.

If considering or planning an in utero transfer, you should consider the administration of the loading prior to transfer and ensuring this is clearly communicated to the receiving team. The use of a proforma such as in Appendix 12.14 may help with this.

For further information and resources see Appendix 12.3.

5.4 Intrapartum Antibiotics

*All women in **established preterm labour**, <34 weeks gestation*

[Consider up to 36+6 (NHSE, 2023b)]

should receive intrapartum antibiotics for prevention of GBS

irrespective of rupture of membranes

*(**Excludes those not in labour and delivered by caesarean section**)*

WHY

The risk of early onset Group B Streptococcal (GBS) disease in the infants of those women who deliver preterm is estimated to be 2.3 per 1000 (WEASHN, 2020).The mortality rate from infection is increased (20–30% in preterm deliveries versus 2–3% at term (WEASHN, 2020)). Therefore there is a recommendation that all women in confirmed preterm labour should receive IAP regardless of membrane status (BAPM, 2020).

For every 10 GBS positive women in preterm labour who are treated with IAP, there will be 1 fewer baby infected (BAPM, 2020). IAP reduces the risk of death from GBS in preterm infants by 25%. They also reduce the risk of neonatal GBS sepsis colonisation by 86%. Further, IAP reduces the risk of abnormal cranial ultrasound findings by 20%. Antibiotics given at least 4 hours before birth reduce the risk of GBS sepsis from 11.1% to 1.6% (BAPM, 2020).

WHAT

Benzylpenicillin should be given if not contraindicated (NHS England, 2023b) (See Appendix 12.4 for other antibiotic options).

NICE (2021) recommends that antibiotics are offered in labour to those women who:-

- Are in pre-term labour **OR**
- Have GBS colonisation, bacteruria or infection in a previous pregnancy, and have not had a negative test for GBS by culture or PCR on a recto-vaginal swab taken between 35- 37 weeks gestation or 3-5 weeks before the anticipated delivery date in this current pregnancy **OR**
- Have had a previous baby with an invasive GBS infection **OR**
- Have a clinical diagnosis of chorioamniotis

However, IAP is not recommended for women having preterm planned caesarean section with intact membranes.

Treatment recommendations for preterm pre-labour rupture of membranes can be found here:-
https://www.nice.org.uk/guidance/ng195/chapter/Recommendations#intrapartum-antibiotics

For further information and resources see Appendix 12.4

5.5 Optimal Cord Management

All babies born <34 weeks gestation

[Although aim for all babies born before 37 weeks (NHSE, 2023b)]

Should have cord clamped at or after 1 minute after birth

WHY

Optimal cord management (OCM) refers to the process of delaying or deferring clamping of the umbilical cord for at least one minute after birth. OCM has been shown to improve neonatal outcomes by reducing mortality particularly in preterm babies by 30% (WEAHSN, 2020). OCM also provides better cardiovascular stability, improved blood pressures and reduces the need for packed cell transfusions by 10% (Fogarty et al, 2018; Rabe et al, 2019; Seidler et al, 2021). It has also been found to reduce the incidence of intraventricular haemorrhage (IVH)(Rabe et al, 2019), periventricular leukomalacia (Rabe et al, 2019), late onset sepsis (Rabe et al, 2019), as well as providing higher level of iron stores at 4-6 months of age. NICE (2022) and WEASHN (2020) recommend that it should take place in all babies with a heart rate and where the placenta/ cord is intact.

WHAT

At birth, the umbilical circulation slows and pulmonary vascular resistance falls, rapidly increasing pulmonary blood flow. This is the beginning of the transition to the neonatal circulation. Continued flow in the umbilical vein and arteries at birth may be part of the physiological mechanisms assisting the baby as it makes this transition. After birth, if the cord remains intact, blood flow from the placenta to the baby continues for a few minutes. The additional blood volume transferred during this time is known as placental transfusion. OCM is when we deliberately leave the cord intact for a period after birth, to allow this process to occur.

For all babies, the key principle is immediate assessment of the baby's condition after birth, to decide whether proceeding with OCM is appropriate and possible.

It is useful to have a traffic light system approach:-

- An absent HR: If the baby's heart rate is absent, the priority is resuscitation, therefore, the cord must be cut immediately and move to the resuscitaire for resuscitation.

- A HR < 100 with no or little respiratory effort- bag and mask ventilation can be administered, for instance from a nearby resuscitaire with an extended PEEP circuit; a neopuff™ circuit; or CPAP system on a bedside resuscitaire, if it is available. Otherwise, the OCM should be discontinued, and the baby transferred to resuscitaire for active management.

- A good HR with no or little respiratory effort: If the baby is gasping/ starting to establish respirations, with a good heart rate, monitor continually to ensure they continue to improve during OCM. Consider the use of a high flow delivery system / Vapotherm™ for on-going stabilisation in preterm babies during OCM, if the baby does not need any initial bag and mask ventilation.

For further information and resources see Appendix 12.5 and the network guideline https://neonatalnetworkssoutheast.nhs.uk/professionals/guidelines/tvw-guidelines/optimal-cord-management/

5.6 Normothermia

All babies born <34 weeks gestation

[Although aim for all babies born before 37 weeks (NHSE, 2023b)]

First temperature within an hour of birth

Within the normal temperature range 36.5-37.5 degrees centigrade

WHY

Preterm infants are at increased risk of hypothermia due to:-

- Large surface area to body mass ratio
- Decreased brown fat stores
- Greater body water content
- Reduced skin thickness
- Ineffective positioning ability
- Poorly developed metabolic mechanisms
- Reduced ability to maintain heat by peripheral vasoconstriction (NatPatSIP (2023))

The International Liaison Committee on Resuscitation (ILCOR) determined that the admission temperature of newly born, non-asphyxiated infants was a strong predictor of mortality and morbidity at all gestations and therefore deemed that temperature should be maintained between 36.5°C and 37.5°C after birth, through stabilisation and admission (Periman et al, 2015). Data also suggests an association between admission hyperthermia (>38°C) and adverse outcomes (Lyu et al, 2015).

Hypothermia has been found to increase the risk of :-

- Death
- Hypoglycaemia
- Metabolic acidosis
- Respiratory distress and acidosis
- Necrotising Enterocolitis
- Coagulation defects
- Intraventricular Haemorrhage (WEASHN, 2020)

WHAT

Staff
- Identification of at risk pregnancies/ babies

Environmental
- Turn off fans/ air con/ close windows
- Turn up the temperature of theatre/ delivery room (to 25 degrees for extreme preterm delivery (Fawke et al, 2021))
- Turn on resuscitaire heater- warm towels / hat
- Neohelp™ sterile plastic bag for Caesarean Section delivery/ Non-sterile plastic bag for other deliveries, if gestation is < 32 weeks.
- Activated transwarmer wrapped in sterile drapes if in theatre. No sterile draping for other deliveries.

Baby
- Place in bag and apply hat (<32 weeks gestation). Utilise heat source
- Dry / remove wet towels/ wrap in warm dry towels (If at least 32 weeks gestation). Ensure environment is warm, otherwise consider heat source

Parent
- Awareness of importance of normothermia
- Skin to skin (as appropriate)

It is important that babies have their temperature monitored regularly around birth, stabilisation and admission in order to ensure that normothermia is achieved and maintained.

For further information and resources see Appendix 12.6; Appendix 12.5

5.7 Maternal Breast Milk

All babies born < 34 weeks gestation

[Although aim for all babies born before 37 weeks (NHSE, 2023b)]

Should receive own mother's milk within 24 hours of birth

WHY

Maternal breast milk is the safest and most effective nutrition for preterm infants (WEASHN, 2020). The use of maternal breast milk for preterm infants

- reduces mortality rates
- reduces rates of sepsis and necrotising enterocolitis (NEC)
- improves neurodevelopmental outcomes
- lowers rates of bronchopulmonary dysplasia (BPD)
- lowers rates of retinopathy of prematurity (ROP)
- and leads to fewer hospitalisations in the first year after discharge compared to formula feeding (BAPM, 2020).

Due to ethical issues, only robust studies comparing feeding with formula versus donor breast milk have been undertaken (Brown et al, 2019). However these studies suggest that feeding with breast milk has major immuno-nutritional advantages for preterm or low birth weight infants (Brown et al, 2019).

Parker et al (2019) found that first milk expression within 8 hours was superior to delaying it till 9 to 24 hours when looking at duration of mother's milk provision for hospitalised infants.

The volumes of milk mothers express, as early as day 3 or 4 of life, are highly correlated with long term breastfeeding outcomes, supporting the idea that this early period is a critical window (BAPM, 2020).

WHAT

Babies born preterm (below 37 weeks gestational age) should receive their own mother's milk, ideally within 6 hours, but aiming always within 24 hours of birth (except in rare situations where there are contraindications to maternal breast milk (NHSE, 2023b)

Various tools have been utilised across the Network to achieve this element. These include using a "Golden Bowl" or "colostrum bag". These tools include all the elements a mother may require in order to do the early expressing of breast milk (See Appendix 12.7). It is important that perinatal teams work together to give consistent advice and support antenatally, intrapartum and in the postnatal period so that mothers are able to express breast milk ideally within two hours of birth (NHSE, 2023b). A training package/ on-going education for all staff and consistent messaging through "Q" cards/ posters will support this aim (See Appendix 12.7).

Mothers in established preterm labour with delivery likely within 2 hours and those awaiting an imminent planned Caesarean Section, can be supported to express ahead of delivery.

Breast milk can be administered as trophic feeds, buccally or used as mouth care.

An opportunity to have a delivery room cuddle or skin to skin after delivery increases the volume of breast milk achieved, as well as providing a positive experience for parents, at what can be a worrying time (BAPM, 2020)

5.8 Volume Targeted Ventilation

<34 weeks gestation and needing invasive ventilation

To be used in conjunction with synchronised ventilation as the primary mode of respiratory support

WHY
Using Volume-guarantee (VG) protects premature lungs from volutrauma and potentially barotrauma from unnecessary pressure being used to achieve ventilation. Triggered VG is preferred as infant-initiated breaths require less pressure to achieve the targeted volumes and therefore are likely to cause less lung injury through barotrauma (WEASHN, 2020)

When compare with pressure limited ventilation, VG reduces the chance of:
- Death
- CLD by 27%
- IVH (Grade 3/ 4) by 47% (NHSE, 2023b; WEASHN, 2020)

VG also decreases the risk of pneumothorax and hypocarbia (WEASHN, 2020)

WHAT

Set VG to 4- 6cms /kg (WEASHN, 2020).

Optimise the PEEP setting on the ventilator to 5- 6 cms H20 (to overcome potential atelectasis) (WEASHN, 2020).

Ensure good chest wall movement by adjusting the VG (WEASHN, 2020).

VG is calculated from the expiratory volume of the previous VG breath (to compensate for endotracheal tube leak).The ventilator will then use this information to adjust the pressure for the next breath (WEASHN, 2020).

Be mindful that excessive air leak (>60-70%) will hinder effectiveness of ventilation mode (WEASHN, 2020).

If synchronised ventilation with VG is not effective, consider high-frequency oscillatory ventilation (HFOV)(NICE, 2019)

For preterm babies who need invasive ventilation but VG and HFOV are not available or not suitable, consider synchronised intermittent mandatory ventilation (SIMV) (NICE, 2019)

Do not use synchronised pressure-limited ventilation such as assist control (AC), synchronised intermittent positive pressure ventilation (SIPPV), patient-triggered ventilation (PTV), pressure support ventilation (PSV) or synchronised time-cycled pressure-limited ventilation (STCPLV) (NICE, 2019)

PLEASE NOTE
Not currently recorded on Badgernet in a codified way, so not able to report on TVWNODN perinatal optimisation dashboard

For further information and resources see Appendix 12.8

5.9 Caffeine

Babies less than 30 weeks gestation or birth weight less than 1500g

Start within 24 hours of birth

WHY

Caffeine has been shown to have indirect neuro-protective effects in premature infants due to its impact on respiratory function, regulation in the brain and its ability to avoid white matter loss due to hypoxia (Yang et al, 2021).

Caffeine has been shown to reduce the risk of:-

- Death
- Disability
- Cerebral Palsy
- Cognitive delay (Moschino et al, 2020)

These results are based on current prescribing practice for apnoea of prematurity (Moschino et al, 2020).

WHAT

- Loading dose of 20 mg/kg of Caffeine Citrate (NICE, 2019)
- Followed 24 hours later by a maintenance dosage of 5 mg/kg once daily (NICE, 2019)
- Increasing up to 20 mg/kg daily if episodes of apnoea persist (NICE, 2019)
- Given to babies born at or before 30 weeks gestation (NICE, 2019)
- Given if the baby has a birth weight of less than 1500g (WEASHN, 2020)
- Started within 24 hours of birth (NHSE, 2023b)
- Consider stopping the Caffeine Citrate when the baby is 33 – 35 weeks corrected gestational age, if the baby is clinically stable (NICE, 2019; Yang et al, 2021).

Using a higher dose of Caffeine has been shown to have short term respiratory benefits but no proven impact on neurodevelopment. Higher than standard doses did however increase the incidence of cerebellar haemorrhage, epilepsy and neuro behavioural abnormalities at term (corrected gestational age)(Yang et al, 2021). Therefore the current standard dose of Caffeine is considered best practice.

The incidence of cerebral palsy, hearing damage and poor cognitive scoring was reduced if the caffeine was given within 2 days of birth (Yang et al, 2021) versus after that period. NHS England (2023b) however recommends best practice is that Caffeine Citrate is administered within 24 hours.

For further information and resources see Appendix 12.9

5.10 Perinatal Optimisation and Team Work

Team working within organisations has been proven to lead to an improvement in safety as well as productivity (BAPM, 2022). However, effective communication is a challenge in the multispecialty shift-based workplace. Mechanisms need to be in place to support cross speciality communication and joint perinatal decision making, such a handovers, huddle, MDT and team briefings, in order to promote patient safety and optimal quality of care (BAPM, 2022). A positive culture of teamwork, learning, sharing, good communication and pursuit of common goals throughout the perinatal pathway is important when considering the provision of perinatal optimisation (BAPM, 2023c).

All members of the perinatal optimisation team require recognition of their value, inclusion in the shared work, and encouragement to help shape the service as one single perinatal optimisation team with a single shared vision (BAPM, 2023c).

Take time to consider who the key stakeholders for these shared goals are in your unit?:

Core Team	**Additional Core**	**Other Members**
Parents	Receiving unit perinatal team	Pharmacists
Obstetricians	Transport team	Community Midwives
Midwives	Ambulance staff	Sonographers
Neonatologists/ Paediatricians	SONET	Maternity Support Workers
Advanced Neonatal Nurse Practitioners	Infant feeding team	Nursery Nurses
Neonatal Nurses		Antenatal Clinic staff
Theatre staff		Other Allied Health Professionals
Preterm Birth Clinic staff		Clerical staff
		Housekeeping staff
		Psychologists

For further information and resources see Appendix 12.10

5.11 Antenatal Counselling

Parents should meet with the obstetric and neonatal team for antenatal counselling (NHSE, 2023b). Utilising tools such as the network guideline on Extremes of Prematurity will support these conversations. A clear decision on active survival versus palliative comfort focused care is important, particularly for those fetuses on the edge of viability.

If active survival focused care is decided upon, the perinatal optimisation package of care should be discussed, and the evidence around each element.

Resources found in Appendix 12.12 could help professionals with these conversations.

If the woman needs an in-utero transfer, the emotional and social impact on her and her partner needs to be recognised. The rationale and its clinical indication should be explained, including networked pathways of care and implications for the neonatal outcome. Repatriation should also be mentioned at this early stage, so that parental expectations are appropriately managed.

Clear documentation of any conversations should be made within the woman's antenatal record (NHSE, 2023b). Providing the family with their first journey log card for perinatal optimisation (see Appendix 12.11 for an example) could also provide tangible evidence of the decisions made.

All available information on the receiving hospital including address and telephone number should be provided to the woman and her partner to minimise anxiety. Parents should be signposted to any appropriate additional information.

For further information and resources see Appendix 12.11; see Appendix 12.12

5.12 Accessing data

Audit and benchmarking are crucial in understanding the optimal delivery of standardised, evidence-based care and providing perinatal teams with means to compare their practice against evidence-based national guidance, analyse shortfalls in care, and ascertain solutions. (BAPM, 2023c)

Perinatal care providers should demonstrate continuing improvement by regular reassessment of the process and outcome indicators (NHSE, 2023b). These data can be accessed through a number of data sources including the National Neonatal Audit Programme (NNAP); the TVWNODN perinatal optimisation dashboard available via the Futures collaboration website; and through locally maintained databases.

Data completeness via electronic maternity and neonatal record systems is vitally important, and data quality should be monitored frequently (NHSE, 2023b).

Appendix 12.13 highlights the areas on neonatal Badgernet that need to be accurately completed for these data sources, and other resources.

6.0 Appendices

6.1 Place of Birth

Version 3 of the Saving Babies Lives Care Bundle (NHSE, 2023b) promotes a predict, prevent and prepare approach. This includes the provision of preterm birth clinics, and an assessment of all women at booking for risk of preterm birth.

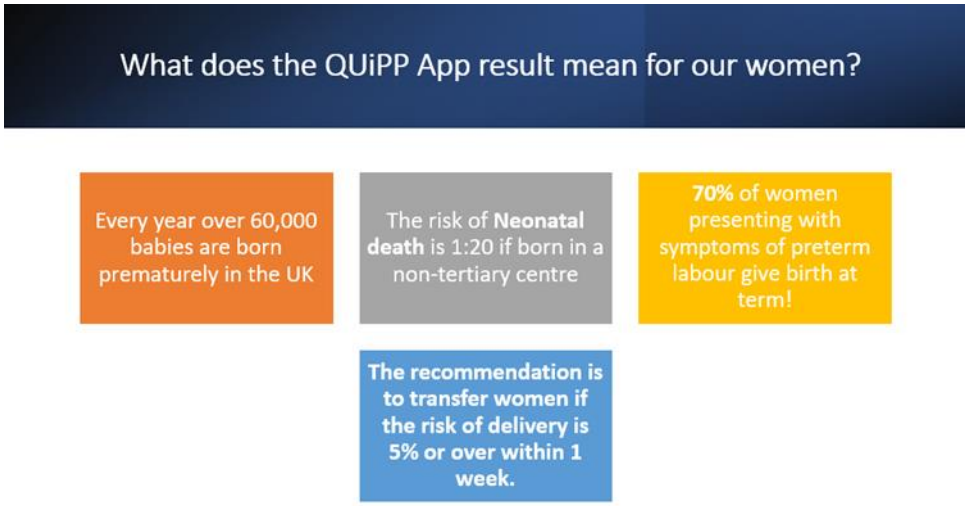
Available from:

NHS England » Saving babies' lives version three: a care bundle for reducing perinatal mortality

It is very important that women identified as being at increased risk of preterm birth are aware of the signs/symptoms of preterm labour and encouraged to attend their local maternity unit early if these occur (NHSED, 2023b). One reason that optimal antenatal corticosteroids are not achieved is due to inadequate time being available between doses or after the course, before the preterm birth occurs. This valuable priming of high risk women could potentially help improve the situation, as well as allow prompt attention to optimal place of birth.

One way of supporting decisions around a potential preterm labour is through the use of the **QUiPP App**. This tool uses medical history and fetal fibronectin or cervical length to give an individualised score for the risk of having a spontaneous preterm delivery.

Available from: https://www.bapm.org/pages/187-quipp-app-toolkit

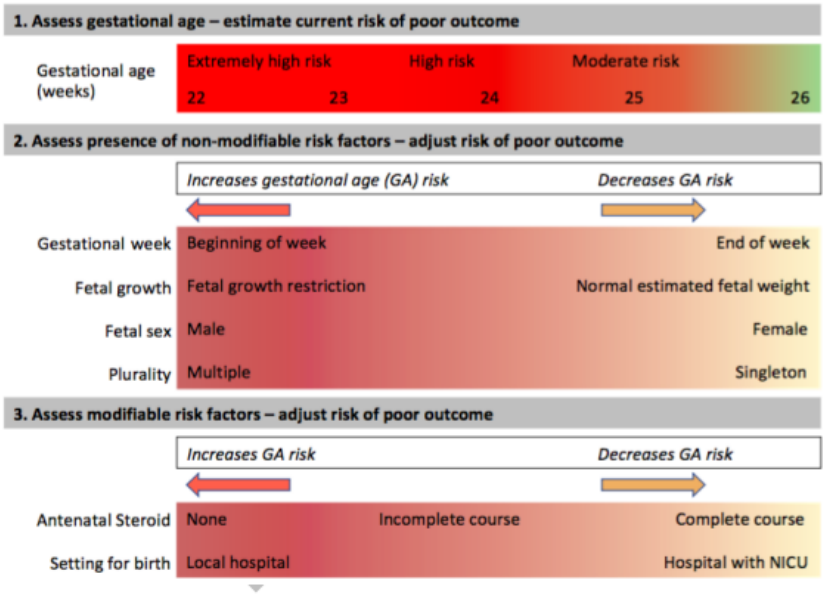


Network guideline for Management at the Extremes of Prematurity

https://neonatalnetworkssoutheast.nhs.uk/professionals/guidelines/tvw-guidelines/extremes-of-prematurity/

Resources from BAPM (2019) Perinatal Management of Extreme Preterm Birth before 27 weeks of gestation A Framework for Practice

Available from: https://hubble-live-assets.s3.amazonaws.com/bapm/file_asset/file/30/Extreme_Preterm_28-11-19_FINAL.pdf



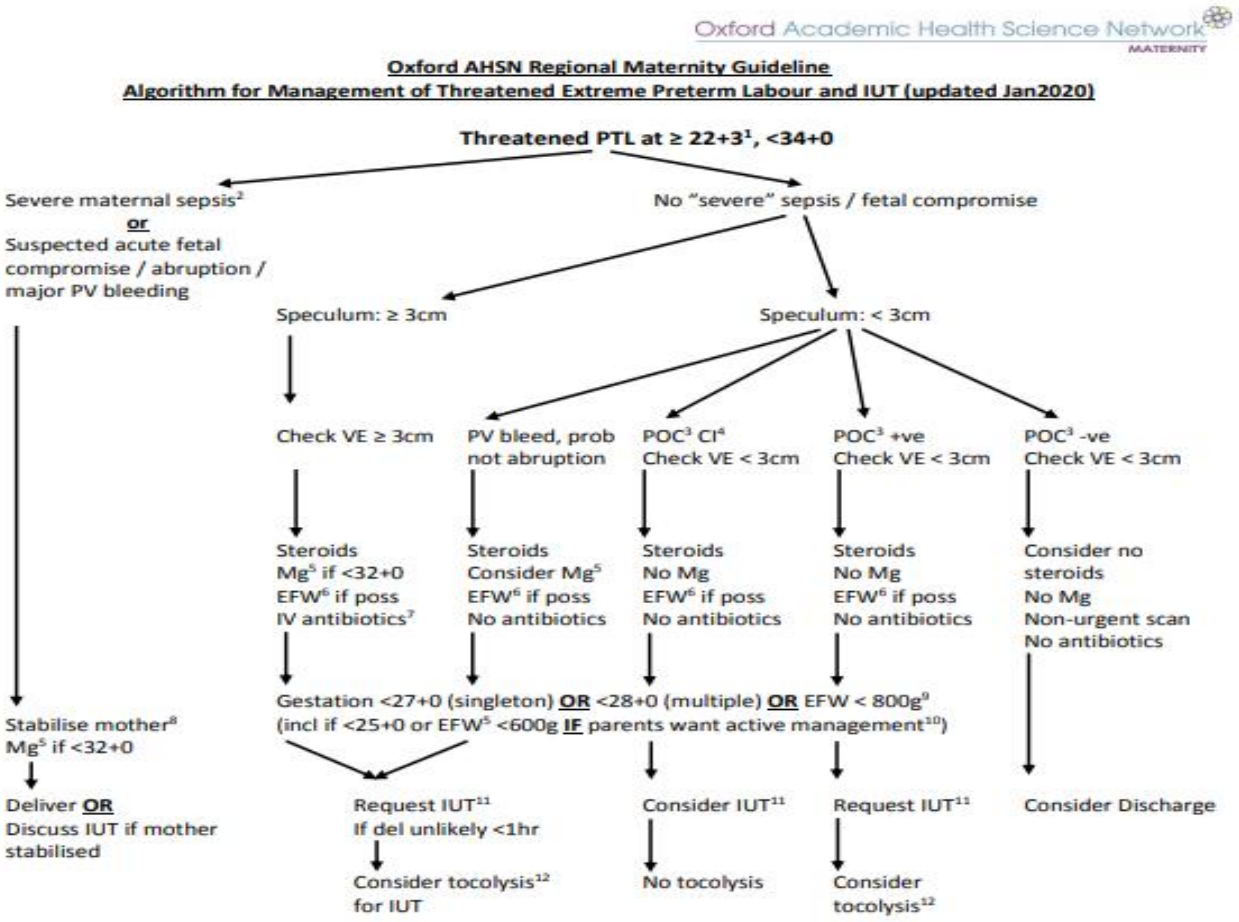
Useful Ethnographic for Parent Conversation in Suspected/ Presumed Preterm Labour Between 22-26 weeks Gestation (BAPM, 2019)

Parent Information Leaflets for those in suspected preterm labour at 22-25 weeks gestation

https://neonatalnetworkssoutheast.nhs.uk/professionals/guidelines/tvw-guidelines/babies-born-22-24-weeks-parent-leaflet/

https://neonatalnetworkssoutheast.nhs.uk/professionals/guidelines/tvw-guidelines/babies-born-25-weeks-parent-leaflet/

In- Utero Guidance for Management and Transfer –Thames Valley



Footnotes:

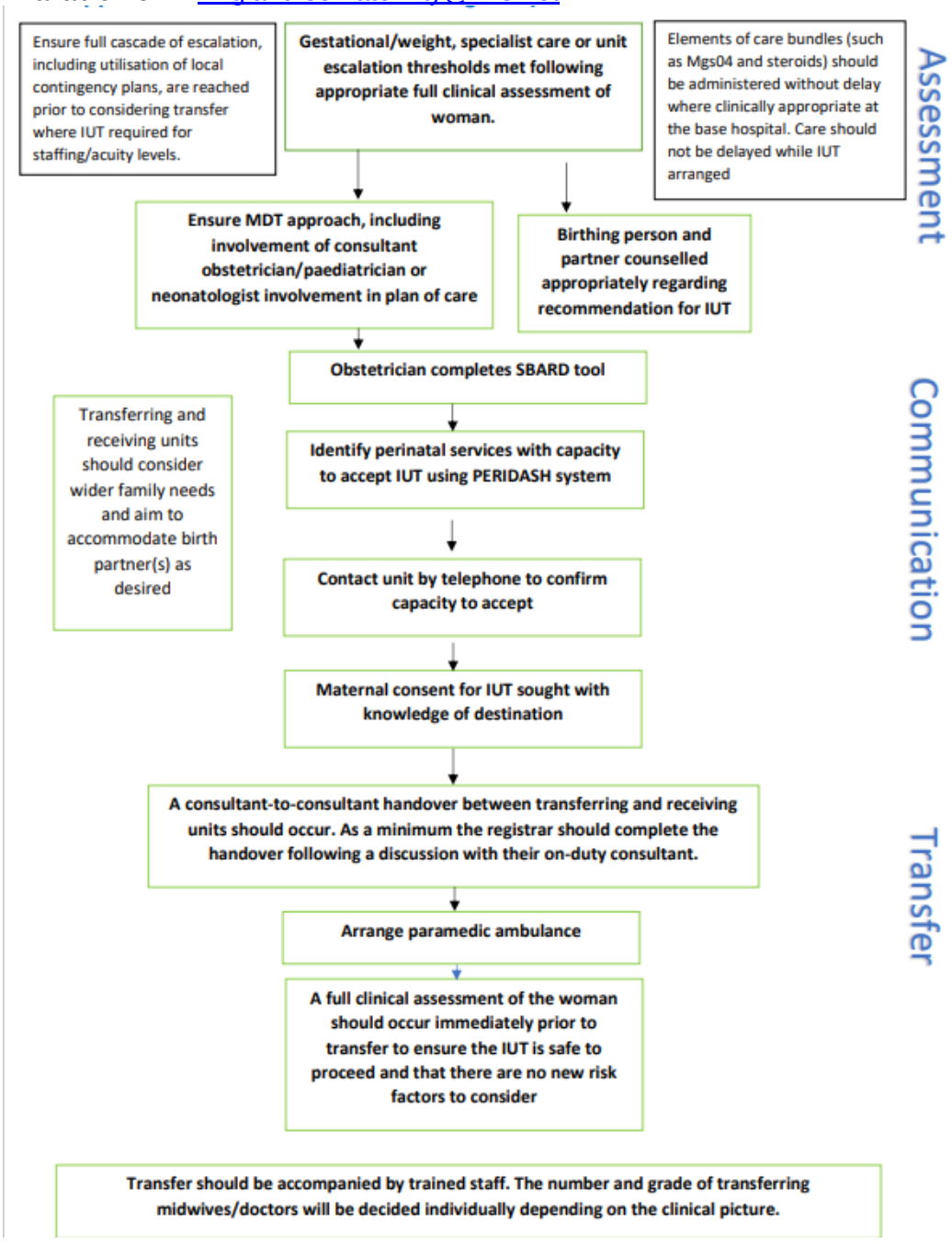
Dates according to CRL excl in IVF pregnancies. Note this gestation has been modified following new BAPM Guidelines. Active resuscitation for neonates <23+0 will be offered if there are good prognostic (eg >/+22+3, had steroids, delivery in Level 3). If there is uncertainty about the circumstances or the dates, call obstetric consultant at OUH.
Women potentially suitable for emergency cerclage (i.e. >16 weeks, no sepsis and with painless cervical opening) should be discussed with Level 3 FMU consultant.

1. Sepsis meeting criteria for local severe sepsis bundle
2. POC: Point of care test (e.g. fibronectin or equivalent) to assess likelihood of preterm delivery more accurately than history and examination
3. CI: contraindicated/ not recommended. Consider fFN usage if postcoital as false negatives unlikely
4. Mg: Magnesium bolus 4g (16mmol) Magnesium Sulphate as 20mls of 20% magnesium sulphate IV over 5 – 10 minutes if <32+0 weeks. Note PReCePT suggests 30 but clinical benefit up to 32 weeks.
5. EFW: estimated fetal weight +/-15% if possible
6. IV antibiotics. Follow unit antibiotic guideline; avoid co-amoxiclav. Prophylactic antibiotics only to be used in labour.
7. Stabilisation of acutely unwell mother beyond scope of this document
8. Criteria for delivery in Level 3 Neonatal Unit. If criteria not met, manage as per local preterm labour guideline
9. If time, offer discussion with paediatrician. Document any discussion regarding IUT with parents. Consider providing Thames Valley Neonatal Network patient information leaflets if available.
10. For IUT: try OUH first. 8-5pm call Delivery Suite (01865 221988/7), and specifically request to speak to the consultant obstetrician on Delivery Suite. From 5pm to 8am, hospital switchboard (01865 741166), with the request to speak to the obstetric consultant on call. DO NOT call neonatal unit or delivery ward manager first.
11. Tocolysis. Follow unit tocolysis guideline. Do not use nifedipine if magnesium has been given or is to be given

IUT Threatened Extreme Preterm Labour V3 updated Jan 2020 Author: Mr Lawrence Impey, Clinical Lead Oxford AHSN Maternity

In-Utero Transfer Flow Chart (Including TVW)

NHSE South East Regional Maternity Team (2023) *Principles of In-Utero Transfer*. NHS England. Available from:- England.sematernity@nhs.net



Useful resources on preterm labour/ birth produced by Oxford Mat Neo SIP

https://www.patientsafetyoxford.org/clinical-safety-programmes/safety-in-maternity/region-wide-guidelines/preterm-labour/

Episode 1 - Place of birth - Preterm Birth Optimisation | Podcast on Spotify

Useful resources on preterm labour/ birth produced by KSS Mat Neo SIP

PREM7 (padlet.com)

Cot Availability Links

SONET

https://www.sort.nhs.uk/SONeT/Aboutus/Liveneonatalcotandmaternitybeddashboard/Live-neonatal-cot-and-maternity-bed-dashboard.aspx

PERIDASH

https://forms.office.com/Pages/ResponsePage.aspx?id=kp4VA8ZyI0umSq9Q55Ctv-yzNCpq4Y5EnTOQQv7RSHhUN1laR0tFNzMwM1hVNU9SRlpHRjFBT1BGSy4u

Parent Information Resource

Transport Service - Neonatal Network South East (neonatalnetworkssoutheast.nhs.uk)

Patient and family (sort.nhs.uk)

6.2 Antenatal Steroids

https://www.patientsafetyoxford.org/wp-content/uploads/2022/12/Antenatal-corticosteroids-for-fetal-lung-maturation-evidence-behind-guideline-V1-FINAL-24-11-2022-Oxford-AHSN-Maternity-Network.pdf

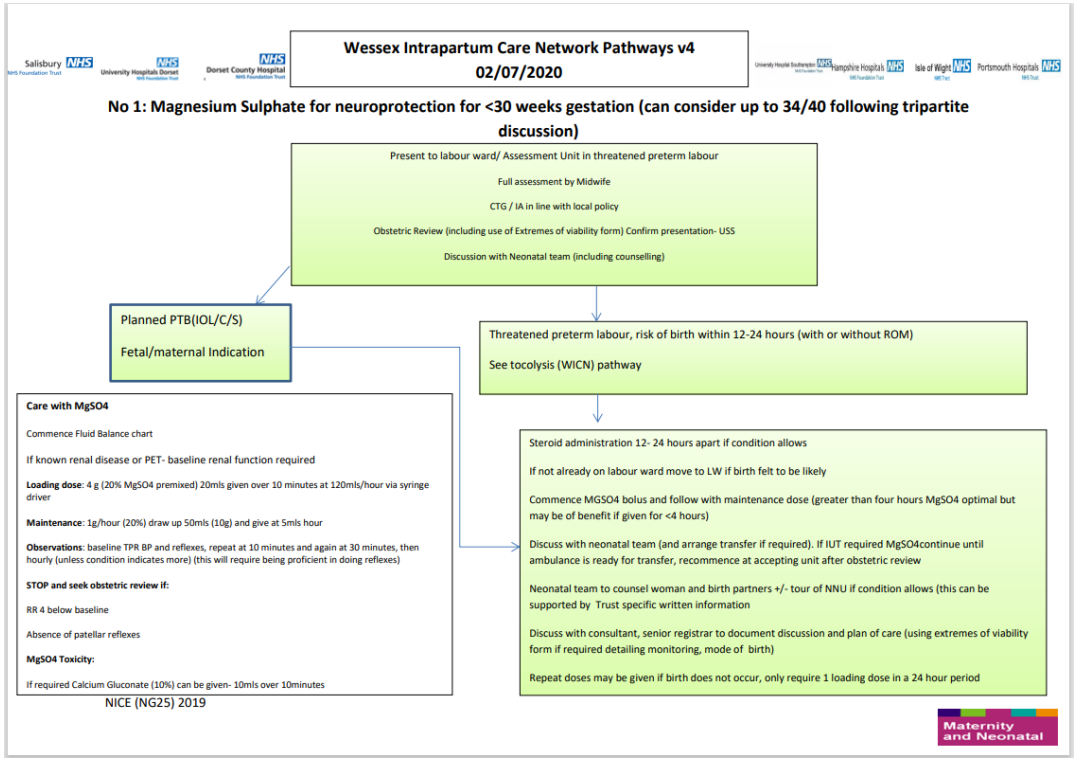
https://www.cochrane.org/CD004454/PREG_what-are-benefits-and-risks-giving-corticosteroids-pregnant-women-risk-premature-birth

https://www.rcog.org.uk/for-the-public/browse-all-patient-information-leaflets/corticosteroids-in-pregnancy-to-reduce-complications-from-being-born-prematurely-patient-information-leaflet/

6.3 Magnesium Sulphate

PReCePT QI Toolkit

https://www.ahsnnetwork.com/wp-content/uploads/2019/07/PReCePT-QI-Toolkit-2.3.pdf



Wessex Intrapartum Care Network Pathways v4
02/07/2020

No 1: Magnesium Sulphate for neuroprotection for <30 weeks gestation (can consider up to 34/40 following tripartite discussion)

Present to labour ward/ Assessment Unit in threatened preterm labour

Full assessment by Midwife

CTG / IA in line with local policy

Obstetric Review (including use of Extremes of viability form) Confirm presentation- USS

Discussion with Neonatal team (including counselling)

Planned PTB(IOL/C/S)

Fetal/maternal Indication

Threatened preterm labour, risk of birth within 12-24 hours (with or without ROM)

See tocolysis (WICN) pathway

Care with MgSO4

Commence Fluid Balance chart

If known renal disease or PET- baseline renal function required

Loading dose: 4 g (20% MgSO4 premixed) 20mls given over 10 minutes at 120mls/hour via syringe driver

Maintenance: 1g/hour (20%) draw up 50mls (10g) and give at 5mls hour

Observations: baseline TPR BP and reflexes, repeat at 10 minutes and again at 30 minutes, then hourly (unless condition indicates more) (this will require being proficient in doing reflexes)

STOP and seek obstetric review if:

RR 4 below baseline

Absence of patellar reflexes

MgSO4 Toxicity:

If required Calcium Gluconate (10%) can be given- 10mls over 10minutes

Steroid administration 12- 24 hours apart if condition allows

If not already on labour ward move to LW if birth felt to be likely

Commence MGSO4 bolus and follow with maintenance dose (greater than four hours MgSO4 optimal but may be of benefit if given for <4 hours)

Discuss with neonatal team (and arrange transfer if required). If IUT required MgSO4continue until ambulance is ready for transfer, recommence at accepting unit after obstetric review

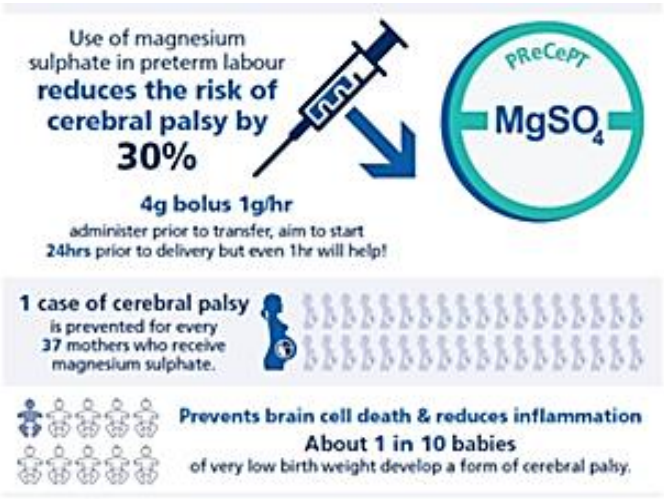
Neonatal team to counsel woman and birth partners +/- tour of NNU if condition allows (this can be supported by Trust specific written information

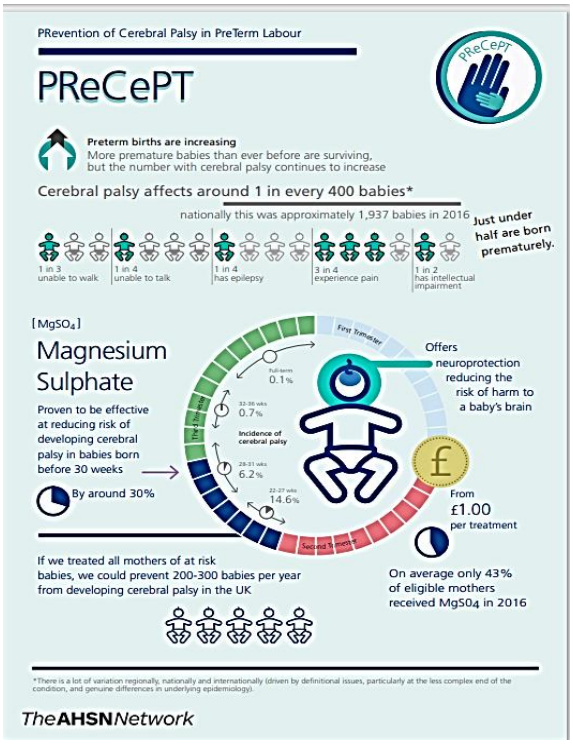
Discuss with consultant, senior registrar to document discussion and plan of care (using extremes of viability form if required detailing monitoring, mode of birth)

Repeat doses may be given if birth does not occur, only require 1 loading dose in a 24 hour period

NICE (NG25) 2019

Maternity and Neonatal





https://www.e-lfh.org.uk/programmes/prevention-of-cerebral-palsy-in-preterm-labour/

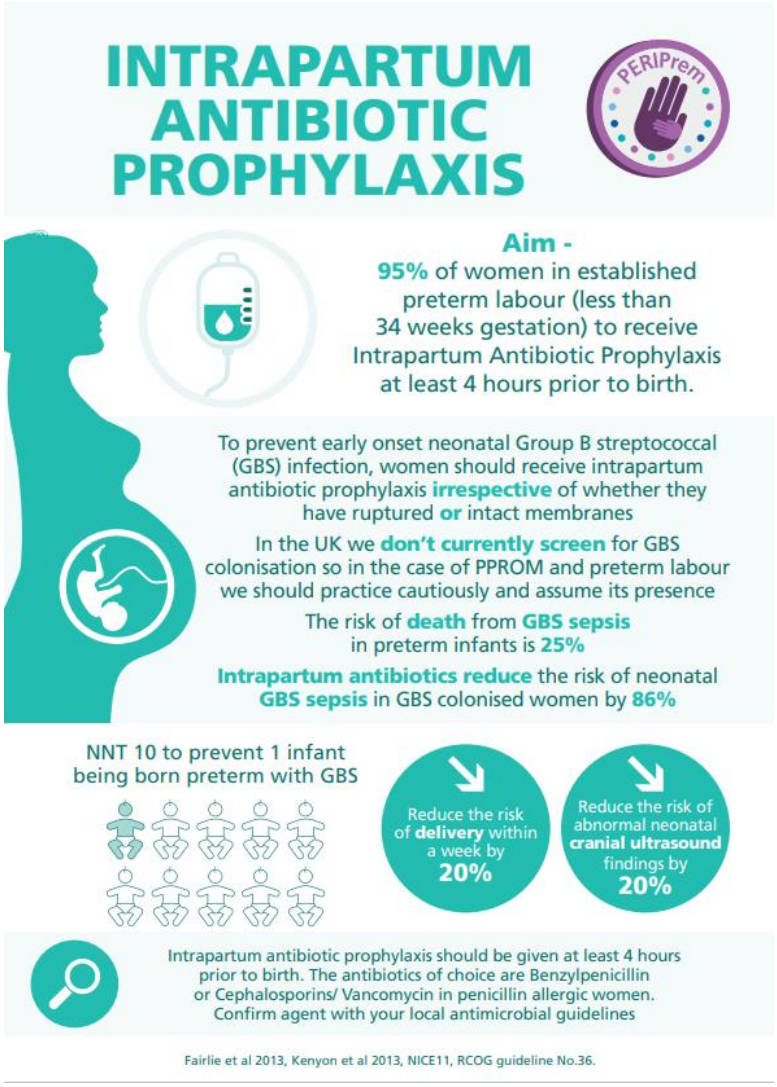
6.4 Intrapartum Antibiotics

NICE (2022) recommends:-

Allergies	Women without chorioamnionitis	Women with chorioamnionitis
No penicillin allergy	Use Benzylpenicillin.	Use Benzylpenicillin plus gentamicin plus metronidazole.
Penicillin allergy that is not severe	Use Cephalosporin with activity against group B streptococcus (for example cefotaxime). Use with caution. In April 2021 this was an off-label use of cephalosporins.	Use Cephalosporin with activity against group B streptococcus (for example cefotaxime) plus metronidazole. Use with caution. In April 2021 this was an off-label use of cephalosporins.
Allergies	**Women without chorioamnionitis**	**Women with chorioamnionitis**
Severe penicillin allergy	Consider: Vancomycin **or** An alternative antibiotic that would be expected to be active against group B streptococcus based on either sensitivity testing performed on the woman's isolate or on local antibiotic susceptibility surveillance data. In April 2021 this was an off-label use of vancomycin.	Consider: Vancomycin plus gentamicin plus metronidazole **or** An alternative antibiotic to vancomycin that would be expected to be active against group B streptococcus based on either sensitivity testing performed on the woman's isolate or on local antibiotic susceptibility surveillance data plus gentamicin plus metronidazole. In April 2021 this was an off-label use of vancomycin.

https://www.nice.org.uk/guidance/ng195/chapter/Recommendations#intrapartum-antibiotics

Other Quality Improvement Work Undertaken by West of England AHSN- PERIPREM



https://www.weahsn.net/our-work/transforming-services-and-systems/periprem/

6.5 Optimal Cord Management

RCOG https://www.rcog.org.uk/media/ahppgoek/sip-14.pdf

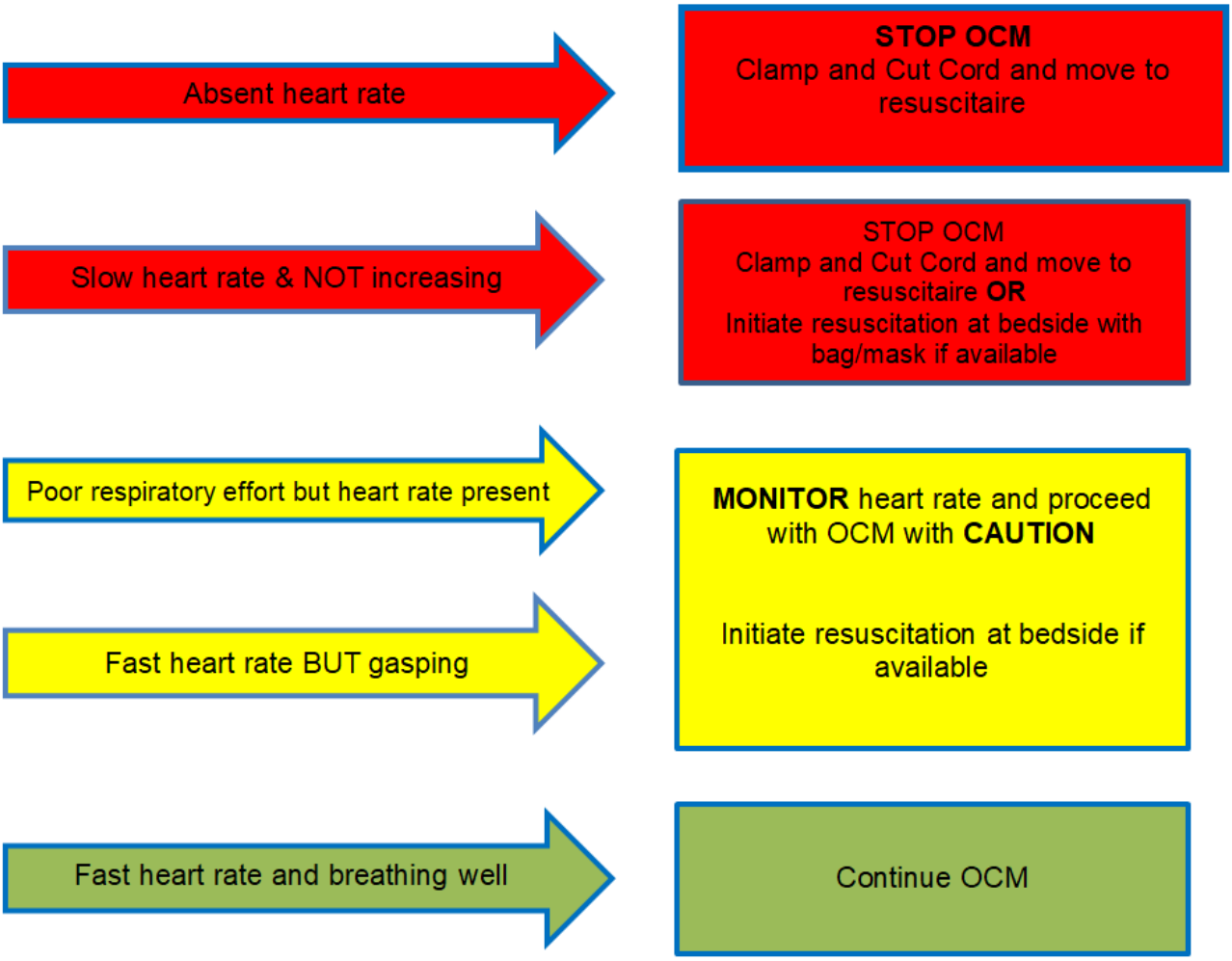
BAPM tool kit hubble-live-assets.s3.amazonaws.com/bapm/redactor2_assets/files/843/AO_Toolkit_FULLTOOLKIT_11-2-21.docx.pdf

Cochrane: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003248.pub3/epdf/full

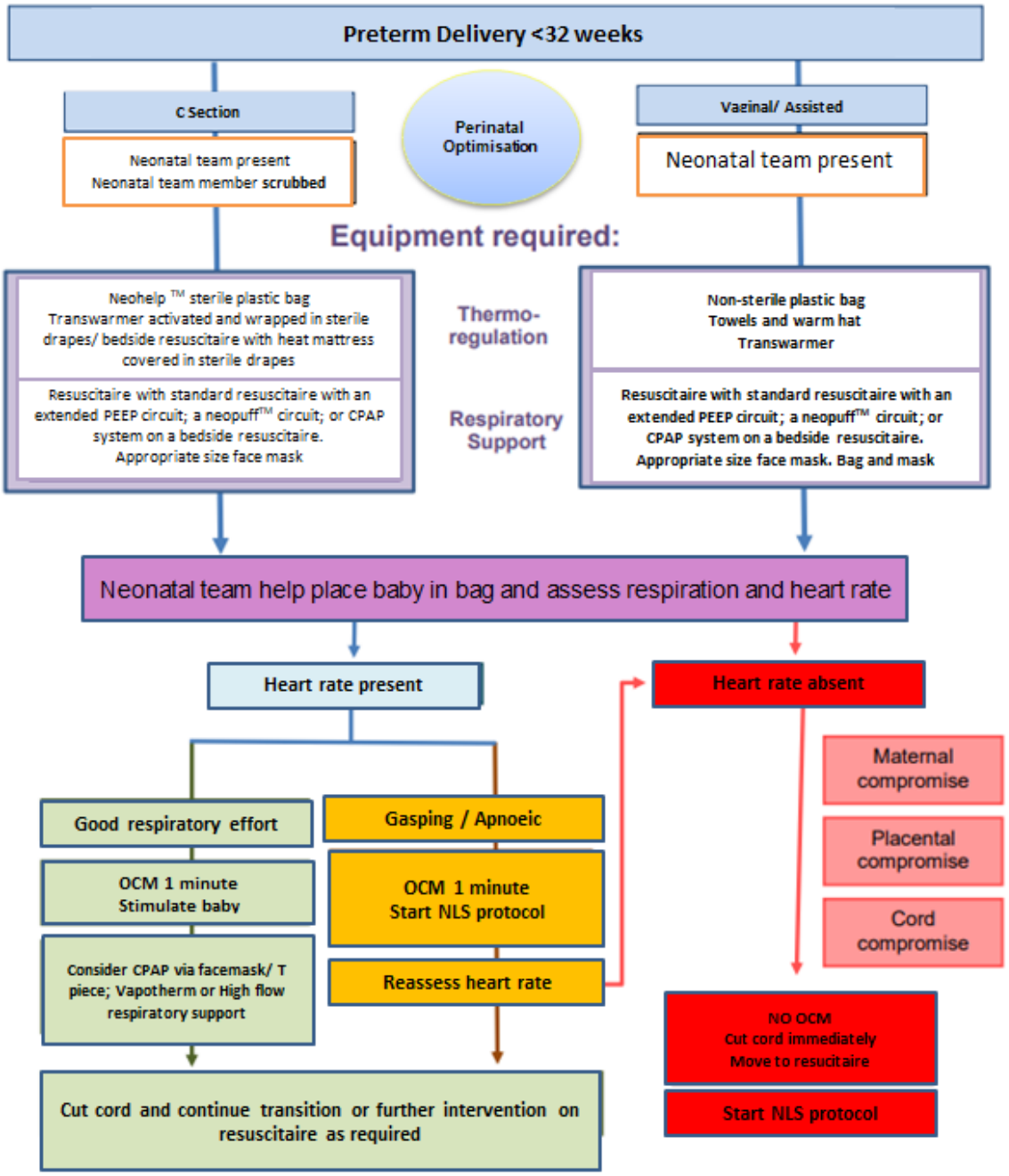
https://fn.bmj.com/content/fetalneonatal/105/3/292.full.pdf

Traffic Light System Approach to OCM from TVWNODN Guideline:-

https://neonatalnetworkssoutheast.nhs.uk/professionals/guidelines/tvw-guidelines/optimal-cord-management/



Example OCM Flowchart: Preterm Delivery



6.6 Thermoregulation

Example of what using the Neohelp™ would look like in practice
(Also relevant to OCM)

https://www.youtube.com/watch?v=RftXUwCpAN4

BAPM Normothermia Tool Kit
https://www.bapm.org/pages/105-normothermia-toolkit

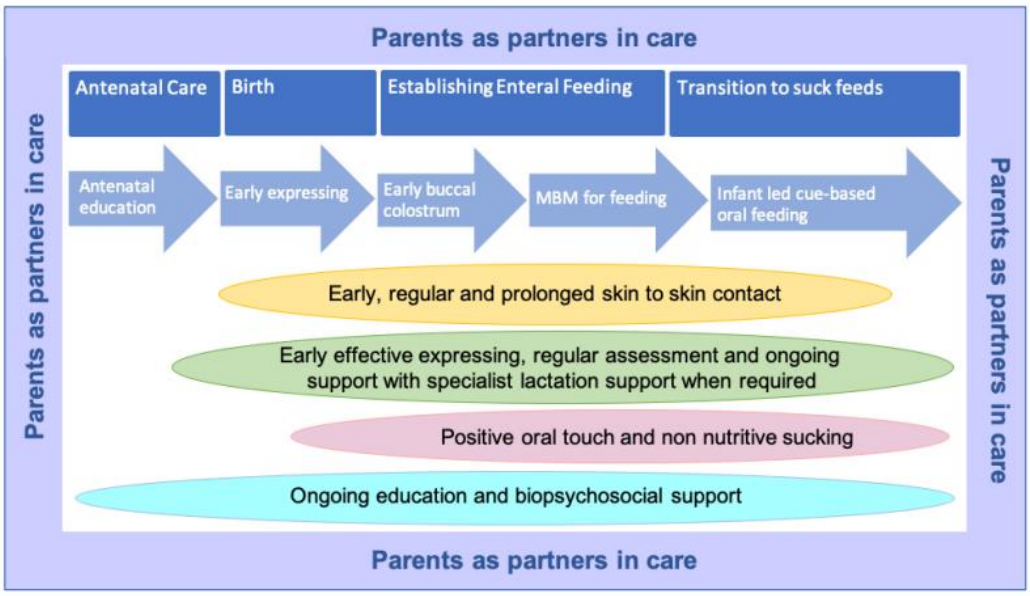
McCall EM, Alderdice F, Halliday HL, Vohra S, Johnston L. Interventions to prevent hypothermia at birth in preterm and/or low birth weight infants. Cochrane Database of Systematic Reviews 2018, Issue 2. [Accessed 19 July 2023].
https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD004210.pub5/full

Abiramalatha T, Ramaswamy VV, Bandyopadhyay T, et al. Delivery Room Interventions for Hypothermia in Preterm Neonates: A Systematic Review and Network Meta-analysis. JAMA Pediatr. 2021;175(9):e210775.

https://jamanetwork.com/journals/jamapediatrics/fullarticle/2780243

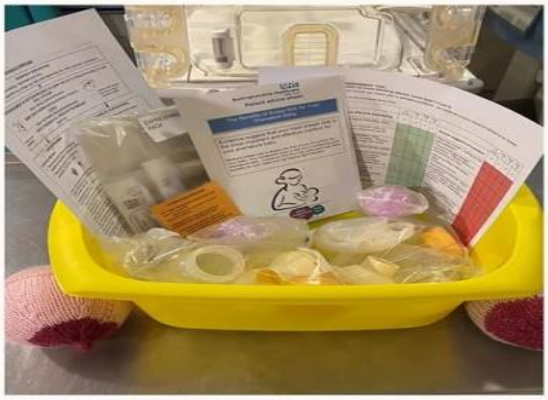
6.7 Maternal Breast Milk (not Donor EBM)

Optimising Early Maternal Breast Milk for Preterm Infants. A Quality Improvement Tool Kit
(BAPM, 2020) https://www.bapm.org/pages/196-maternal-breast-milk-toolkit

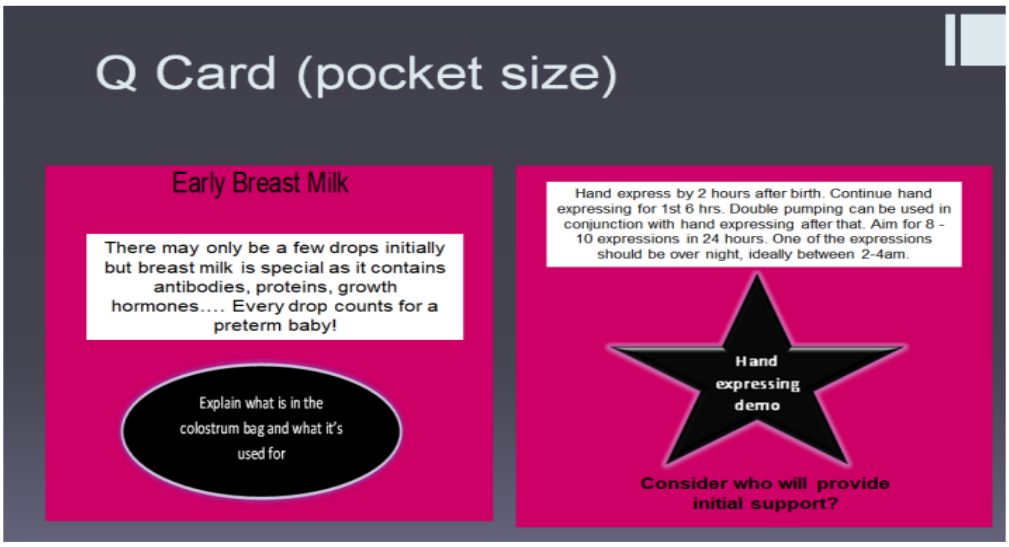


Quality Improvement ideas from the network:-

GOLDEN BOWL



- Bowl to wash up anywhere
- 10 golden tip cards
- Leaflet on preterm milk and why to express, link of video in leaflet
- How to express leaflet
- Syringes
- Bottles
- Pump sets
- Medela information about washing sets, funnel sizes
- Expressing Assessment Sheet



6.8 Volume Targeted Ventilation

PERIPrem resource

https://www.weahsn.net/wp-content/uploads/2021/01/02755-PERIPrem-VTV-FAQ.pdf

NICE Recommendation

https://www.nice.org.uk/guidance/ng124/chapter/Recommendations

6.9 Caffeine

PERIPrem resource

https://www.weahsn.net/our-work/transforming-services-and-systems/periprem/periprem-bundle-caffeine/

6.10 Perinatal Optimisation and Team Work

BAPM resources

https://www.bapm.org/resources/building-successful-perinatal-teams-doc

https://hubble-live-assets.s3.eu-west-1.amazonaws.com/bapm/file_asset/file/1494/BAPM_Service_Quality_Standards_FINAL.pdf

https://www.bapm.org/pages/209-qi-made-easy

Civility Saves Lives resources

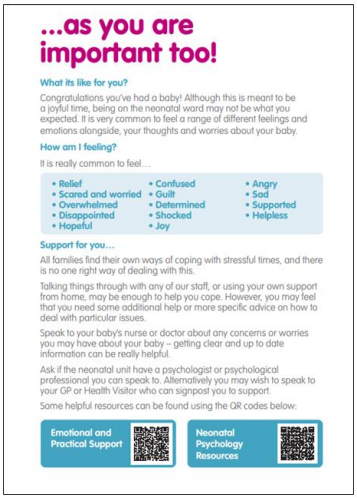
https://www.civilitysaveslives.com/resources

Reading the signals Maternity and neonatal services in East Kent – the Report of the Independent Investigation (2022)

Reading the signals: maternity and neonatal services in East Kent, the report of the independent investigation (print ready) (publishing.service.gov.uk)

6.11 Parent / Baby journey log (Example Cards)

Content added to reverse by specialist groups



6.12 Antenatal Counselling

Network Repatriation Framework

https://neonatalnetworkssoutheast.nhs.uk/professionals/guidelines/tvw-guidelines/repatriation-framework-and-guideline/

BAPM Resource (Appendix 3)

https://hubble-live-assets.s3.eu-west-1.amazonaws.com/bapm/file_asset/file/30/Extreme_Preterm_28-11-19_FINAL.pdf

Articles

Lemyre B, Moore G. (2017) Counselling and management for anticipated extremely preterm birth. *Paediatric and Child Health*. 22(6):334-34. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5804811/

Morgan A, Mendonça M, Thiele N et al (2022) Management and outcomes of extreme preterm birth. *BMJ* 376. https://www.bmj.com/content/376/bmj-2021-055924

https://www.mybirthmychoice.co.uk/wp-content/uploads/2021/10/Helping-parents-to-understand-extreme-preterm-birth.pdf

6.13 Accessing Data

NNAP online

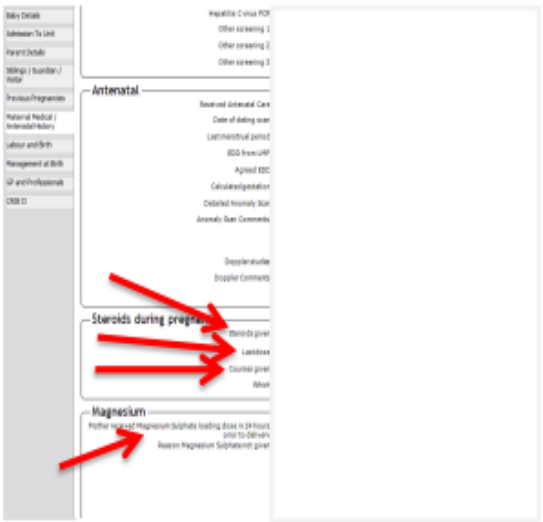
https://nnap.rcpch.ac.uk/default.aspx

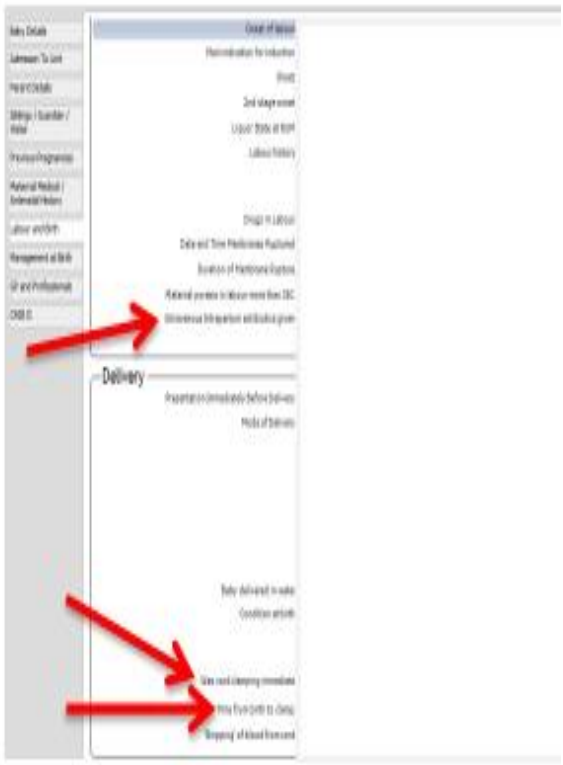
Link to Futures Collaboration website for access to TVW NODN Perinatal Optimisation Database

https://future.nhs.uk/TVW_Neo_ODN/view?objectId=135784613

Areas to complete on neonatal Badgernet for perinatal optimisation

From Badgernet Admission Pages





From Nursing Daily Summary

6.14 Proforma to Aid Data Collection

THAMES VALLEY & WESSEX NEONATAL NETWORK

Thames Valley & Wessex Operational Delivery Networks (Hosted by University Hospital Southampton NHS Foundation Trust)

PREM 7+ (Perinatal Optimisation) Proforma

Checklist to be completed for all births less than 34 weeks gestation and must accompany the baby/ babies to the neonatal unit/ receiving unit

Gestation: /40 Date of Birth: Time of Birth: Birth Weight: g	Antenatal Scan Concerns? .... Parents counselled re Preterm birth/ optimisation: Yes ☐ No ☐ Other concerns?	Patient Sticker
Right place of birth All babies born in appropriate settings for their gestation		< 27 weeks gestation in a NICU: Yes ☐ No ☐ < 28 weeks gestation in a NICU if multiples: Yes ☐ No ☐ < 800g gestation in a NICU: Yes ☐ No ☐ Unable to achieve? Why? Remember to complete exception report ☐
Steroids To be offered to all women before 34 weeks with threatened labour		Dexamethasone ☐ Betamethasone ☐ 1st dose: Date: ..... Time: ..... 2nd dose: Date: ..... Time: ..... Further dose: Date: ..... Time: ..... (<34/40 and dose given > 7 days ago) Unable to achieve? Why?
Magnesium Sulphate To be offered to all women before 30 weeks with imminent or planned birth [Consider for 30+0 - 33+6 (NIHSE, 2023b)] Loading dose plus a minimum of 4 hour infusion within 24 hours of birth		Loading dose: Date ..... Time..... Further dose: Date ..... Time ..... Date ..... Time ..... Unable to achieve? Why?
Intrapartum Antibiotic Prophylaxis To be offered to all women in established labour before 34 weeks [Consider up to 36+6 (NIHSE, 2023b)]		Time when in **established** labour: Date..... Time..... Name of antibiotic given..... 1st dose: Date: ..... Time: ..... 2nd dose: Date: ..... Time: ..... Unable to achieve? Why?

THAMES VALLEY & WESSEX NEONATAL NETWORK

NHS Thames Valley & Wessex Operational Delivery Networks (Hosted by University Hospital Southampton NHS Foundation Trust)

Optimal cord management For all babies before 34 weeks [Although aim for all babies born before 37 weeks (NHSE, 2023b)] Minimum of 1 minute before clamping cord	OCM Yes ☐ No ☐ How long: Minutes..... Seconds ..... Unable to achieve? Why?
Temperature Normal temperature range (36.5-37.5°C) for all babies before 34 weeks [Although aim for all babies born before 37 weeks (NHSE, 2023b)]	Temperature within 1 hour of birth: ..... °c Skin to skin: Yes ☐ No ☐ Unable to achieve? Why?
Breast milk Maternal breast milk to be received within 24 hours of birth for all babies before 34 weeks [Although aim for all babies born before 37 weeks (NHSE, 2023b)] Ideally within 6 hours	Discussion on benefits of MBM: Yes ☐ No ☐ Expressing demonstrated: Yes ☐ No ☐ Early colostrum collection: Date..... Time ..... Colostrum given to baby as trophic feed/ mouth care/ buccal application: Date .....Time..... Unable to achieve? Why?
Volume Targeted Ventilation As the primary mode of respiratory support Used in conjunction with synchronised invasive ventilation	Invasive ventilation needed: Yes ☐ No ☐ Volume guarantee applied: Yes ☐ No ☐ Was VG primary mode of respiratory support: Yes ☐ No ☐ Unable to achieve? Why?
Caffeine For all babies before 30 weeks gestation or < 1500g Start within 24 hours of birth	Loading dose: Date: .....Time: ..... Next dose: Date: .....Time: ..... Unable to achieve? Why?

ENSURE ALL DATA ADDED ACCURATELY ON TO NEONATAL BADGERNET