North East and North Cumbria
Local Maternity and Neonatal System

NENC LMNS Management of Preterm Birth Clinical Guideline.

Including:

- **Threatened preterm labour**
- **Established preterm labour**
- **Planned preterm birth**

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Applicable to:	All Trusts in the NENC LMNS geographical area: This guideline is for all maternity staff: Obstetric consultants, all other obstetric doctors, Midwives and, Ultrasonographers.
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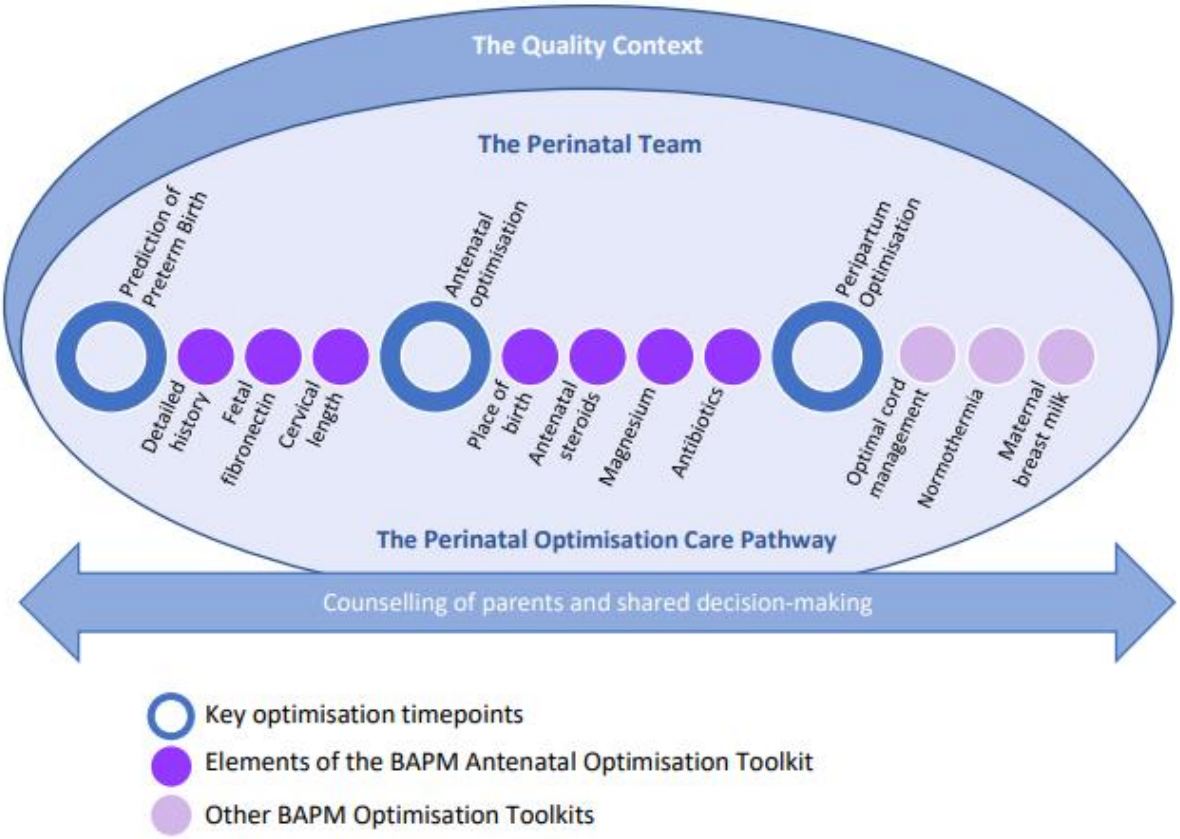
**Although the term "women" and new "mums/mothers" is used throughout this document, we recognise that not all birthing people identify as such.*

Contents

1. Introduction

Preterm birth (PTB) is a common complication of pregnancy, comprising around 8% of births in England and Wales. It is the most important single determinant of adverse infant outcome with regards to survival and quality of life. Babies born preterm have high rates of early, late, and post-neonatal mortality and morbidity. PTB is estimated to cost health services in England and Wales £3.4bn per year.

There are many well-established evidence-based antenatal interventions to improve preterm outcomes. 'Perinatal optimisation' refers to the process of reliably delivering these interventions in the antenatal, intrapartum and neonatal period. The British Association of Perinatal Medicine has created four toolkits (antenatal optimisation, optimal cord management, normothermia and maternal breast milk) to support the delivery of these initiatives, and together, these make up the 'Perinatal Optimisation Care Pathway'.



2. Guideline Scope

The aim of this guideline is to support staff in providing care based on best practice and best available evidence. It is intended for all health professionals involved in the care of women who present with signs and symptoms of preterm labour (PTL), or those requiring medically indicated preterm delivery.

Management strategies for prevention of preterm birth in 'at risk' women are addressed separately in local Preterm Prevention Clinic Guidelines.

3. Extreme preterm birth <24 weeks

Survival of extremely preterm infants has increased steadily since 2006 with greater willingness to offer neonatal intensive care.

Guidance from the British Association of Perinatal Medicine (BAPM) suggests neonatal stabilisation may be considered for babies born from 22+0 weeks of gestation following assessment of risk and multiprofessional discussion with parents. This is not appropriate for all infants and the decision to offer survival focussed care (rather than comfort focussed care) needs to be made after counselling from a Neonatal Consultant in a level 3 unit considering all risk factors. At gestations under 23 weeks, this discussion should take place prior to antenatal optimisation, as interventions would usually be offered only when there has been a decision for active (survival focused) care, rather than palliative (comfort focused).

There is regional consensus from the Northern Neonatal Network that at 22-22+6, women wishing for active intervention can be considered for in utero transfer to a level 3 unit. Further counselling can then take place with antenatal optimisation being offered from 22+0 weeks if there is a decision for survival focussed care. At under 23 weeks, antenatal optimisation should not be commenced prior to parental multidisciplinary counselling in the level 3 unit.

Critical decisions to offer active (survival focused) neonatal care at gestations below 24 to 25 weeks, do not imply that the obstetric team will enact active obstetric interventions such as CTG monitoring or caesarean section (CS). This is a separate critical decision to be discussed and agreed on a case-by-case basis by the multidisciplinary team.

Appendix 1 expands upon the Obstetric principles of care at 22-22+6 weeks (counselling re neonatal survival, obstetric intervention, use of CS, fetal monitoring) and can be used to help clinicians when planning intrapartum care at extreme preterm gestations.

4. Diagnosis and Management of PPROM

PPROM before 37 weeks' gestation complicates up to 3% of all pregnancies but is associated with 30 – 40% of preterm deliveries[12.] PPROM can result in significant neonatal neurodevelopmental morbidity and mortality, primarily as a result of prematurity, cord prolapse and pulmonary hypoplasia. Maternal risks include chorioamnionitis, need for manual removal of placenta and maternal death (UKOSS 2023).

The diagnosis and management of women with PPROM who are not in labour is addressed in the flowchart 'Suspected preterm pre labour rupture of membranes < 37 weeks' (Appendix 2):

- In women who report symptoms suggestive of PPROM, a sterile speculum examination should be offered to look for pooling of amniotic fluid and take HVS.
- If pooling of amniotic fluid is noted, no further diagnostic tests are required.

- If pooling of amniotic fluid is not noted (and there is a good history of PPROM), consideration should be given to performing a point of care test (Amnisure - placental alpha microglobulin-1). If this is negative, the woman should be reassured and discharged.
- The role of ultrasound assessment of amniotic fluid volume is unclear in the diagnosis of PPROM. USS confirming oligohydramnios may be useful to support the clinical diagnosis of PPROM and therefore may be considered on an individual basis if point of care testing is not available.

Diagnostic tests for PPROM are not appropriate if the woman is clearly in PTL. Diagnostic tests such as cervical length measurement and actim partus (AP) are not suitable in women who have ruptured membranes.

RCOG Green Top Guideline No. 73 (2019) states that where PPROM has been diagnosed >23+0 weeks of pregnancy, there is a 45-50% miscarriage or spontaneous preterm birth in the first week after PPROM, 70-75% will deliver by two weeks and 80-85% or more within 1 month**. The mean latency between PPROM and delivery remains constant at 7 days when it occurs between 24+0 – 28+0 (median 8 – 10 days) then shortens to 5 days at 31+0 .**

- If confirmed PPROM – admit for at least 48 hours.
- Observe for infection/preterm labour.
- A combination of clinical assessment, maternal blood tests (C-reactive protein and white blood cell count) and measurement of fetal heart rate using cardiotocography should be used to diagnose chorioamnionitis in women with PPROM: these parameters should not be used in isolation.
- Decision to deliver if suspected sepsis should be made by a Consultant Obstetrician
- Decision to offer outpatient management following a period of inpatient care should be made on an individual basis by the obstetric consultant, taking into account past obstetric history, support at home and distance from the hospital.
    - Retrospective cohort studies have found no differences in maternal or neonatal outcomes when planned home versus hospital-based care was compared >24+0[13].
    - However, as quoted in the RCOG Green Top Guideline No 73, a retrospective cohort study[14] of women with PPROM who had planned home care found that:
        - when **PPROM occurred <26+0**
        - with a **non-cephalic presentation** and
        - **ultrasound confirmed oligohydramnios**,

      there was an increased risk of complications (placental abruption, umbilical cord prolapse, fetal death and delivery outside hospital). The authors concluded **that hospital-based care should be recommended to women with all three of these features**.
- Prolonged in-patient management may also be considered if the patient lives far away from level 3 care (eg Cumbria) and has experienced PPROM at <30 weeks.

- If no maternal or fetal concerns, induction of labour is usually recommended at 37+0 weeks.
- For women who are known GBS carriers, delivery should be offered at 34+0 weeks[1]. Patient to be counselled by consultant.
- Women with a history of **recurrent genital herpes** should be started on **prophylactic antiviral medication** (see regional HSV guidance). A neonatal alert should be completed on badgernet.

Considerations for women presenting with PPROM at <23 weeks

A UK Obstetric Surveillance System (UKOSS) survey of all pregnancies affected by PPROM 16+0 to 22+6 weeks' gestation in the UK over 18 months 2019-2021, found that when expectant management was chosen, 39% deliver within 7 days (27% in the first 72 hours). A further 21% will deliver in the second week following PPROM, and an additional 16% will deliver in the third week.

Women presenting with PPROM <23 weeks gestation should be counselled by a senior obstetrician / consultant experienced in managing such pregnancies. Risks to both mother and fetus should be discussed.

Maternal risks

- Sepsis (12% UKOSS)
- Surgical removal of placenta (20% UKOSS)
- Death (0.6% UKOSS)

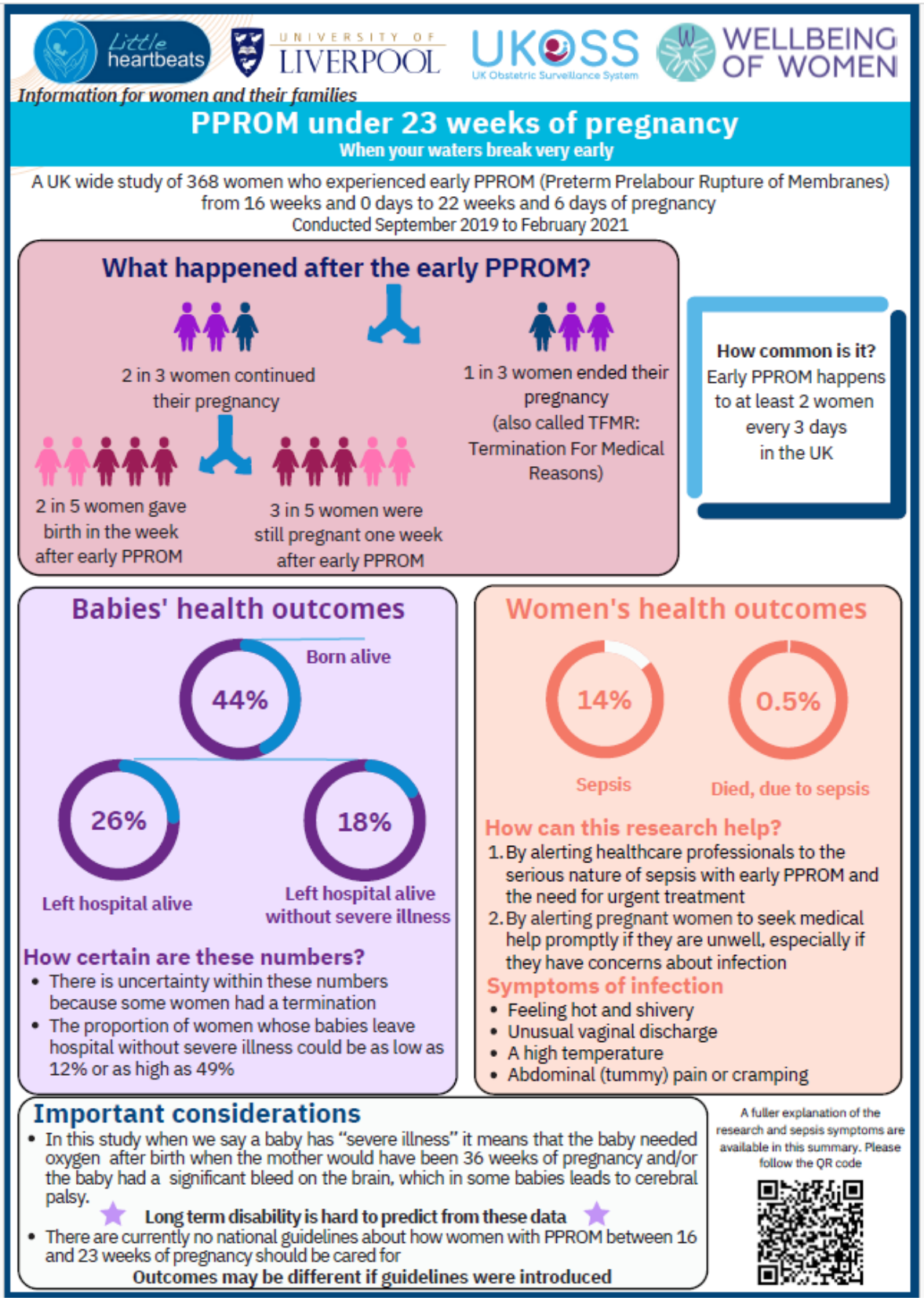
Fetal risks

- Infection
- Pulmonary hypoplasia and subsequent respiratory distress
- Limb contractures
- Miscarriage
- Preterm delivery
- Neonatal mortality

Pregnancy risks

- Preterm labour
- Cord prolapses
- Placental abruption

The following infographic may be useful when counselling women who have experienced PPROM at <23 weeks.



5. Threatened preterm labour (TPTL)

Definition of preterm labour

Preterm labour can be defined as regular painful contractions leading to cervical dilatation before 37 weeks gestation. However, preterm labour can be relatively asymptomatic and so clinicians need to have a high index of suspicion when women present with symptoms such as vaginal discharge, antepartum haemorrhage, urinary tract symptoms etc.

Initial assessment

Where a woman presents and preterm labour is suspected, a history should be taken and the following examinations and investigations should be performed. The woman should be kept informed throughout the process. The findings and plan of care should be documented in the maternal records.

The best diagnostic tests for TPTL is transvaginal US to measure cervical length (CL) and use of the QUiPP App. The QUiPP app (www.quipp.org) is a clinical decision-making tool that can use CL to help clinicians determine the risk of preterm birth in women with symptoms of threatened preterm labour. It is acknowledged that many units will not have 24 hour access to CL scanning. Actim Partus is an alternative point of care test which can be used to determine risk in women presenting with TPTL.

For women with signs or symptoms of suspected preterm labour **<33^{+6} diagnostic testing is recommended**[3]. This allows for antenatal optimisation; transfer to appropriate place of birth and administration of corticosteroids, magnesium sulphate and antibiotics where appropriate.

- Maternal history should include:
    - Previous obstetric and medical history
    - History of present pregnancy including gestational age
    - Frequency and strength of contractions/presence of abdominal or back pain
    - History of any vaginal loss (blood/liquor/discharge)
    - Symptoms of systemic illness
    - Urinary/bowel symptoms
    - Fetal movements
- Maternal pulse, BP and temperature, respiratory rate and oxygen saturations.
- On abdominal examination, the fundal height should be estimated and the presenting part determined. The presence of uterine or renal angle tenderness should be recorded. The frequency and duration of any uterine contractions should also be noted.
- The fetal heart should be auscultated.

- Ultrasound scan to confirm presentation.
- If the gestational age is ≥26 weeks CTG monitoring should be commenced. At <26 weeks there should be a discussion between a senior obstetrician and the patient regarding fetal monitoring.
- Actim Partus (AP) testing should be performed on women presenting with symptoms of threatened preterm labour, unless there is a clear contraindication.
- A speculum examination **(without gel – use water only)** should be performed in order to:
    - Assess cervical effacement and dilatation
    - Assess for evidence of PPROM
    - **Take swab for AP** & consider HVS
- **Gel should not be used to lubricate the speculum as it may affect the AP results; water should be used instead.**
- Digital examination should be avoided if possible as this may increase the risk of infection. However, a digital examination can be done after a speculum examination if the extent of cervical examination cannot be assessed on speculum examination.
- The following investigations should be performed:
    - Blood for FBC, G+S and CRP
    - Urine dipstick analysis +/- MSU
    - TV USS Cervical length (if available)

Use the 'Symptomatic' function in the QUiPP app to calculate the risk of delivery.

QUiPP App

The QUiPP app is a decision support tool that uses medical history and cervical length to give an individualised risk of having a spontaneous preterm delivery. There are 2 functions within the app (screening in asymptomatic vs symptomatic women) and the correct function should be selected. The app is free to download on Apple or Android and it is also available to use online at www.quipp.org

If CL measurement is available, management should be dependent on QUiPP risk and location:

- If the **risk of delivery within 1 week is ≥5%, in utero transfer (if required) and antenatal optimisation are recommended.**
- If the probability of delivery within 1 week is <5% - low chance of spontaneous preterm birth. Reassure woman and consider alternative cause of abdominal pain.

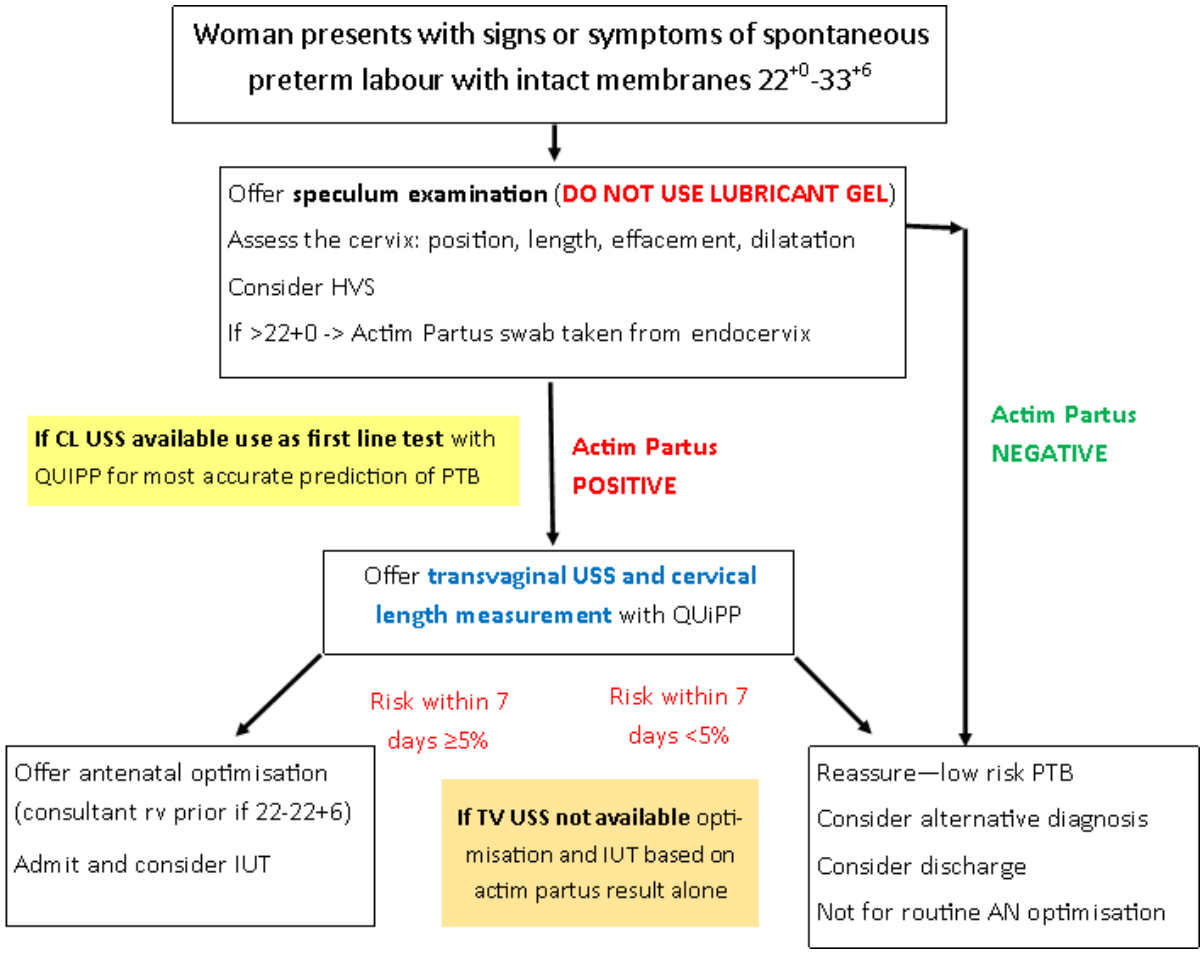
Geographical location should be taken into account when making decisions about in utero transfer based on risk of delivery.

- If **transfer duration is > 1 hour** (eg transfers from Cumbria), units may wish to consider transfer when **risk of delivery in 1 week is ≥1%**
- These women would be transferred for observation only and antenatal optimisation would not be recommended in this group.

The most accurate risk assessment of TPTL is achieved using cervical length measurement and calculation of QUiPP risk.

If CL measurement is not available, a positive actim partus (AP) test should be considered as high risk for delivery in the next 7 days. In utero transfer is indicated if required and antenatal optimisation should be commenced.

Units with limited access to cervical length scanning may **consider using actim partus as an initial POC test and then focus CL scanning on those who have a positive AP result**.



Actim Partus testing

Result should be confirmed **AT 5 MINUTES only**

⇒ Negative result (one blue line)

⇒ Positive result (two blue lines) only if visible **BEFORE OR AT 5 MINUTES**

After 5 minutes there is a higher chance of false positive

Contraindications to AP use:
>3cm dilated
Moderate/heavy PV bleed
Higher order pregnancy – triplets+
Ruptured membranes
Cervical stitch placed in last 6 weeks
<22 weeks
If there is a history of genital herpes, women who meet the threshold for antenatal optimisation should also be commenced on prophylactic antiviral medication to reduce the risk of active lesions at delivery (see regional Herpes guideline).

6. Antenatal Optimisation

Antenatal optimisation can be summarised using the acronym S.T.A.M.P.E.D.

S. **Steroids:** if <34+0. Give so that course is completed around 24h before birth and not more than 7 days before birth. Benefit remains if given <24h, if birth is imminent.

T. **Transfer:** <30+0 weeks (Gateshead & Carlisle <32+0), any EFW <1250g → Level 3 NNU

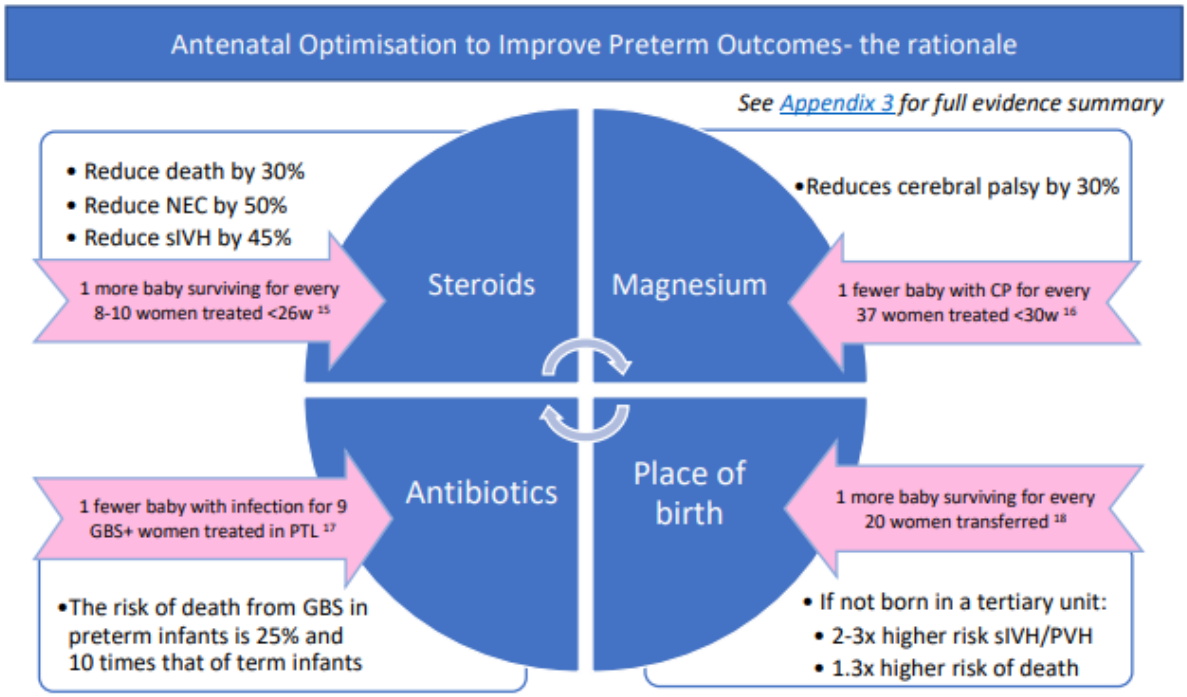
A. **Antibiotics:** if labour is established, start GBS prophylaxis with optimal timing at least 4h before birth. If premature rupture of membranes, follow local guidance.

M. **Magnesium:** if <30+0 (consider up to 34+0). Give a loading dose of intravenous magnesium sulphate then a maintenance infusion. Pause for transfer if necessary and restart after. Optimal timing to start at least 4h before and continuing up until birth but benefit may remain if given <4h, if birth imminent.

P. **Parents:** establish parental understanding and discuss risks and benefits of PTB and potential interventions. This should include the neonatal team, describe likely neonatal journey and offer tour.

E. **Evaluate for Tocolysis**: consider only if it allows administration of steroids or transfer.

D. **Delivery Plan**: to include early discussion with neonatal team, intrapartum monitoring, mode of birth, optimal cord management and whether active or palliative management for baby at birth.



6.1 Steroids

Aim: All women giving birth before 34 weeks of gestation, should receive **a full course of antenatal steroids no longer than 7 days prior to birth**, and ideally completed 24-48 hours before birth.

A full course of antenatal steroids consists of **2 IM doses of either Betamethasone 12mg or Dexamethasone 12mg, 24 hours apart**. **Clinicians should not give the second dose at 12 hours[5,6,7,8] as there is some evidence that this may increase the risk of NEC[4].**

In women at risk of preterm birth a single course of antenatal corticosteroids reduce the risk of neonatal death by 30%, respiratory distress syndrome (RDS) by 44% and intraventricular haemorrhage by 45%. Antenatal corticosteroid use is also associated with a reduction in necrotising enterocolitis, respiratory support, intensive care admissions and systemic infections in the first 48 hours of life when compared with no treatment or treatment with placebo.

For women who are in suspected, diagnosed or established preterm labour, are having a planned preterm birth or have PPROM,

- **Offer maternal corticosteroids to women between 23+0 and 33+6 weeks**
- **At 22+0 to 22+6 weeks, the decision to offer antenatal corticosteroids should only be taken after parental counselling with a level 3 unit neonatal consultant**

Maternal corticosteroids may be considered up to 36+6 on an individual basis (taking into account risk factors such as fetal growth restriction, multiple pregnancy and planned CS) after counselling about the risks and benefits of their use. **The decision to give steroids at 34-36+6 weeks should only be taken by an Obstetric Consultant and should be supported by use of the 'Late Preterm Corticosteroids' patient information leaflet (LINK).**

Optimal benefit is observed if delivery is between 24 hours and 7 days of administration. Benefit is seen when delivery occurs within 24 hours, therefore steroids should still be given even if delivery is expected within this time. There is evidence that the beneficial effects from antenatal corticosteroids diminish and are lost when birth occurs >7 days from the last dose.

The timing of antenatal steroids is therefore of paramount importance and should be improved by more accurate prediction of preterm birth using diagnostic tests such as CL, QUIPP and use of actim partus.

Repeat Course of Antenatal Steroids

The gold standard of care remains a single course of antenatal steroids timed so as birth occurs between 24 hours and 7 days from administration. However, in those circumstances when a previous course has been given >7 days earlier, a repeat course of antenatal steroids significantly reduces respiratory morbidity in preterm babies. Whilst there is a reduction in birth weight there is no convincing evidence of harm for either mother or infant.

A single repeat course of antenatal corticosteroids can be considered in women who are less than 34 weeks gestation, who are at very high risk of preterm delivery within the next 48 hours, and whose prior course of antenatal corticosteroids were administered more than 7 days previously[9,11].

This decision should only be taken by a **Consultant Obstetrician** and should be based on a convincing change in clinical condition (such as cervical change, ROM, active labour).

Regularly scheduled repeat courses or serial courses (more than two) are not recommended.

6.2 Transfer in Utero

Aim: Any infants **less than 30 weeks of gestation (<32 weeks Gateshead & Carlisle)**, and any gestation with an **estimated fetal weight of less than 1250g** should be born in a maternity service on the **same site** as a level 3 **neonatal intensive care unit** (NICU).

The Northern Neonatal Network comprises a group of Level 1 and Level 3 units as below.

Level 1	Level 3
Northumbria Emergency Care Hospital, Cramlington	Royal Victoria Infirmary, Newcastle
Queen Elizabeth Hospital, Gateshead	Sunderland Royal Hospital, Sunderland **(over 26+0 babies only)**

University Hospital of North Durham, Durham	James Cook University Hospital, Middlesbrough
University Hospital of North Tees	
Darlington Memorial Hospital, Darlington	
Cumberland Infirmary, Carlisle	
West Cumberland Hospital, Whitehaven	

When extreme preterm infants are born in a high volume, neonatal intensive care setting, mortality is reduced by around 50%. There is also evidence that ex utero transfer of extreme preterm babies increases the risk of IVH and severe brain injury.

There is a regional agreement to transfer in utero if the QUiPP risk of delivery in 1 week is ≥5% or there is other objective evidence of preterm labour (PPROM, cervical change, significant APH).

In utero transfers must be arranged through the Northern Neonatal Transport Service (NNeTS) who will identify the most appropriate receiving unit. There should then be a Consultant to Consultant Obstetric referral, and once accepted, the referring midwife should contact the receiving unit's Delivery Suite Coordinator to handover. An IUT transfer document (Appendix 4) should be completed and women are transferred by ambulance with a midwife.

The timing and safety of the transfer is at the discretion of the referring unit. There is no need for a fixed period of observation prior to transfer.

There may be occasions when it is not safe to attempt IUT. **Any decision NOT to arrange an IUT must involve the Obstetric Consultant.** When in utero transfer is not possible, a baby may need to be transferred to a level 3 unit after delivery. The Northern Neonatal Network has created a patient information leaflet on why babies may require care in more than one hospital (appendix 8).

Where NNU capacity exists, there is a regional Maternity Unit policy of 'auto-acceptance' unless the receiving unit is closed to all admissions. Any Obstetric refusal for IUT should be made by the Consultant Obstetrician at the receiving unit. Liaison with the NNeTS Consultant may be required.

When delivery does not occur following IUT, a regional discharge proforma should be completed by the tertiary unit and emailed to the appropriate contact from the distribution list (appendix 9). This should also be uploaded into the badgernet notes.

Northern Neonatal Transport Service: 0191 2303020

6.3 Antibiotics

Aim: All women in established **preterm labour (<37 weeks)** should receive **intrapartum antibiotic prophylaxis** to prevent early onset neonatal Group B Streptococcal (GBS) infection, irrespective of whether they have ruptured amniotic membranes[1].

- Preterm or low birthweight babies are particularly vulnerable to Group B Streptococcal sepsis, so all women in preterm labour should be given intrapartum antibiotic prophylaxis (3g benzylpenicillin IV loading dose, then 1.5g benzylpenicillin IV four-hourly until birth)[1]. Follow local antibiotic guidance for penicillin allergy.

6.4 Magnesium

Aim: All women giving birth **before 30 weeks** of gestation, should receive a loading dose and ideally a minimum of 4 hour infusion of **antenatal magnesium sulphate within the 24 hours prior to birth**.

- Offered to all women between 24^{+0} and 29^{+6} weeks gestation inclusive, who are in established preterm labour or having a planned preterm birth within 24 hours.

- Considered in women between 30^{+0} and 33^{+6} weeks, or 22^{+0} and 23^{+6} of pregnancy who are in established preterm labour or having a planned preterm birth within 24 hours. In extreme prematurity this should be a consultant decision taking parental wishes into account.

Treatment Regimen

- Loading Dose
    - 4g (40ml) of 10% MgSO4 infused IV over 15 minutes (rate=160ml/h).
- Maintenance Dose
    - 1g (10ml) of 10% MgSO4 infused IV hourly (rate=10ml/h)

Monitoring

- Pulse, blood pressure, respiratory rate and reflexes should be recorded with each loading dose, and 4 hourly after that.
- Medical staff should review the patient urgently if the respiratory rate falls below 12 breaths per minute, or falls by more than 4 breaths per minute from baseline.
- Medical staff should review the patient urgently if the diastolic blood pressure falls by more than 15mmHg from the baseline.
- ECG/pulse oximetry: ECG is mandatory during and for 1 hour post loading dose. Pulse oximetry is required for the duration of treatment.

Magnesium Sulphate should be discontinued at delivery, or if delivery is no longer thought to be imminent, or if the duration of treatment has exceeded 24 hours.

Repeat courses for further episodes of threatened preterm delivery can be considered by individual consultants.

Contraindications:

- previous hypersensitivity to Magnesium Sulphate
- hepatic coma
- myasthenia gravis

Renal impairment is not a contraindication but if the patient develops oliguria or other signs of renal failure magnesium levels should be monitored and signs of toxicity looked for more closely. Consider reducing the dose of magnesium sulphate. In the absence of pre-eclampsia fluid restriction is not required.

If undergoing intrauterine transfer, give the loading dose followed by the maintenance dose until the ambulance arrives**. Stop the maintenance dose during transfer** and reassess on arrival at tertiary unit. Recommence if still indicated.

6.5 Parents

In order to properly involve parents as equal partners in care and decision-making for their babies, all parents facing potential extreme preterm birth need to understand the risks associated with their baby's birth, and possible treatment options.

Consultation should be provided by the most experienced members of the perinatal team and where possible should be delivered as a joint Neonatal, Obstetric and Midwifery approach. Supporting written information should also be provided – a **paper copy of the baby passport** should be given along with **'Improving the outcomes for preterm birth'** patient information leaflet - both available on the LMNS website at:

Clinical Expert and Advisory Groups - Local Maternity Systems Northern England Local Maternity Systems Northern England
(go to Preterm Birth, then Patient Information Leaflets).

Appendix 4 - The Very Early Baby Leaflet may also be useful.

6.6 Evaluate for Tocolysis

There is no clear evidence that use of tocolytic drugs reduces perinatal or neonatal mortality, or neonatal morbidity, and therefore it is reasonable not to use any tocolytic drug.

Tocolysis is considered in the following circumstances since these women are most likely to benefit from tocolysis:

- those who have not completed a full course of corticosteroids
- those requiring transfer to another unit

NICE recommend Nifedpine as the first line tocolytic.

Tocolysis is contraindicated in the presence of antepartum haemorrhage, chorioamnionitis, abnormal fetal heart rate, cervical dilatation >4cm.

The decision to commence tocolysis should be discussed with a consultant obstetrician.

Nifedipine

Nifedipine is a calcium channel blocker; it should be considered as the first line tocolytic agent in the management of suspected or diagnosed preterm labour.

- Nifedipine should be *considered* for tocolysis in women between 22^{+0} and 25^{+6} weeks pregnant who have intact membranes and are in suspected labour.
- Nifedipine should be offered to women between 26^{+0} and 33^{+6} weeks of pregnancy who have suspected or diagnosed preterm labour.

Adverse effects include:

- Flushing
- Palpitations
- Nausea and vomiting
- Hypotension
- Pulmonary oedema

Presence of maternal cardiac disease is a contraindication for the use of nifedipine for tocolysis.

The recommended nifedipine regime is:

- 20mg Nifedipine stat
- 20mg Nifedipine three times a day for 48 hours

If nifedipine is used for tocolysis, monitoring (maternal BP every 15 minutes and CTG) should be instituted for at least the first 2 hours.

Atosiban (Tractocile)

- Atosiban is an oxytocin receptor antagonist; it is the only tocolytic drug licensed in the UK for the treatment of threatened preterm labour.
- Nifedipine and atosiban have comparable effectiveness in delaying birth for up to seven days.
- Atosiban may be administered even if other tocolytics have already been administered.
- Atosiban is administered intravenously and treatment costs are high. It should only be offered for tocolysis after discussion with a consultant.

Its use should be considered:

- when there is maternal cardiac disease
- when there is an adverse reaction/allergy to nifedipine

The recommended regimen is intravenous administration in 3 successive stages:

1. Bolus dose of 6.75mg	Dilute 1x 0.9ml vial atosiban for injection with 10 ml N/Saline; inject over 1 minute IV
2. Continuous high dose infusion at a dose of 18mg/hr for 3 hours	Remove 10ml from a 100ml bag of N/Saline and add 2x 5ml (7.5mg/ml) vials of atosiban for infusion; infuse at 24ml/hr
3. Continuous low dose infusion at a dose of 6mg/hr for up to 45 hours.	Reduce rate of above infusion to 8ml/hr

6.7 Delivery Plan

This should be made in consultation with parents and should include decisions regarding:

- intrapartum monitoring
- mode of birth
- optimal cord management
- active or palliative management for baby at birth
- importance of early breast milk expression

Intrapartum Care

- At gestations of less than 34+0
  - Do not use FSE
  - Do not use FBS
  - Do not use ventouse

- FSE use can be considered between 34^{+0} and 36^{+6} weeks of pregnancy if it is not possible to monitor the fetal heart rate using external cardiotocography or intermittent auscultation

- Offer the following investigations following preterm birth:
  - placental histology
  - placental microbiology (swab for C&S)

Postnatal Review

Following delivery, parents should be offered a postnatal review appointment to discuss the results of any investigations. This is particularly important when PTB has occurred at <30 weeks.

7 Peripartum Optimisation

7.1 Optimal Cord Management

Aim: **All babies born <34 weeks** gestation should have their **umbilical cord clamped at least 60 seconds or more after birth** unless there are specific documented maternal or fetal conditions to justify earlier clamping.

Optimal Cord Management (OCM) is an evidence-based, simple and effective non-intervention for improving newborn outcomes. Preterm babies particularly benefit from this enhanced placental transfusion and physiological transition.

- **Optimal Cord Management reduces death in preterm babies by nearly a third**
- **The number of babies needing to receive OCM to prevent a death is around 30-50 overall and may be as low as 20 in the least mature babies**

Parents should receive information about OCM at the time of antenatal counselling about their imminent preterm birth, along with information about the importance of early breast milk expression.

Contraindications to OCM are extremely rare but include:

- The need for maternal resuscitation in the face of massive, acute haemorrhage.
- A ruptured vasa praevia, snapped cord or other trauma to the cord vessels which will result in haemorrhage from the baby.

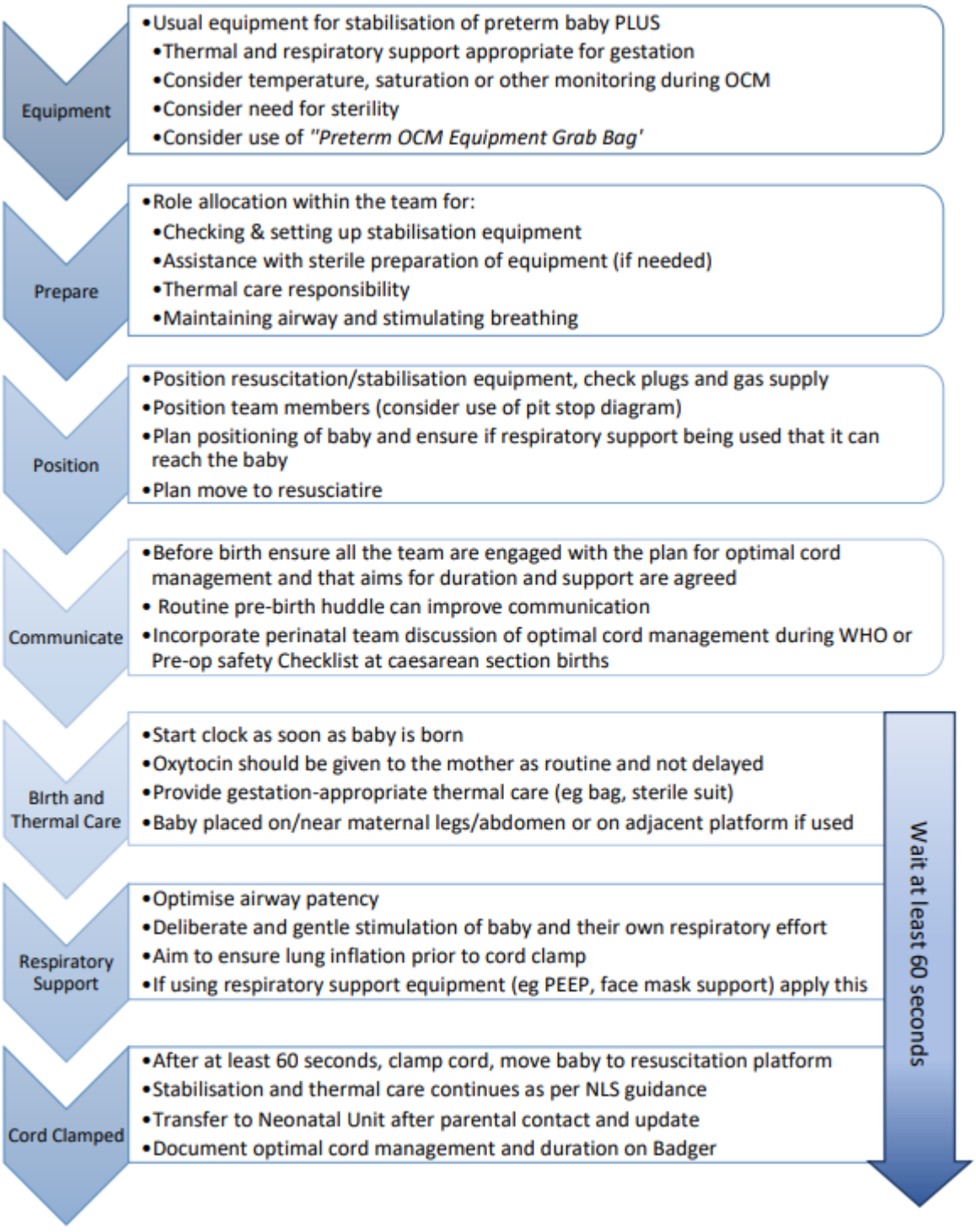
Cord milking is not sufficiently well researched to be introduced formally at this time. Evidence suggests potential harm (increased incidence of IVH) in babies under 27 weeks gestation (22% vs 4%)[10]. This will be open to review as more evidence becomes available.

Despite clear evidence of the advantages of OCM, available data suggests that the practice of delayed cord clamping is variable, especially amongst preterm babies. From 2020, the National Neonatal Audit Programme (NNAP) will report on rates of cord clamping at or after 1 minute for infants < 32 week. Recent data suggests a national rate of 34.6% so there is likely to be significant scope for improvement.

Despite the first minute after birth being a potential risk period for thermoregulation, there is no evidence for an increased risk of hypothermia in preterm babies who receive Optimal Cord Management. OCM is consistent with good thermal practices, such as putting the baby in a bag, drying, putting a hat on, and/or bringing an external heat source to the bedside. Teams should identify the risks and put in place measures to minimise hypothermia.

An awareness of human factors and an effective perinatal team are important in the optimal management of preterm birth. The BAPM flowchart below highlights areas to be focussed on to achieve best practice for OCM.

Best Practice Flowchart for OCM



A suggested pathway for achieving Optimal Cord Management in different settings (delivery room vs theatre) can be found in Appendix 6.

7.2 Normothermia

Aim: All babies **less than 34 weeks** gestational age have a documented **first temperature of 36.5°C to 37.5°C within one hour of birth.**

The World Health Organisation (WHO) defines infant hypothermia as a core body temperature of <36.5°C, or a skin temperature of <36.0°C. Preterm babies are at particular risk of hypothermia with associated adverse effects including an increased risk of hypoglycaemia, hypoxia and metabolic acidosis, respiratory distress and chronic lung disease, necrotising enterocolitis, intraventricular haemorrhage, late-onset sepsis and death.

There are a wide range of strategies to minimise heat loss and promote normothermia. Some of these interventions can be found in the table below.

	Mechanism of heat loss	Intervention	Evidence or Professional Recommendation
Evaporation	Loss of moisture and heat from warm wet skin into a low humidity, cooler environment Loss of moisture and heat from respiratory tract mucosa	Occlusive plastic wrap/bag Woollen or plastic hat Warm, humidified gases	A 2018 Cochrane Review concluded that plastic wraps improved core body temperature on admission to NICU and that fewer infants had hypothermia on admission to NICU or up to 2 hours after birth with a number needed to treat for an additional beneficial outcome of 4[3]. Two multicentre, randomised controlled trials have shown significant reductions in admission hypothermia in preterm infants resuscitated using warm, humidified inspired gases above standard care (wrap, woollen hat and radiant heat) [20,21].
Convection	Heat loss due to cooler circulating air, particularly in the context of open windows and doors	Increased room temperature	The American Heart Association (AHA) [22], European Resuscitation Council (ERC) [23], UK Resuscitation Council[24], World Health Organisation (WHO) [1] and International Liaison Committee for Resuscitation (ILCOR)[4] all recommend increased room temperature for anticipated preterm deliveries <32 weeks. The recommended temperature varies from 23-26°C. There are multiple studies demonstrating the benefit of increased room temperature on body temperature at 5 mins from birth and admission temperature [25-30].
Conduction	Heat loss due to direct contact with cooler surfaces	Transwarmer or exothermic mattress	The Cochrane review reports meta-analysis of two studies (119 infants) comparing plastic bags and thermal mattresses with plastic bags alone for infants <31 weeks gestation[3]. Results showed improvement in core body temperature on admission to the NICU or up to two hours after birth but with an increase in elevated temperature. NB: Manufacturer safety guidance recommends these mattresses should not be used in conjunction with other heat sources due to the risk of overheating and the rare but potentially serious risk of severe burns. Units who choose to use transwarmers should be aware of this guidance. Strict vigilance must be undertaken to ensure skin integrity, to avoid hyperthermia by continuous temperature monitoring and to limit the duration of use particularly in the context of radiant heat.
Radiation	Non direct transfer of heat to cooler mediums	Radiant heat source	Recommended as standard care by ILCOR and UK Resuscitation council[4, 24].

7.3 Maternal Breast Milk

Aim: All babies **less than 34 weeks** gestational age to **receive maternal breast milk** (Including **buccal colostrum** or maternal breast milk as mouth care **within 6 hours always within 24 hours of birth**.

Maternal breast milk is the optimal form of feeding for all babies. Specific health benefits for the preterm infant include (compared to formula feeding):

- lower mortality rates
- lower rates of sepsis and necrotising enterocolitis
- improved neurodevelopmental outcomes
- lower rates of bronchopulmonary dysplasia
- lower rates of retinopathy of prematurity
- fewer hospitalizations in the first year after discharge

Women at high risk of preterm birth should be counselled about the benefits of maternal breast milk in the antenatal period. The importance of maternal breast milk should also form part of the perinatal counselling of all women who present with threatened preterm labour or require planned preterm birth.

BAPM recommends women who have given birth prematurely are shown how to express **within 2 hours of birth**, and that the infant should then **receive colostrum within 6 hours of birth**. Even infants with complex health concerns can receive buccal colostrum. Early expression facilitates early colostrum receipt and improves total volumes of breast milk received overall.

Counselling should be supported with written information (See Appendix 7 for current RVI patient information leaflet on early expression/importance of colostrum).

National audit will be undertaken through NNAP. BadgerNet also now carries specific detail on colostrum under the 'UNICEF' heading.

There are very few situations in which maternal breast milk is contraindicated for a preterm baby (outside of situations where all enteral intake is contraindicated, and in many of these situations buccal colostrum may still be given safely). These include maternal HTLV lymphoma, infant classical galactosaemia, congenital lactose intolerance and maternal HIV infection.

7.4 Neonatal interventions: Volume Targeted Ventilation (VTV) & Caffeine

For babies born at <34 weeks' gestation who need invasive ventilation, VTV should be used in combination with synchronised ventilation as the primary mode of respiratory support. This reduces the chance of death or bronchopulmonary dysplasia (BPD) by 27% and intraventricular haemorrhage (grades 3–4) by 47% compared with pressure-limited ventilation modes.[15]

For babies born at <30 weeks' gestation, caffeine reduces the chance of death or disability. Caffeine citrate should be started within the first 3 days of life.[15]

8 NIHR Clinical Research Trials

Please consider offering entry into relevant NIHR 'portfolio' research trials that are running in your unit. This may also be discussed when patients are transferred to units with level 3 neonatal care.

References

1. NICE Guideline NG195. Neonatal infection: antibiotics for prevention and treatment
   Published: 20 April 2021. https://www.nice.org.uk/guidance/ng195
2. BAPM Perinatal Management of Extreme Preterm Birth <27 weeks Perinatal Management of Extreme Preterm Birth Before 27 weeks of Gestation (2019) | British Association of Perinatal Medicine (bapm.org)
3. BAPM Toolkits
   - https://www.bapm.org/pages/104-qi-toolkits
     - Antenatal Optimisation
     - Maternal Breast Milk
     - Normothermia
     - Optimal Cord Management
     - QUiPP App
4. Betamethasone dosing interval: 12 or 24 hours apart? A randomized, noninferiority open trial, Meena Khandelwal, Eric Chang, Clare Hansen, Krystal Hunter, Barry Milcarek,, Meeting paper smfm paper| volume 206, issue 3, p201.e1-201.e11, march 01, 2012
5. Cochrane review 2022
6. Bulut AM et al 2021
7. Saldana Garcia et al 2022
8. EPICE Cohort 2017
9. Crowther et al; PRECISE Group. Effects of repeat prenatal corticosteroids given to women at risk of preterm birth: An individual participant data meta-analysis. PLoS Med. April 2019. Effects of repeat prenatal corticosteroids given to women at risk of preterm birth: An individual participant data meta-analysis - PubMed (nih.gov)

10. Anup C et al (2019) premature Infants receiving Cord Milking or Delayed Cord Clamping: A Randomised Controlled Non-Inferiority Trial. American Journal of Obstetrics & Gynecology Supplement to January 2019: S682.
11. NICE Guideline 25: Preterm Labour and Birth, 20th November 2015, Updated 10th June 2022
12. Thomson AJ, on behalf of the Royal College of Obstetricians and Gynaecologists. Care of Women Presenting with Suspected Preterm Prelabour Rupture of Membranes from 24+0 Weeks of Gestation. BJOG 2019;126:e152–166
13. Abou El Senoun G, Dowsell T, Mouse HA. Planned home versus hospital care for preterm prelabour rupture of membranes (PPROM) prior to 37 weeks' gestation. Cochrane Database Syst Rev 2014;:CD008053.
14. Petit C, Deruelle P, Behal H, Rakza T, Balagny S, Subtil D, et al. Preterm premature rupture of membranes: which criteria contradict home care management? Acta Obstet Gynecol Scand 2018;97:1499–507.
15. NHS England Saving Babies Lives, version 3.2 element 5

Appendix 1 - Extreme Preterm Birth: Principles of Obstetric Care at 22-22+6 weeks

Counselling about prognosis when delivery may occur at 22+0 to 22+6 weeks

The counselling of parents about the likely prognosis of babies born at 22+0 to 22+6 weeks will be based on the outcomes that were described in the recent BAPM Framework for Practice (2019), many of which were based on the findings from the MBRRACE-UK 2018 dataset. The key statements within the BAPM document are summarised below. The following pictorial representation may also be useful when counselling women.

Survival
The survival rates in the MBRRACE-UK dataset were as follows:

- About 63% of babies born at 22+0-22+6 weeks were live born
- Resuscitation was attempted in 23% (n=43) of all live born babies
- Survival to 1 year
    - Of all babies alive at the start of labour 5%
    - Of those receiving active resuscitation 35%
    - Of those admitted to NNU 54%

These figures are shown graphically in the algorithm on the next page. This may be useful to share with patients during discussions.

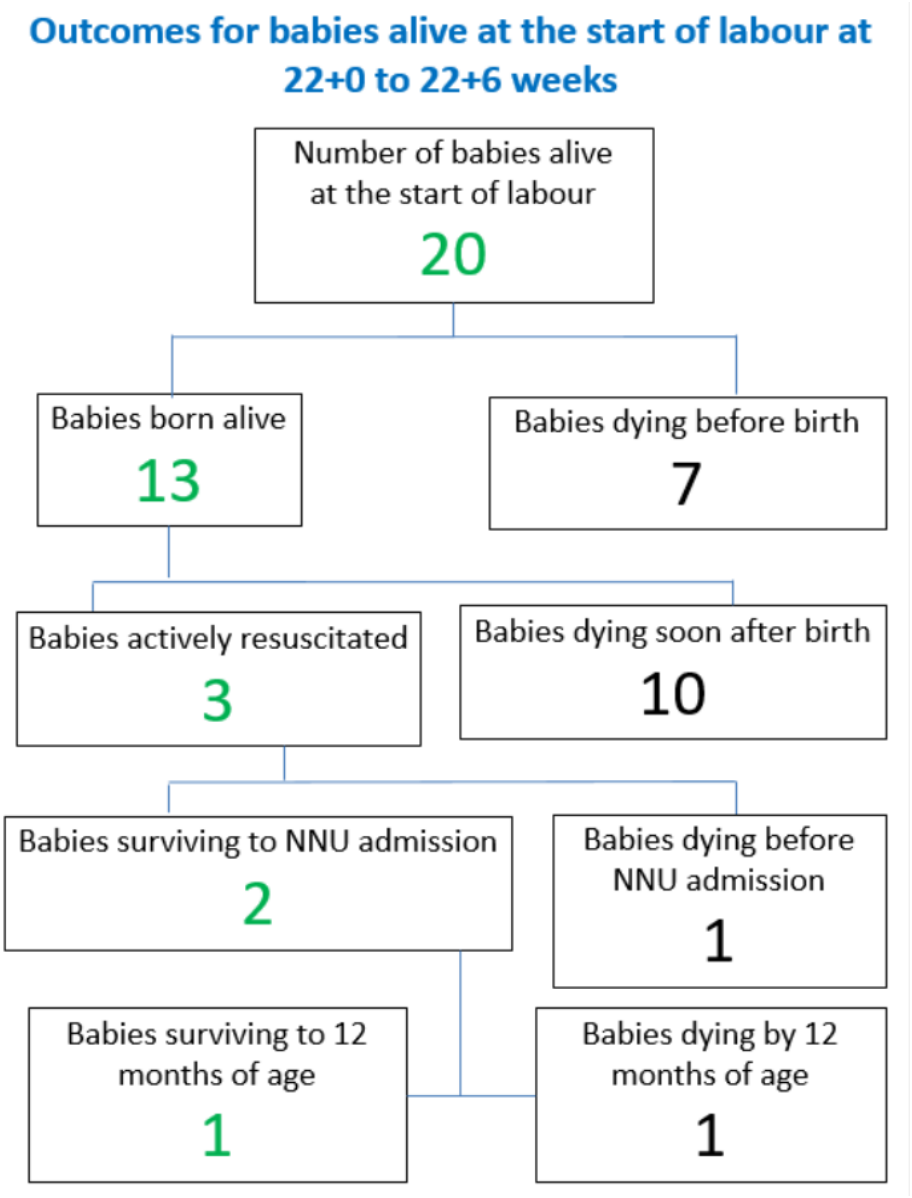
The BAPM Framework for Practice acknowledges that since only a small proportion of babies born at 22 weeks of gestation within this case series received active treatment, there is the possibility of selection bias and survivors may represent a sub-group of 22 week gestation babies with more favourable risk factors. Hence, it seems likely that the more widespread resuscitation of babies at this gestation (and potentially including those who might not have a full range of 'favourable' risk factors) will be associated with survival rates that are less than 35%.

Morbidity
The BAPM Framework for Practice suggested that severe morbidity (at 2 years) was evident in about 1 in 3 surviving babies born at 22+0 to 22+6 weeks (as based on four major studies).
The severe impairment category includes any of:

- severe cognitive impairment with an IQ lower than 55 (< -3 standard deviation); this will usually result in the need for special educational support and require supervision in daily activities
- severe cerebral palsy – classified as Gross Motor Function Classification System (GMFCS) grade 3 or greater
- blindness or profound hearing impairment

Individualised decision-making
Several non-modifiable risk factors are known to be associated with an increased risk of adverse outcomes in babies born at the margins of viability, including fetal growth restriction, male sex, multiple pregnancy and chorioamnionitis. Modifiable risk factors associated with an improved chance of a good outcome include the administration of antenatal steroids, magnesium sulphate, and birth in a hospital with a NICU.
However, it is difficult to quantify the relative risks associated with each of these factors in babies born at 22+0 to 22+6 weeks. Hence, while it is appropriate to include these factors in decision-making and the counselling of parents at risk of PTB at 22+0 to 22+6 weeks, careful and cautious senior clinical judgement is needed when adjusting risks based on any of the above.

Reference
Smith LK, Draper ES, Manktelow BN, Fenton A, Kurinczuk J on behalf of the MBRRACE-UK Collaboration. MBRRACE-UK Report on survival up to one year of age of babies born before 27 weeks gestational age for births in Great Britain from January to December 2016. Leicester: The Infant Mortality and Morbidity Studies, Department of Health Sciences, University of Leicester. 2018.



The role of caesarean section (CS)/hysterotomy at 22+0 - to 22+6 weeks gestation.

At periviable gestations (in particular at 22+0 to 22+6 weeks) the greatest benefit in terms of reducing neonatal mortality and morbidity is for the baby to remain *in utero*. A gain of even a few days can make a significant difference to neonatal outcome. Obstetric intervention in labour is not routinely recommended as there is a lack of high quality evidence to suggest that neonatal outcomes are improved (1).

Caesarean section (CS) at periviable gestations is a significant undertaking. The uterus is relatively small, making the likelihood of hysterotomy (using a vertical 'upper segment' incision) much greater. A vertical uterine incision is associated with a higher risk of maternal haemorrhage and four times the risk of placenta accreta spectrum in a future pregnancy (2). Patients should also be aware that CS at very early preterm gestations is associated with an increased risk of uterine rupture in future pregnancy (the risk of rupture being 25 in 1000 compared to 5 in 1000 for CS at term) (3).

The potential for adverse effects on reproductive outcome in subsequent pregnancies, has led professional bodies to recommend against **routine** use of CS below 23+0 weeks (4). The information above should be used when counselling women and their partners, helping them to reach an informed decision about the role of CS *in labour* below 23+0 weeks gestation. It is accepted that after counselling and despite concerns raised, women may still occasionally request delivery by CS. The obstetric team should adopt a conservative approach to suspected preterm labour at 22+0 to 22+6 weeks, as this frequently settles with observation. Therefore, CS should not be undertaken too early because of the neonatal benefits associated with remaining *in utero*/prolonging gestation.

References

1. *Alfirevic, Z., Milan, S. J. & Livio, S. Caesarean section versus vaginal delivery for preterm birth in singletons. Cochrane Db Syst Rev **9**, CD000078 (2013).*
2. *Gyamfi-Bannerman, C. et al. Risk of Uterine Rupture and Placenta Accreta With Prior Uterine Surgery Outside of the Lower Segment. Obstetrics Gynecol **120**, 1332 (2012).*
3. *Lannon, S. M. R., Guthrie, K. A., Vanderhoeven, J. P. & Gammill, H. S. Uterine Rupture Risk After Periviable Cesarean Delivery. Obstetrics & Gynecology **125**, (2015).*
4. *Periviable birth. Obstetric Care Consensus No. 6. American College of Obstetricians and Gynecologists. Obstet Gynecol 2017;130:e187– 99*

Gestational threshold for 'antenatal optimisation'

In women < 23+0 weeks gestation

- 'Antenatal optimisation' entails preparation of the fetus at the tertiary centre when threatened preterm labour occurs prior to 23+0 weeks' gestation (i.e. consideration of steroids, magnesium sulphate etc)
- If after an initial conversation, the woman wishes to consider active intervention in the form of 'antenatal optimisation', arrange transfer to a centre with neonatal intensive care such that this can be achieved from 22+0 weeks
- Explain that a further confirmatory discussion with the parents will take place in the tertiary centre, after which a final decision would be taken with regards to subsequent management.
- On occasions, this may mean arranging transfer just prior to 22+0 weeks in order to allow full optimisation from 22+0 weeks onwards.
- Antenatal optimisation would be implemented only after multi-disciplinary counselling of the family at the tertiary level 3 centre.

The diagnosis of threatened preterm labour at 22+0 to 22+6 weeks

- There will be a cohort of patients in obvious preterm labour presenting with painful uterine contractions and cervical change, ruptured or bulging membranes.
- There will be another cohort that present at an earlier stage where the physical signs are not yet as apparent. Here we recommend diagnostic testing. We recommend units use cervical length (CL) USS in combination with a decision support tool (QUiPP)(1,2). This will generate a risk of delivery within 1 week. If this risk is ≥5% this would be regarded as a positive test. If CL USS is not available, an actim partus swab can be performed.
- If the patient is not at a level 3 unit we recommend that the case is discussed with the neonatal transfer team and there is a consultant to consultant discussion between the obstetrician looking after the patient and the receiving obstetrician at the level 3 unit.
- We do not recommend antenatal optimisation at this stage, as this should be done at the level 3 unit after the patient and partner have been counselled by the level 3 neonatal and obstetric team.

References
1.Carter, J. et al. Development and validation of predictive models for QUiPP App v.2: tool for predicting preterm birth in women with symptoms of threatened preterm labor. Ultrasound in Obstetrics & Gynecology ***55****, (2020).*
2. https://quipp.org

Fetal monitoring in the context of extreme prematurity 22+0-24+0 weeks (note this covers a wider gestation)

Fetal condition may be monitored in 4 ways:

1. Reported fetal movements
2. Ultrasound assessment
3. Fetal heart rate auscultation
4. Fetal CTG monitoring

And in three circumstances:

1. Prior to labour
2. During the first stage of labour
3. During the second stage

The purpose of fetal monitoring is twofold:

1. To determine whether the fetus is alive
2. To determine whether there are signs of fetal hypoxia

All women require a documented plan on the agreed method and frequency of fetal monitoring. Even if there is an agreement not to act in the fetal interest based on fetal monitoring there are maternal benefits to fetal monitoring and this should be made clear.

Fetal monitoring at 22+0-24+0

(1) Fetal movements at 22+0-24+0 (note wider gestation)

Reported fetal movements provides a degree of reassurance but are subjective.

Document at which gestation fetal movements were regularly felt and their typical pattern. Do not rely on fetal movements as a monitoring strategy at 22+0-24+0, instead establish an agreed objective monitoring strategy with suitable frequency.

a. It follows that reassuring fetal movements should not replace the object assessment of viability.
b. It also follows that a lack of fetal movements need not trigger an object assessment of viability.

(2) Ultrasound assessment at 22+0-24+0 (note wider gestation)

This is useful to assess lie, presenting part, placental position, amniotic fluid index, growth and umbilical artery Doppler (where indicated) as baseline. Subsequent ultrasound assessments may be required to determine whether the fetus is alive should this be technically challenging by other means.

(3) Fetal heart rate auscultation antenatally & during the first stage of labour at 22+0–24+0 (note wider gestation)

This will be the monitoring used for the vast majority. It will confirm whether the fetus is alive. A necessary part of auscultation is to determine the fetal heart rate as distinct from the mother's. Clinical weight may be given to developing fetal tachycardia for example in the context of suspected chorioamnionitis. Further interpretation of the auscultated fetal heart should not take place.

At the time of measuring the fetal heart rate the maternal heart rate should always be documented. The minimum auscultation frequency should therefore be the same as the frequency of the maternal observations. As such this frequency will vary due to the maternal circumstances.

A decision to auscultate the fetal heart rate more frequency than the maternal observations should be accompanied by a clear rationale in the notes.

Benefits of fetal auscultation

a. To reassure

b. To establish if there is fetal demise as this will likely alter the maternal management and may reduce maternal risks by allowing obstetric intervention to augmenting labour or delivery
c. Fetal tachycardia from an earlier normal baseline *may* increase suspicion of chorioamnionitis

(4) Fetal heart rate auscultation during the second stage of labour at 22+0-24+0 (note wider gestation)

At the confirmation of full dilatation the fetal heart should be documented along with the maternal rate. As active second stage may not necessarily be encouraged at this point further assessments will typically be hourly and not less than at the frequency of maternal observations.
At the onset of active second stage the fetal heart rate should again be documented along with the maternal rate.
Further auscultation is likely to be technically challenging and may require the support of ultrasound. The purpose of monitoring in the second stage is to simply confirm viability and not to influence the mode of delivery.

(5) CTG analysis (computer-based) at 22+0-24+0 (note wider gestation)

There is no evidence of benefit for this group. Neither a computerised CTG prior to labour, nor an intrapartum CTG analysis have been shown to be appropriate in this group and both are likely to lead to increased obstetric intervention without evidence of benefit.

Appendix 2: Antenatal Flowchart

Suspected Prelabour Premature Rupture of Membranes < 37 weeks (PPROM)

- History/Examination: Abdominal palpation and amount/colour of PV loss. Temp, pulse, BP, Urinalysis (+/- MSU). Bloods (CRP/WCC) on admission if suspected chorioamnionitis.
- Fetal Observations: FHR/CTG
- Speculum examination to visualise cervix/posterior fornix - ? liquor & consider HVS

PPROM Confirmed

No liquor seen

Reassure and discharge home

Admission to antenatal ward for 48 hours

No liquor seen but **very good history**

If second (or more) visit with suspected PPROM

- Prescribe corticosteroids (should be offered at 23+0 – 33+6 weeks. At 22+0-22+6 may be considered after counselling in level 3 unit)
- Prescribe erythromycin 250mg QDS for 10 days (or until delivery) or penicillin if cannot tolerate erythromycin
- Do not give co-amoxiclav

Consider point of care testing for ROM

PPROM confirmed

Negative - reassure and discharge

Follow up on MAU after discharge

- Arrange weekly MAU review
- Provide disposable thermometers for home use and instruct on use. Advise to take temperature every 6 hrs while awake and to ring and return to MAU if temp ≥ 37.2 for assessment
- Inform woman to contact MAU if feels unwell, shivery, pyrexial, bleeding or offensive discharge, abdo pain or reduced FMs

MAU weekly review

- Consider revision of diagnosis if initial diagnosis uncertain
- Maternal temp, pulse and bloods for CRP/WCC. Fetal monitoring - computerised CTG if ≥26wks (Dawes/Redman)
- 4 weekly U/S - EFW and UA Doppler
- Medical review if any concerns

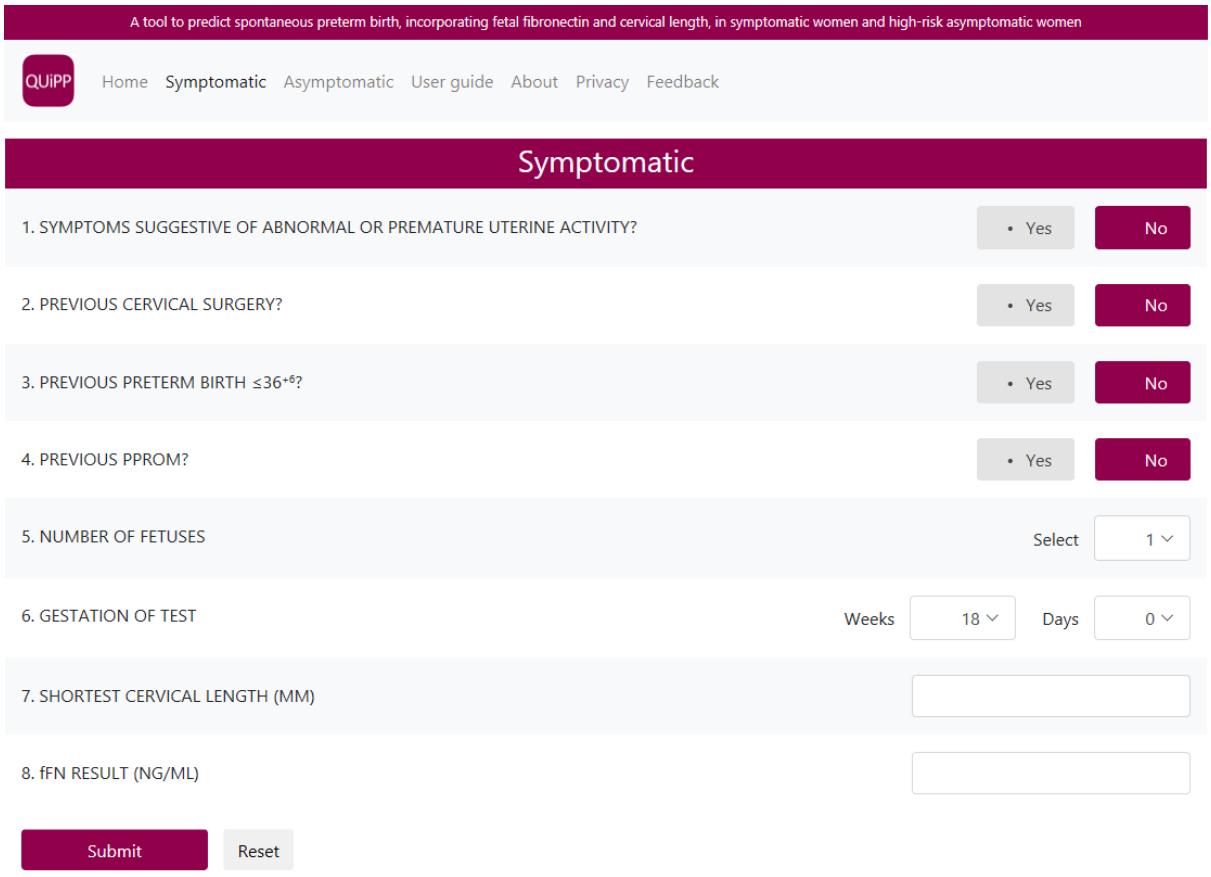
Arrange IOL at 37 weeks if no fetal/maternal concerns
(GBS positive – d/w Consultant & offer delivery from 34+0)

Appendix 3

Use of QUiPP App in Symptomatic Women

https://quipp.org/symptomatic.html

Calculation can be completed without FFN (leave this box empty) and use cervical length measurement alone.



Appendix 4 - In Utero Transfer Document

Transferring Unit _____

Gestation _____

EDD _____

Actim Partus _____

Cervical length _____

QUiPP risk of delivery in 1 week

Patient ID Label

IUT transfer required:

- Neonatal hotline contacted ☐ ***0191 2303020***
- Receiving Unit _____
- Obstetric Consultant to Consultant referral ☐
- Midwifery handover of care ☐
- NEAS contacted ☐ Time _____
  - Priority of transfer 1 2 3
  - Time of departure _____

S Steroids 1st dose ☐ Date_____ Time_____

2nd dose ☐ Date_____ Time_____

T Transfer required ☐ Date_____ Time_____

A Antibiotics GBS ☐ Date_____ Time_____

M Magnesium Loading ☐ Date_____ Time_____

Infusion ☐ Date_____ Time_____

P Parent discussion ☐ Date_____ Time_____

E Evaluate for tocolysis ☐ Date_____ Time_____

D Delivery plan made ☐ Monitoring, mode of birth, resuscitation

The Northern Neonatal Network
An Operational Delivery Network
Website - www.nornet.org.uk

NHS

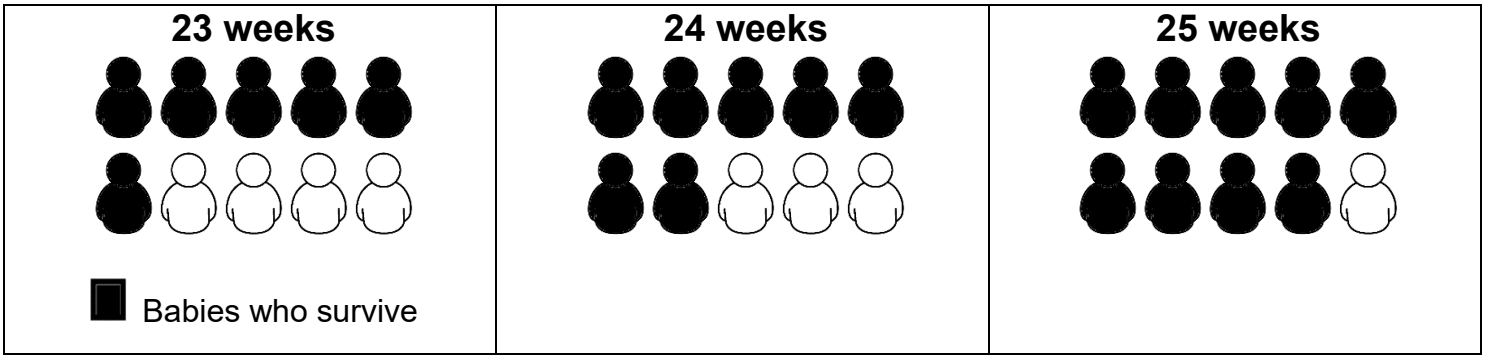
The Very Early Baby

Parent Information Leaflet

Having a new baby is an exciting event, but if your baby is born very early this can be stressful. We want you to have the most up-to-date information about what it means to be born this early. This may help you with decisions you are asked to make at this time.

Each baby is different. The information below shows survival for babies born in the Northern Neonatal Network, and admitted alive to the Neonatal Intensive Care Unit.

What are the chances my baby will survive?



Based on our previous experience and national recommendations, our advice is:

- 22 weeks; intensive care may be offered in some situations after detailed discussion
- 23 weeks; intensive care is offered
- 24 weeks and above; intensive care is given

Other factors, as well as being born very early, can affect whether a baby survives and whether they have long term problems. These include:

- Multiple births (twins, triplets)
- Babies with other abnormalities or genetic problems
- Infection in the womb
- Leaking of fluid from the womb for days or weeks before delivery
- Babies who are smaller than average

The needs of each family are different and your needs will be discussed with you.

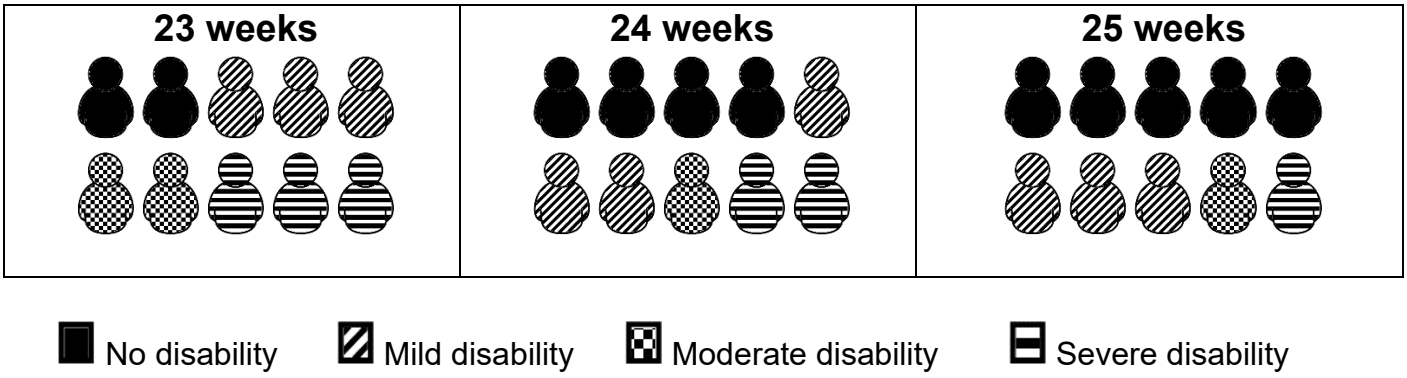
If my baby survives, will he/she have problems in the future?

The following information is provided to help you better understand the concerns if your baby is born very early. We have defined different kinds of disabilities as follows:

	Movement	Understanding & learning	Hearing	Eyesight
Mild disability	Does not cause major problems on a day to day basis e.g. may be clumsy/struggle with pencil work	Learning difficulties e.g may need extra help with school work	Mild hearing loss, but does not need hearing aids	Likely to need glasses
Moderate disability	May have a condition called cerebral palsy*, but can walk	Needs extra support to be able to learn	Needs hearing aids	Poor eyesight, even with glasses
Severe disability	Unable to walk without help	Likely to need lifelong care	Deaf	Blind

*Cerebral palsy: a condition that affects muscle control and movement

If my baby survives, what are the chances he/she will have a disability?



- Some problems only become clear when a child is older (e.g school age).

- Approximately 2 out of 3 children born very early will need some extra help at school. The main problems seem are problems with attention and short term memory.
- Approximately one out of ten children born very early have autism spectrum disorder (a condition that affects the way a person communicates and relates to people around them).

It is important to remember that a baby's family and surroundings play a very important role in development. Your Doctor and/or physiotherapist can give you more information about how to help your baby's development.

We hope this information is useful to you and your family. We are here to support you. If you have any questions please ask us.

For further information

Contact details

Neonatal Consultant or Sister
Please ask for details of your local contacts

Useful Resources

Charitable organisations:
Tiny Lives: http://www.tinylives.org.uk/
BLISS: www.bliss.org.uk.

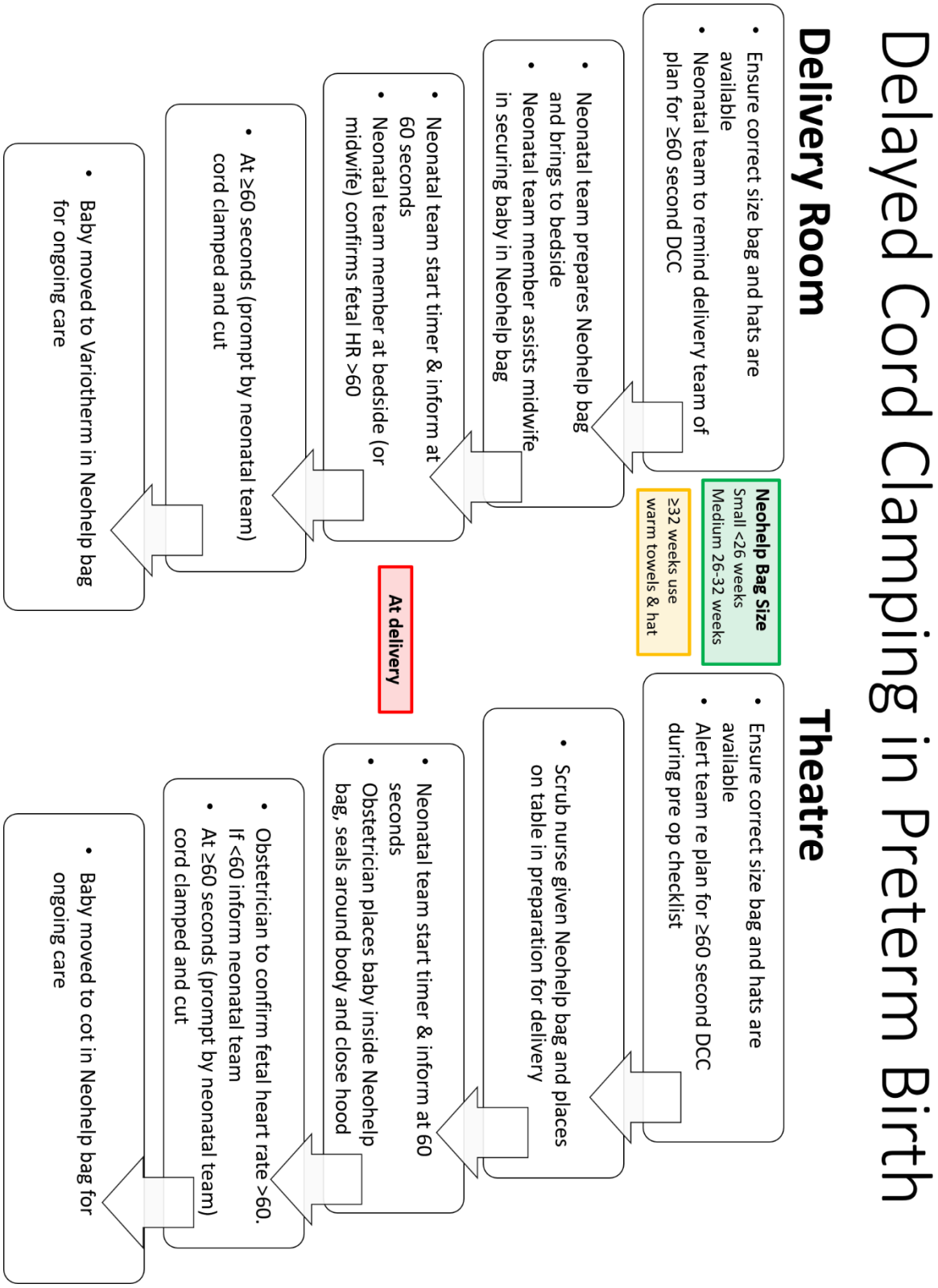
NHS Website: https://www.nhs.uk/conditions/pregnancy-and-baby/premature-early-labour/

Patient Advice and Liaison Service (PALS): Freephone: 0800 032 0202

Northern Neonatal Network. Modified from BC Womens Health Centre, Vancouver with permission

Reviewed: September 2021
Review date: September 2023

Appendix 6 - Optimal Cord Management



Appendix 7 – Early Expression & Colostrum Information

North East and North Cumbria
Local Maternity System

SUPPORTED BY tiny lives SPECIAL CARE BABIES

PROVIDING COLOSTRUM FOR YOUR BABY

What is Colostrum?

Colostrum is the first milk your body makes. Acting 'like a medicine' it can help their immune system, gut and brain and protect from infection. It starts to work as soon as it is given. **Even very small, sick or early babies can have colostrum as soon as they are born.** We will show you how to express it. **Your colostrum is unique**, made by you especially for your baby's needs and expressing it can help you feel close to them. The earlier you express the sooner your baby can have colostrum and the more milk your body will make overall. **Ideally express within 2 hours after birth. At first you will produce very small amounts – every drop is precious and will help your baby.**

How to express Colostrum

Being **close to your baby can help expressing** or look at a **photograph** or inhale their **scent**. Skin-to-skin contact will help – ask your nurse about this.

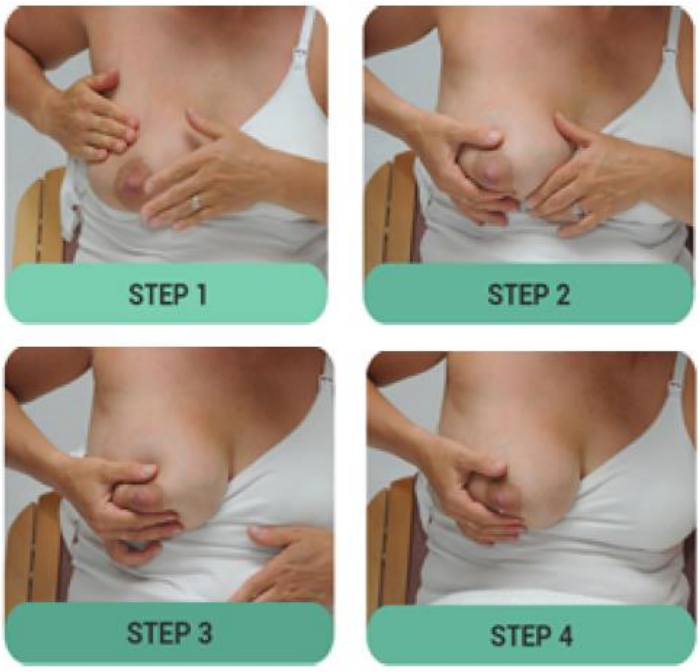
Scan the QR code: you will be taken to a video showing you how to hand express colostrum (watch from 31 seconds)

Hand Expressing Video

Credit: Unicef UK Baby Friendly Initiative Hand expression - YouTube

How to express Colostrum – Step by Step Guide

- Gently massage the breast and stimulate the nipple.
- Have the little purple syringe to hand.
- Make a C shape with your hand and place your thumb and forefinger 2-3 cm behind your nipple.
- Gently squeeze and release. Press back while doing this if you can and try not to slide your fingers along the breast. Compress and release – it shouldn't hurt.
- Repeat and build up a rhythm. A few drops may appear – if not re position your fingers and do it again - it often it takes a little while.
- Drops will appear and this will increase over time. Once this stops, rotate your fingers around the breast so that every part of the breast is expressed.
- Do both breasts each time.
- LABEL the syringe and buzz the midwife and ask them to take the milk to Neonatal unit, if your baby is there, or help you give it if you have your baby with you
- Aim to hand express colostrum 8-10 times in 24 hours.
- Even if you get nothing or the tiniest drop please continue to massage and express every 2-3 hours – it will come.



Colostrum Expressing Record

	Time and Date	Amount Obtained
First Hand Expressed		
2 – 6 hours		
6 – 10 hours		
10 – 14 hours		
14 – 18 hours		
18 – 24 hours		
24 – 30 hours		
Other		
Electric Pump Demo		

Baby/ies Information

Baby/s MRN Sticker	Time of Birth

Appendix 8

Northern Neonatal Network

Providing Neonatal Care; why your baby may receive care in more than one hospital

The purpose of this leaflet is to explain why it may be necessary to move your baby from one hospital to another, to receive their care.

Maternity care is usually booked in the early stages of pregnancy at your local hospital. These hospitals can provide immediate care for babies who are born unexpectedly premature or sick. However, not all hospitals have the facilities needed to provide on-going care for the sickest and smallest babies.

Neonatal Units are different, depending on the type of care they provide;

Neonatal Intensive Care Units (NICUs) look after preterm infants from 22 weeks' gestation, sick term infants, and babies who need complex specialist care such as babies needing surgery or who have a heart problem.

Special Care Baby Units (SCBUs) look after babies from 30 weeks gestation, who do not require intensive care.

Within the Northern Neonatal Network, there are ten different neonatal units.

We have three NICUs and seven SCBUs.

All the units have specially qualified neonatal staff, who can care for your baby at each stage of their neonatal journey.

Deciding where your baby should receive their care

If your baby is likely to be born below 30 weeks, they will need to be cared for in a hospital that can provide intensive care. This may not be the hospital closest to your home. To ensure that your baby receives the right level of care, you may be moved to a different hospital before they are born. Other babies who are unexpectedly sick or premature may require a transfer to an intensive care unit after they are born.

We have a specialist neonatal transfer service (NNeTS), with dedicated doctors and nurses who are very experienced in caring for sick or preterm infants. This is the team who transfer babies between hospitals in our region.

NNeTS
Northern Neonatal Transport Service

You will be given the option to travel alongside your baby, if it safe to do so.

Care closest to home

As your baby's care needs change, we always aim to move them back to your local unit as soon as they are well enough, and it is safe to do so. This will be planned between the teams caring for your baby and yourselves. Moving from one unit to another can be stressful for families, but we will make every effort to support you throughout your baby's transfer.

The unit your baby is moved to may be different from the unit you booked in for maternity care. Neonatal care is provided on a needs basis, as close to home as possible. Follow up services are also dependent on your home address; this is one of the reasons why transferring back to your local unit is important at this stage.

Preparing to transfer

You may have met the team in your local unit before your baby was transferred for specialist care. If you haven't then this can be arranged for you. Your local unit will receive regular updates on your baby's progress and will be aware of your family's needs. This should help with the transition between one unit and another.

We would never transfer your baby without discussion with yourselves, however the unit may need to contact you at short notice if the neonatal unit becomes full, and your baby's care needs can be safely met by a local unit closer to home.

It may take several days to settle in and feel more comfortable in a new unit. This is very normal, but your new setting will soon become more familiar. Your local unit will be ready to help you to continue to develop your relationship with your baby, and to help them flourish and grow, with the additional support of those closest to you, who know you and you baby best.

You can find more information about the units in our network by scanning below:

Many thanks to the parents from the Northern Neonatal Network's Parent Advisory Group & Maternity & Neonatal Voices Partnership who helped with this leaflet.

North East and North Cumbria
Local Maternity and Neonatal System

Appendix 9. Discharge document following IUT (undelivered) & email distribution list

DISCHARGE FOLLOWING THREATENED PRETERM BIRTH

Regional Discharge Summary for women who are discharged from a Tertiary Unit following an episode of threatened preterm labour.

Mother's MRN		Mother's NHS Number	
Mother's Name			
Does the mother smoke? If yes, are they engaged in smoking cessation?			
Had the mother been identified antenatally as having risk factors for pre-term birth? If so, what was the risk?			
From which Trust is the mother being discharged from?			
Gestation at time of admission to Tertiary care?			
How many admissions (including this one) with threatened premature labour?			
Gestation at time of discharge from Tertiary care?			
OPTIMISATION			
Has the mother received steroids? If 'yes' how many doses?			
Dates of corticosteroids:			
Did the mother have a discussion with the specialist Neonatal team?			
DISCHARGE MANAGEMENT PLAN			
Is there a plan if mother presents with a further episode of premature labour within 7 days?			
Have any follow-up appointments been made at Tertiary level care?			
Which Trust is the mother booked to deliver at?			
Are there any action required by the booked Trust?			
Date and time of discharge from Tertiary level care			
Any additional comments?			
Dated:	/ /	Completed by:	

Email Addresses for Threatened Preterm Labour Discharge Form

Unit	Consultant Lead	Specialist MW	Discharge Contact
RVI	Alexandra Patience	Jess Shaw	Alexandra.patience@nhs.net jessica.shaw12@nhs.net Nuth.rviantenatal@nhs.net
NSECH	Alexa Lilley	Jackie Ward Barbara Quarshie	Alexa.lilley2@northumbria-healthcare.nhs.uk Jacqueline.ward@northumbria-healthcare.nhs.uk barbara.quarshie@northumbria-healthcare.nhs.uk
QE	Celia McKee	Stephanie Clark	Cecilia.mckee@nhs.net stephanie.clark28@nhs.net ghnt.preterm.birth@nhs.net
SRH&ST	Jen Johnson Rania El-Gendy	Lynn Bailey	Jennifer.johnson28@nhs.net Rania.el-gendy@nhs.net Lynn.bailey4@nhs.net Stsft.pretermbirthteam@nhs.uk
UHND	Heather Weir Elizabeth Nevins	Paula Osbourne	Heather.weir1@nhs.net elizabeth.nevins1@nhs.net Paula.osborne1@nhs.net Cddft.pre-termgroupuhnd@nhs.net
DMH	Sangeetha Shastry	Paula Osborne	Sangeetha.shastry@nhs.net Paula.osborne1@nhs.net
North Tees	Steve Wild	Laura Ireland	s.wild@nhs.net Laura.ireland3@nhs.net nth.tr.nt.adauscanning@nhs.net
JCUH	Louise Michie	Kimberley Charlton	Louise.michie1@nhs.net Kimberley.charlton@nhs.net Stees.fetalmedicine@nhs.net
Carlisle	Ravimohan Velauthapillai	Emma Savage	Velauthapillai.ravimohan@ncic.nhs.uk Emma.savage@ncic.nhs.uk
Whitehaven	Pradumna Jamjute	Claire Winthrop	Pradumna.jamjute@ncic.nhs.net Claire.winthrop@ncic.nhs.uk