Greater Manchester and Eastern Cheshire SCN

Saving Babies Lives Care Bundle

REDUCING PRETERM BIRTH GUIDELINE

Final V2
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Document Control

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Version control

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Contents

1 Introduction

The guideline applies to women at risk of preterm birth or in preterm labour between 22 weeks and 0 days, and 36 weeks and 6 days. The guideline provides strategies to identify women at risk of spontaneous preterm birth (sPTB), screening/preventive options for these women, management of suspected preterm labour, and imminent preterm birth. The BAPM Perinatal Management of Extreme Preterm Birth Before 27 weeks of Gestation framework for practice[1] includes neonates from 22 weeks and 0 days gestation.

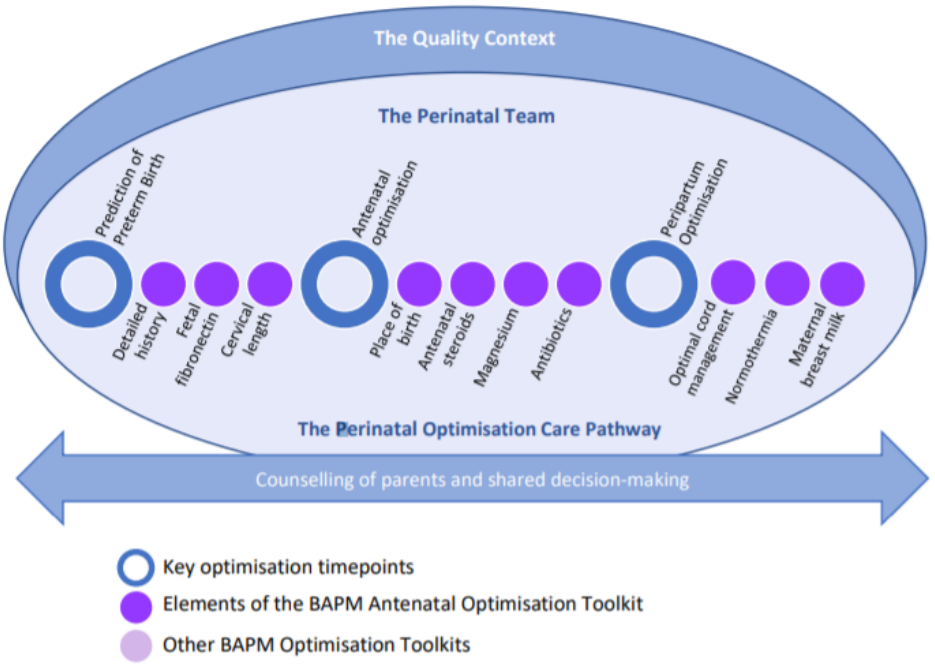
Preterm birth (PTB), defined as delivery at less than 37+0 week's gestation, is a common complication of pregnancy, affecting around 8% of births in England and Wales[2]; this corresponds with the figure for Greater Manchester and Eastern Cheshire. It is the most important single factor contributing to adverse infant outcome with regards to survival and quality of life. Babies born preterm have high rates of early, late, and infant mortality and morbidity. PTB is estimated to cost health services in England and Wales £3.4bn per year.

2 Aims of this guideline

The prevention of preterm birth is an additional element to the NHS England Saving Babies' Lives Care Bundle v2, updated in March 2019. It was developed in response to the Department of Health's 'Safer Maternity Care' report, which extended the 'Maternity Safety Ambition' to include reducing preterm births from 8% to 6%. The element focuses on three intervention areas to improve outcomes, which are prediction and prevention of preterm birth and better preparation when PTB is unavoidable.

The BAPM toolkit looks at these intervention areas as part of their Optimisation pathway:

The Perinatal Optimisation Care Pathway[3]



3 Risk factors for preterm birth

The following conditions are associated with spontaneous PTB and therefore history and examination should be performed to identify any of these conditions.

Previous preterm birth
Previous PTB is the most significant risk factor for PTB. This association is modified by three risk factors:

- the number of prior PTBs
- the gestational age at which the previous birth(s) occurred, and
- the order in which the prior PTB(s) occurred.

For example, the risk of PTB in the current pregnancy, with one previous PTB, is 15-20%, after two PTBs it is 35-40% and with one preterm and a subsequent term birth the risk is reduced to 10-15%.[4]

Abnormal vaginal flora
The imbalance of microbial subpopulations seen in bacterial vaginosis (BV), predominance of anaerobes and deficiency of lactobacilli is associated with an increased risk of PTB[5]. Therefore, consider treatment of BV if identified whilst performing routine screening. Pathogenic organisms such as Neisseria gonorrhoeae and Chlamydia trachomatis may also trigger an inappropriate inflammatory response leading to labour. Group B streptococcal colonisation is normally seen in up to 25% of inner-city populations and is not an indication for antepartum treatment unless accompanied by symptomatic discharge or bacteriuria.[6]

Urinary tract infection (UTI)
UTI including asymptomatic bacteriuria, cystitis, and pyelonephritis is associated with PTB.[7]

Systemic bacteraemia
Both acute (e.g. pyelonephritis, appendicitis, pneumonia and dental abscesses) and chronic (cystic fibrosis) bacteraemias are associated with PTB. This is presumed to be either due to direct blood-borne spread of infection to the uterine cavity or indirectly due to chemical triggers such as accompanying endotoxins or cytokines. [8,9]

Cervical compromise
Cervical compromise (to length or strength) may arise following large loop excision of the transformation zone (LLETZ), where the amount of tissue removed is >10mm in depth, multiple dilatations of the cervix, hysteroscopic procedures where the cervix has been dilated up to or beyond Hegar 10, or in conjunction with Mullerian variants (alterations in uterine size/shape such as unicornuate or bicornuate uteri). [10,11]

Uterine capacity
Conditions that increase uterine distension or interfere with uterine capacity such as fibroids, polyhydramnios, multiple pregnancy, or as a consequence of Mullerian variants are risk factors for PTB. [12]

Placentation
Antepartum haemorrhage and/or persisting extrachorionic haemorrhage due to abnormal placentation, with chronic and repeated bleeding, is also a recognised risk factor for PTB.[13]

Social factors
Smoking, domestic violence and maternal age are also risk factors for PTB.

4 Identification and care of women at risk of preterm birth

Prevention of preterm labour involves the screening of **all** women to identify and initiate interventions tailored to specific risk factors. The following risk factors should be identified at the booking visit:

Smoking
This doubles the risk of PTB. **All** women should be asked about their smoking status at each antennal contact, and appropriate Very brief Advice delivered and a 'opt-out' referral to Stop Smoking Support should be provided as soon as possible. Women who have experienced a previous PTB and who stop smoking early in the pregnancy modify their risk back to that of a non- smoker. If stop smoking support is delayed until the third trimester, this modifiable benefit is lost. The promotion of stop smoking interventions is therefore one of the most important prevention strategies to implement.

Maternal age
Young women (<18 years) have an increased risk of PTB. Appropriate referral to the Teenage Pregnancy team should be offered to provide adequate support and advice throughout the pregnancy.

Domestic violence
Women experiencing domestic violence and/or other social pressures should be directly counselled and referred for specific support through our local pathways.

Urinary tract infection (UTI)
A midstream urine sample (MSU) should be taken and sent for culture and sensitivity in all pregnant women at booking. Culture-positive samples, even in symptom-free women (asymptomatic bacteriuria), should be promptly treated. Following any positive culture and treatment, a repeat MSU to confirm clearance is recommended. Those who have a recurrent episode require review in secondary care. Each antenatal attendance a urinalysis should be undertaken with a view to identifying UTIs in symptom free women to reduce the chance of preterm birth.

Vaginal infection
Pathogens such as *Neisseria gonorrhoeae* and *Chlamydia trachomatis* are associated with PTB and screening should be offered to at-risk women. In particular, the booking midwife should inform each pregnant woman under the age of 25 years about the high prevalence of chlamydial infection in their age group and may offer screening depending on local policy. The role of organisms found in bacterial vaginosis (BV) remains controversial; the presence of BV is linked with PTB, but the varying methods used to ascertain its presence, and the timing and means of treatment in several studies have meant that no consensus currently exists as to its screening and treatment in at-risk women. The presence of Group B Streptococci in a vaginal swab is not an indication to treat until in labour unless also isolated from a midstream urine specimen.

Risk factors requiring referral to the preterm prevention clinic/ clinic with access to specialist in preventing/managing preterm birth

A further set of questions should be used to ascertain risk factors associated with pre term birth at the booking appointment to appropriately identify women at **high risk** (table 1) of preterm birth who will benefit from preventative strategies and more intensive monitoring.

In addition, women at **intermediate risk** should be reviewed in a consultant-led setting and offered increased surveillance as per table 2.

Risk factors associated with preterm birth and recommended referral pathways for preterm prevention surveillance

Table 1

Risk factors	Gestation	Surveillance	Management
HIGH RISK **To be seen in PTB specialist prevention clinic/pathway**			
Previous use of cervical cerclage	**10/12 weeks**	Further risk assessment based on history +/- examination as appropriate in secondary care with identification of women needing referral to tertiary services All women to be offered transvaginal cervical scanning as a secondary screening test to more accurately quantify risk every 2 – 4 weeks between 16 and 24 weeks Additional use of quantitative fetal fibronectin in asymptomatic women may be considered where centres have this expertise	Interventions should be offered to women as appropriate, based on either history or additional screening tests by clinicians able to discuss the relevant risks and benefits. These interventions should include cervical cerclage, pessary and progesterone as appropriate.
History of trachelectomy (for cervical cancer)			
Previous PTB or mid-trimester loss (16 to 34 weeks gestation)	**16 Weeks**		
Previous preterm prelabour rupture of membranes <34/40			
Intrauterine adhesions (Ashermann's syndrome)			
History of significant cervical excisional event • more than one LLETZ procedure • any knife cone biopsy			
Known or suspected uterine variant (i.e. unicornuate, bicornuate uterus or uterine septum)			

Table 2

Risk factors	Gestation	Surveillance	Management
INTERMEDIATE RISK **Review in a consultant-led setting and offer increased surveillance**			
Previous delivery by caesarean section at full dilatation (or documented extensions to lower segment incision at operation)	**16 weeks**	Further risk assessment based on history +/- examination as appropriate in secondary care with discussion of option of additional screening tests, including: A single transvaginal cervical scan between 18 – 22 weeks as a minimum Additional use of quantitative fetal fibronectin in asymptomatic women can be considered where centres have this expertise	Interventions should be discussed with women as appropriate based on either history or additional screening tests by clinicians able to discuss the relevant risks and benefits. These interventions should include cervical cerclage, pessary and progesterone as appropriate. Women at intermediate risk should be reassessed at 20 weeks for consideration of transfer back to a low risk pathway
One previous LLETZ procedure where evidence of depth of excision is greater than 10mm			

***Incorporate into Risk Assessment at booking ***

Cervical length surveillance

Transvaginal sonography may be used to assess cervical length and the anatomy of the internal os between 16 to 24 weeks. In low-risk women, cervical length is a normally-distributed variable with a mean of 35-40mm from 14 to 30 weeks. Cervical length is a good predictor of PTB for high risk women, with sensitivity of 60-80% and PPV of 70% when cervical length is less than 25mm between 16-18 weeks.

After 30 weeks of gestation, the cervix progressively shortens physiologically in preparation for labour and thus it is not usual to rely on cervical length measurement at this gestation and beyond for the prediction of spontaneous PTB in asymptomatic women.

5 Prevention of preterm birth in high risk women

After assessment within the PTB specialist prevention clinic/pathway, on the basis of history and/or additional screening, women may be offered treatment to prevent second trimester miscarriage and PTB.

Several interventions have been assessed for women at high risk of PTB: cervical cerclage, progesterone and Arabin pessaries. Cervical cerclage is an established procedure, progesterone is recommended in certain situations by NICE, and there are randomised trials suggesting benefit in the use of Arabin pessaries in at-risk women.

At present the evidence base cannot determine precisely in which women, and in what circumstances, each intervention will be most effective. Care must, therefore, always be individualised, taking into account the women's wishes, and following a discussion with a clinician able to discuss the potential risks and benefits of each intervention.

The following options will usually be discussed via the Preterm specialist prevention clinic/pathway:

Women with a history of spontaneous preterm birth or late miscarriage (16-34 weeks):

- Transvaginal ultrasound surveillance of the cervix within the second trimester or a history-indicated (planned, prophylactic, elective) cervical cerclage
- History-indicated cerclage will usually be placed by the end of the first trimester where possible, typically after the dating scan and first trimester combined screening has been performed
- For women having ultrasound surveillance, intervention will be discussed when the closed length of cervix is <25mm cervical cerclage, Arabin pessary or prophylactic progesterone* (vaginal) can be considered.

Women with a previous failed transvaginal suture:

- The circumstances of the failed suture and other clinical factors will be considered prior to placement, and a Shirodkar (high vaginal) or transabdominal cerclage may be considered
- Transabdominal placement is preferable preconception, and only as a last resort prior to 14 weeks gestation in the current pregnancy. Referral to a centre offering this can be made at the debrief appointment. See section 10 for details of regional referral centres.

Women with no history of spontaneous preterm birth or midtrimester loss in whom a transvaginal cervix scan has been carried out between 16+0 and 24+0 weeks of pregnancy and the cervix is 25mm or less:

- Care for these women should be individualised; counselling should include options of continued surveillance or intervention which could include cervical cerclage, pessary and progesterone* as appropriate. In the case of progesterone, the effects are most beneficial in women with a cervical length of 10-20mm

Women with an intervention (cerclage, pessary or progesterone*) should remain under the care of the PTB specialist prevention clinic/pathway until delivery.

Women undergoing transvaginal cervix scanning screening usually continue this until 24 weeks; if no intervention is recommended, women may be transferred to routine pathways of care. Midwifery-led care is appropriate if no other additional risk factors are identified.

*** Dose for progesterone: 200mg Cyclogest pessaries PV BD from 16-36 weeks**

5.1 Initiation of preterm birth prevention treatment

Consider prophylactic vaginal progesterone* for women who have a history of spontaneous preterm birth (up to 34+0 weeks of pregnancy) or mid- trimester loss (from 16+0 weeks of pregnancy onwards), irrespective of cervical length

In addition:-

Offer cervical cerclage to women who have:

- a cervical length of 25mm or less
  and
- a history of PPROM <34+0 weeks gestation

Offer cervical cerclage or cervical pessary to women who have:

- a cervical length of 25mm or less

***Dose for progesterone: 200mg Cyclogest pessaries PV BD from 16-36 weeks**

Note: personalisation of care
For women who have previously had cervical surgery, a cervical length <25mm may be tolerated without treatment, providing that measurements remain stable. In these cases, treatment for short cervix should be offered if cervical length <15mm or evidence of acute and progressive cervical shortening.

5.2 Cervical Cerclage

History-indicated cerclage is offered to asymptomatic woman electively between 12-14 weeks of gestation who have had:

- Multiple mid-trimester losses or preterm births less than 34 weeks
- Successful pregnancy with a cerclage in situ previously
- Previous significant cervical surgery (cone biopsy/2 x LLETZ) and evidence of cervical shortening in a pregnancy complicated by preterm delivery
- When cervical length scanning has failed to identify at risk women in a previous pregnancy

Cerclage is associated with increased risks of:

- Maternal pyrexia
- bleeding
- small risk of bladder injury, cervical trauma, rupture membranes
- vaginal discharge which are of uncertain clinical significance

A patient information booklet is available from the RCOG website
https://www.rcog.org.uk/en/patients/patient-leaflets/cervical-stitch/

5.3 Indications for Rescue Cerclage

Rescue cerclage can be considered between 16+0 and 27+6 weeks in women with a dilated cervix and unruptured membranes if there are no:

- uterine contractions
- signs of infection
- bleeding or in established Labour

If the ultrasound appearance of 'sludge' is seen on scan and there are no other symptoms of infection, a rescue cerclage can still be considered.

5.4 Contraindications to cerclage insertion

- Active preterm labour
- Clinical evidence of chorioamnionitis
- Continuing vaginal bleeding
- Preterm Pre-labour Rupture Of Membranes (PPROM)
- Evidence of fetal compromise
- Lethal fetal defect
- Fetal death

5.5 Informed Consent

Before any type of cerclage insertion, women should be informed of the following:

- There is a small risk of intraoperative bladder damage, cervical trauma, membrane rupture and bleeding during insertion of cervical cerclage
- Cervical cerclage may be associated with a risk of cervical laceration/trauma if there is spontaneous labour with the suture in place
- Provide the RCOG information leaflet.

5.6 Peri-operative management

5.6.1 Pre-operative investigations

- Before the insertion of a history-indicated suture, offer a first-trimester ultrasound scan and screening for aneuploidy to ensure both viability and the absence of lethal/major fetal abnormality
- Before ultrasound-indicated or rescue cerclage, it is good practice to ensure an anomaly scan has been performed recently
- If patient presents with symptoms and signs of genital tract infection, genital swabs should be taken and empirical treatment commenced (to be changed to sensitive antimicrobial after culture results). Microbial eradication should be confirmed before proceeding with insertion of cervical suture. In the absence of symptoms of genital tract infection, a high vaginal swab may be taken immediately prior to cerclage insertion
- In women with no signs or symptoms of genital tract infection there are no studies to support immediate versus delayed cerclage insertion in either rescue or ultrasound-indicated procedures, but as delay can only increase the risk of infection, immediate insertion is likely to supersede the benefits of waiting to see if infection manifests clinically
- There are no studies evaluating the benefit of screening for genital tract infection before insertion of a cerclage
- The decision for antibiotics prophylaxis at the time of cerclage is at the discretion of the surgeon/ team (no studies)

5.6.2 **Cerclage Insertion**

- Insertion is usually undertaken under spinal anaesthetic
- Consider use of a foley catheter
- Intraoperative antibiotics should be given if membranes require manual manipulation
- Placement of the knot, either anteriorly or posteriorly can be surgeon's preference
- Suture type should be surgeon's preference

5.6.3 **Post-operative management**

- Rescue cerclage are at high risk of PPROM, early preterm delivery, infection and miscarriage. Therefore recommend 24 hours post- operative observation in hospital
- Ultrasound indicated cerclage can be managed as day case
- All patients undergoing cervical cerclage should have an appointment made for review in preterm birth prevention after cerclage insertion
- Bedrest is not routinely recommended

5.7 Removing cerclage or cervical pessary

- Cerclage or cervical pessary should be removed in the event of PPROM
- Cerclage or cervical pessary should be removed in women presenting in established preterm labour to minimise the risk of trauma to the cervix
- Cerclage or cervical pessary should be removed electively before labour, usually after 37+0 gestation, unless delivery is by elective caesarean section, in which case suture removal could be delayed until this time
- A plan for removal of cerclage or pessary should be made at the time that it is placed

6 Initial assessment in suspected preterm labour

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 and consent gained. The findings and plan of care should be documented in the maternal records (see appendix 1 appendix 2 Quick reference guides).

Clinical information should be obtained, including:

- Gestational age
- Possibility of ruptured membranes (See GMEC Pre-Labour Rupture of Membranes (PROM) before 37 weeks Guideline)
- Onset, frequency and duration of contractions; with direct confirmation by palpation
- Past obstetric history including: Mid-trimester miscarriages, pre-term deliveries, vaginal bleeding/discharge
- Antepartum haemorrhage
- Symptoms suggestive of generalised infection or a urinary tract infection (UTI)
- Major social disturbance/life events
- History of cone biopsy/ LLETZ/ other cervical surgery

A clinical examination should be performed looking for:

- Evidence of infection – Modified Obstetric Early Warning Score
- Evidence of any abdominal pathology e.g. pyelonephritis
- Presence of any uterine tenderness and irritability
- Contractions – duration and frequency
- Obstetric abdominal palpation – presentation, lie, level of presenting part, amniotic fluid

The following investigations should be performed:

- CTG. Note - in women who are less than 26 weeks gestation, CTG monitoring must not be used unless discussed with a consultant
- Ultrasound scan to confirm presentation. It may also be necessary to confirm gestation and assess fetal growth
- Full blood count
- MSSU

Speculum/vaginal examination

- Following exclusion of other causes of abdominal pain a sterile speculum examination should be performed with consent, to inspect for liquor and take HVS.
- Use water as a lubricant NOT Hibitane® or gel
- If there is no evidence of preterm, prelabour rupture of membranes (PPROM) then perform a FFN test. **DO NOT** perform a FFN test if gestation is less than 22 weeks or >34+6 weeks; if there is PPROM, bleeding or a history of sexual intercourse in the last 24 hours, or significant cervical dilatation

- If there is evidence of PPROM collect liquor using a quill or swab, send for culture and sensitivities and manage as per the PPROM guideline
- When a FFN test is performed the patient details and test result must be recorded. A FFN test result sticker must be placed in the woman's notes along with a completed FFN swab sticker

The recommended methods to diagnose preterm labour are shown on flowcharts 1 (16+0 to 21+6 weeks gestation) and 2 (22+0 to 34+6 weeks gestation). For women 35+0 weeks gestation and above diagnosis should be based on vaginal examination. If the cervix is <3cm dilated, and the gestation 22+0 to 34+6 weeks then there are 3 possible methods of assessing the likelihood of preterm birth.

These are:

a) Quantitative fetal fibronectin: Quantitative fetal fibronectin can be used as a diagnostic test in symptomatic women to determine the likelihood of delivery within 48 hours for women who are 22+0 to 34+6 weeks, particularly when cervical length scan cannot be performed. The use of qualitative fetal fibronectin estimation and other near-patient tests such as placental alpha macroglobulin-1 (PAMG-1, PartoSure) and insulin-like growth factor binding protein-1 (IGFBP-1, Actim Partus), are not currently recommended by NICE to diagnose preterm labour[14]
b) Cervical length scan
c) QUiPP app (available at https://quipp.org). This is a risk-calculator which uses medical history and either cervical length, fetal fibronectin, or both to compute a risk of birth If the risk of delivery within 1 week is <5% manage as unlikely preterm labour and consider discharge. If the risk of delivery within 1 week ≥5% manage as likely preterm labour. This can be personalised to patient and clinician preference

   For details of how to interpret A-C see appendix 3

7 Management of bulging membranes before 24 weeks

Second trimester miscarriage and very early PTB results in significant risks of morbidity and mortality to babies. Cervical weakness is one important cause of mid-trimester birth. An established treatment for cervical insufficiency is vaginal cervical cerclage.

In a situation where the cervix has opened and the fetal membranes are exposed, an emergency cervical cerclage (ECC) could be considered. This procedure aims to halt further cervical dilatation and prolong pregnancy, preventing miscarriage or PTB, and thus potentially improving neonatal outcome. However, it carries risks to both the mother and baby. These risks include cervical trauma, severe infection/sepsis and iatrogenic rupture of membranes during the procedure leading to fetal loss.

ECC is currently under evaluation in the C-Stitch2 study and there remains uncertainty about both the immediate benefit and long-term development of babies born following ECC. If a woman at 16-24 weeks gestation presents with bulging membranes, ECC may be considered (NICE 2019)[15]. There is reference to ECC up to 28 weeks gestation in the 2019 NICE guidance however, the risk vs benefit would need to be discussed in detail.

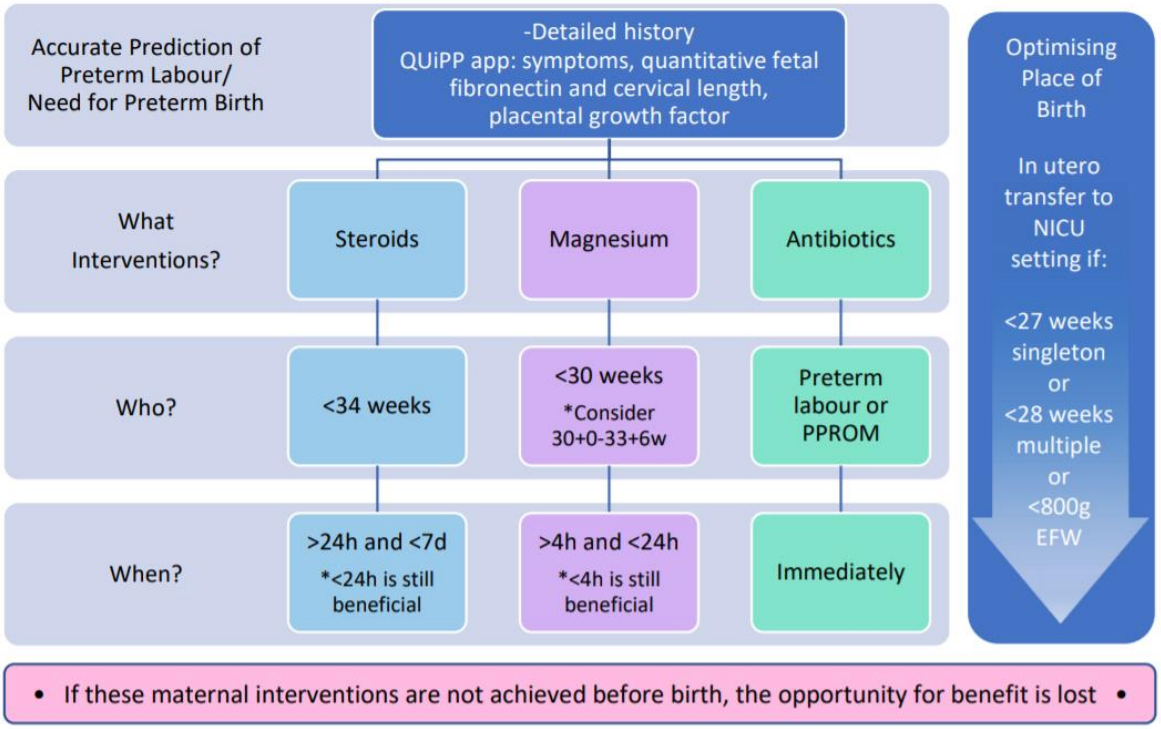
Contraindications to a cerclage would be where pain, contractions, heavy bleeding, ruptured membranes, chorioamnionitis were present, or where fetal parts were no longer in the uterus.

On identification of a woman with bulging membranes at 16-24 weeks:

- Admit to Delivery Suite
- Bloods – FBC and CRP
- HVS
- MSU, even with negative dipstick
- TED stockings
- Inform on call consultant
- If presenting overnight, fast from 3am, water until 7am if a suture is to be considered

There is no evidence of benefit for a head-down tilt, total bed rest or urinary catheter insertion and so these should be avoided.

8 Care following diagnosis of preterm labour



Aims of obstetric components of antenatal optimisation, from British Association of Perinatal Medicine (BAPM) (2019) Antenatal Optimisation Toolkit https://www.bapm.org/pages/194-antenatal-optimisation-toolkit

Treatment is aimed at:

- addressing the precipitating cause
- improving fetal outcome with the use of steroids and magnesium sulphate
- delaying delivery to enable corticosteroids/magnesium sulphate to act or permit *in utero* transfer
- prevention of chorioamnionitis

8.1 Corticosteroids

Antenatal steroids are associated with a significant reduction in rates of neonatal death, respiratory distress syndrome (RDS) and intraventricular haemorrhage and are safe for the mother (RCOG 2010). They are most effective in reducing RDS for neonates that deliver between 24 hours and 7 days after administration of the second dose. Use of a single course of antenatal corticosteroids does not appear to be associated with any significant short-term maternal or fetal adverse effects.

Between 22+0 and 24 weeks

Any woman offered tocolysis should also be offered a single course of antenatal corticosteroids unless there are maternal contra-indications. Other women at high risk of delivery between these gestations should also be offered a single course e.g. bulging membranes with expectation of neonatal resuscitation. The decision to administer corticosteroids at gestations less than 24w0d should be made at a senior level taking all clinical aspects into consideration.

Between 24+1 and 34+6 weeks
All women on tocolysis should be offered a single course of antenatal corticosteroids unless there are maternal contra-indications. Other women at high risk of delivery between these gestations should also be offered a single course of corticosteroids.

Between 35+0 and 36+6 weeks
Infants who are born at 35 to 36 weeks of gestation (late preterm) are at greater risk for adverse respiratory and other outcomes than those born at 37 weeks of gestation or later (NICHD Maternal–Fetal Medicine Units Network, 2016). Therefore, consideration should be given to offering a single course of antenatal corticosteroids to women delivering at these gestations to reduce the rate of neonatal respiratory complications in line with other regional guidelines. In the setting of growth restriction, steroids should be given for premature delivery up to 36+6 weeks.

(The PHOENIX trial[16] (Chappell et al, Lancet 2019) found that the likelihood of the baby being admitted to the neonatal unit is increased by around 25% with planned early delivery due to pre-eclampsia, mainly due to prematurity. Steroids should therefore be offered if delivery is planned due to pre-eclampsia up to 36+6 weeks.

Repeat courses:
A single rescue course may be considered with caution for women where the initial course was given at less than 26+0 weeks gestation. This must be a consultant decision.

Dose and route of administration:
Two doses of betamethasone 12mg given intramuscularly, or two doses of dexamethasone 12mg intramuscularly, given 24 hours apart (or can be given with a 12 hour interval if it is felt there is a risk of delivery within the next 24 hours). Choice depends upon the stock available. These are unlicensed indications for these medications but are commonly used within practice.

8.2 Antibiotics

Preterm or low birthweight babies are particularly vulnerable to Group B Streptococcal sepsis, so all women in *confirmed* preterm labour should be given intrapartum antibiotic prophylaxis (3g benzylpenicillin IV loading dose, then 1.5g benzylpenicillin IV four-hourly until birth).

8.3 Tocolysis

Tocolytics may be used to delay delivery and so allow time for the effect of steroids/ magnesium sulphate, or to allow in utero transfer to occur, in at-risk women under 34 weeks' gestation.

In randomised trials there was no decrease in perinatal mortality or morbidity associated with tocolytic use and it should be remembered that prolongation of the pregnancy is not always beneficial for the baby.[20] Its use is mainly to allow time for steroids/magnesium sulphate to be effective or to enable an *in-utero* transfer.

Indications for tocolysis

- regular uterine contractions of at least 30 seconds duration at a rate of 4 per 30 minutes or greater

or

- cervical dilatation of 1-3cm and effacement of at least 50%

Relative contraindications to tocolysis

- less than 22+0 or more than 33+6 weeks gestation
- antepartum haemorrhage
- chorioamnionitis
- known hypersensitivity to the active substance or any of the excipients (the carrier vehicle for the active drug)
- any other conditions in the mother or fetus in which continuation of the pregnancy would be hazardous

8.3.1 Nifedipine

The decision to start nifedipine should be taken by a senior obstetrician (ST5 or above or equivalent) with the aim of delaying delivery long enough to allow steroids/ magnesium sulphate to be effective or to enable an *in-utero* transfer.

There is evidence that the calcium channel blocker nifedipine is effective in treating preterm labour, does not cause a significant fall in blood pressure in normotensive women, and has no significant fetal/neonatal side effects but may in fact have some positive benefits in terms of reduced neonatal complications (when compared with β-sympathomimetics).

Nifedipine is contraindicated in women with cardiac disease and should be used with caution in women with diabetes or multiple pregnancy (risk of pulmonary oedema).

Nifedipine regime:	
Dosage	Loading dose of immediate release nifedipine orally, 20mg
Timings	Maintenance therapy of nifedipine modified release (MR) orally 20mg, 3 – 4 times a day 6 hourly for up to 48 hours.
Monitoring	Blood pressure and pulse every 15 mins for the first 2 hours. Continuous EFM for first 2 hours which can be discontinued if contractions settle.

If nifedipine is contraindicated or there is a multiple pregnancy then Atosiban should be used as a first-line tocolytic.

8.3.2 **Atosiban**

The decision to start Atosiban should be taken by a senior obstetrician (ST5 or above or equivalent) with the aim of delaying delivery long enough to administer steroids (as above)/magnesium sulphate to be effective or to enable an *in-utero* transfer.

1.	**Initial bolus dose (6.75milligrams) over one minute.**
	• draw up 0.9ml from 5ml ampoule of Atosiban 7.5mg/ml concentrate for intravenous infusion and give over one minute
2.	**Immediately followed by a continuous high dose infusion (300 micrograms/min) of Atosiban over three hours**
	• withdraw 18.1ml from a 100ml bag of 0.9% sodium chloride • add to the remaining sodium chloride (81.9ml), a total of 9.1ml of Atosiban 7.5mg/ml (the 4.1ml from the first 5ml ampoule. and a second 5ml ampoule of the same concentrate) • the resulting solution (0.75mg/ml) should be infused at 24ml/hour (300micrograms/min) over three hours • this solution will last nearly four hours
3.	**Followed by a lower dose of Atosiban infusing at 100micrograms/min for up to 45 hours or a total treatment length of 48 hours**
	• withdraw 10ml from a 100ml bag of 0.9% sodium chloride • add two 5ml ampoules of Atosiban 7.5mg/ml concentrate for solution for infusion • the resulting solution (0.75mg/ml) should be infused at 8ml/hour (100micrograms/min)

Atosiban regime				
Step	**Regime**	**Injection/infusion rate**	**Atosiban dose**	**Length**
1	0.9ml IV bolus	Over 1 minute	6.75mg	1 minute
2	3 hours IV loading infusion	24ml/hour	18mg/hour (300mcg/min)	3 hours
3	Subsequent IV infusions	8ml/hour	6mg/hour (100mcg/min)	Up to 45 hours

If the uterus remains quiescent, discontinue infusion.

Response to Atosiban should be judged by uterine activity and not by repeated vaginal examinations. If labour progresses, discontinue Atosiban.

Monitoring

- Maternal pulse and BP every 15 minutes for the first hour then hourly
- Continuous electronic fetal monitoring (>26 weeks) until contractions stop after which intermittent auscultation should be carried out every 4 hours and a CTG twice daily until the Atosiban infusion is completed. Continuous electronic fetal monitoring (>26 weeks) should be restarted if contractions recommence

8.3.3 **Indomethacin**

Note this is an off-label use of this medication. Contraindications include:

- Gestation greater than 28w 0d as there have been reported cases of premature closure of the ductus arteriosus at higher gestations
- Known sensitivity to non-steroidal anti-inflammatory drugs
- Maternal renal disease
- Maternal peptic ulcer disease
- Fetal renal disease
- Severe oligohydramnios
- Twin to twin transfusion syndrome
- Severe asthma
- Suspected or known IUGR (unless directed by a consultant)

Indomethacin should be used with caution in women with:

- Antepartum haemorrhage
- Fetal malformation.
- Thrombophilia on low molecular weight heparin or aspirin

Indomethacin Regime	
Dosage	100mg rectal suppository stat.
Timings	Followed by 25mg orally 6 hourly for 48 hours starting 24 hours after receiving the 100mg dose (or a further 2 doses of 100mg PR at 24 hour intervals).
Monitoring	• Routine obstetric observations • Continuous electronic fetal monitoring until uterine activity ceases. At less than 26 weeks gestation this should only be performed at the discretion of the consultant • Fluid balance chart, no specific restrictions • U+ E at initiation of therapy • Medical review after 3 hours if still contracting with a view to performing vaginal examination. If at this stage there is clear cervical change then discuss use of second line agent with consultant • Ultrasound assessment of amniotic fluid index at 24 hours or on the next standard working day

8.3.4 **Indications to discontinue tocolytic therapy**

- Evidence of chorioamnionitis not responding to antibiotics
- Progressive cervical dilatation
- Maximum Liquor Pool Depth (MPD) less than 2cm
- Sensitivity reaction, maternal oliguria or vomiting
- The decision to discontinue therapy should be made following discussion with the consultant on call
- At extremely preterm gestations it may be appropriate to try multiple therapies. At gestations less than 28+0 weeks consideration can also be given to the use of nifedipine
- Where uterine activity persists but there is little cervical change, evidence of placental abruption and chorioamnionitis should be actively sought

8.3.5 Fetal monitoring during tocolysis

Between 26+0 and 36+0 weeks gestation continuous CTG monitoring should be used whilst tocolysis is being administered and/or uterine activity is present

Between 22+0 and 25+6 weeks gestation discussion should take place with women regarding the different fetal monitoring options that are available. No monitoring, intermittent auscultation and CTG are all acceptable in certain circumstances

The purpose of the fetal monitoring and how it impacts on clinical decisions at differing gestations must be clearly explained. If CTG is used there should be a clear plan of what interventions would be performed if abnormalities develop

- This discussion should be performed by an ST6 or above, (or the most senior on-site with remote support from a more senior obstetrician)
- The discussion should include explanation that a normal CTG is reassuring of fetal wellbeing but an abnormal CTG does not necessarily indicate fetal hypoxia or acidosis
- It is usual to advise against the use of CTG monitoring at a gestation less than 24 weeks, due to difficulties with interpretation

8.4 Neuroprotection

Refer to Greater Manchester and Eastern Cheshire SCN Prevention of Cerebral Palsy in Preterm Labour (Precept) Guideline.

8.5 Management of suspected preterm labour with an Arabin pessary in situ

Fetal fibronectin testing and the QUiPP app have not been validated with Arabin pessary in situ. Its use could be considered as part of the overall diagnosis of preterm birth, but do not discharge a woman with symptoms of preterm labour solely on the result of a low risk fibronectin or QUiPP result.

In a woman with threatened preterm labour with an Arabin pessary in situ perform the following assessment:

- A cervical length scan. This can be technically difficult with a pessary in situ, but if performed interpret as per appendix 2.
- If a cervical length scan is not possible then perform a digital vaginal examination
  - If the pessary is no longer attached to the cervix then it is likely there has been significant cervical shortening and the pessary should be removed. Treat as likely preterm labour
  - If the cervix is ≥ 4cm dilated remove the pessary and treat as preterm labour
  - If the Arabin is still attached to the cervix with palpable cervix in the middle of the pessary then leave it in situ and reassess in 4 hours. If there is no change in 4 hours, then preterm labour is unlikely and aim for discharge

9 Preparations for delivery if preterm birth imminent

The neonatal team and neonatal unit need to be informed of the management proposed by the obstetric team regarding time, place and mode of delivery.

There needs to be joint parental counselling with the neonatal team regarding active resuscitation as opposed to planned palliative care of the baby, particularly in cases of compromise (growth restriction, infection, prolonged oligohydramnios) or extreme prematurity (in line with BAPM guidance). See parent information leaflet (appendix 7).

In cases of non-availability of a neonatal cot or preterm labour occurring in a unit without high dependency/ intensive neonatal care facilities, a decision has to be made about *in utero* transfer. Transfer is not advisable if cervical dilatation is more than 3cm and *ex utero* transfer may have to be considered in conjunction with the neonatal team. The use of the QUIPP app Appendix 3) may be valuable in aiding the decision to transfer, as probability less than 5% of delivering within 7 days would suggest that delivery is not imminent and therefore would avoid unnecessary transfer.

If delivery appears imminent then administration of magnesium sulphate for neonatal neuroprotection should be offered in gestations up to 30 weeks and considered up to 33+6 weeks, following discussion with a senior obstetrician (ST5 or above or equivalent). In meta-analyses use of magnesium sulphate reduced the likelihood of cerebral palsy from 10 to 7% in babies born at less than 30 weeks.[21] It is likely that benefit is conferred even after the loading dose has been given so administration to mothers should be considered even if delivery appears imminent, and should also be given to mothers undergoing delivery as a planned event e.g. for fetal growth restriction.

9.1 Intrauterine transfer

If active management has been chosen the team should aim to facilitate delivery of all singletons <27+0 weeks gestation and multiples <28+0 weeks gestation in a level 3 unit with a NICU. If the woman presents to a unit without capacity for level 3 NICU care then intrauterine transfer should be requested as per appendix 5.

- When an intrauterine transfer is being considered for a woman <27+0 weeks gestation a conference call with the receiving Level 3 unit may be necessary. This will be dependent upon the gestation and the risk categorisation but is essential for all babies <24 weeks gestation

Gestations above this threshold may require transfer according to local policy and capacity. The referring and receiving obstetricians should discuss the case by telephone call in these situations.

Please refer to NWNODN IUT guidance the key points for preterm birth.

9.2 Planned palliative (comfort focused) management of baby

If a decision is made for palliative (comfort focused) management of the baby at birth then steroids, magnesium sulphate, tocolysis and intrauterine transfer are not normally appropriate . Intrapartum fetal heart rate monitoring is not advised, although assessing or listening for the presence of a fetal heart to check viability may be helpful in clarifying expectations around the baby's condition at birth and be preferable for parents. Parents should be made aware that their baby may show signs of life after birth, including visible heartbeat, gasping and/or movement of limbs. Obstetric, neonatal and midwifery teams should work together to optimise the comfort focused care for the family.

9.3 Mode of delivery

Extreme preterm babies (less than 26 weeks) are usually delivered vaginally however caesarean section could be considered. Caesarean section carries significant maternal morbidity with risk of classical caesarean section and implications for future pregnancies.

In preterm labour after 26 weeks, a decision on mode of delivery will be governed by obstetric factors. There is no clear evidence to suggest benefit from caesarean section for preterm breech presentation; the risk of head entrapment (5-7%) is a feature of all breech births under 37 weeks, regardless of route.[17]

The available evidence does not support the use elective episiotomy for vaginal delivery. Ventouse delivery must be avoided below 34 weeks gestation and used with caution thereafter.

Delayed cord clamping should be facilitated wherever possible regardless of mode of delivery.

The use of epidural anaesthesia is not contraindicated and is frequently advocated. Postulated benefits include avoiding expulsive efforts before full dilatation or a precipitate delivery, a relaxed pelvic floor and perineum and the ability to proceed quickly to abdominal delivery. Remifentanil is relatively contraindicated in preterm delivery. Other types of analgesia can be used (with the usual side effect profiles which may impact on the neonate) and choice should be guided by maternal wishes in conjunction with the usual clinical indicators such as progress of labour. The neonatal team involved in care of the neonate should be informed about any analgesic drugs that have been used.

10 Postnatal care

Follow up pathways are imperative for all women who have undergone a PTB. All women who have delivered prior to 34 weeks should be offered debriefing, whilst still an in-patient, or postnatal consultation by the local obstetric team, and if recurrent or more complex, by a more experienced preterm prevention specialist. This should lead to a plan of care prior to and during any future pregnancy.

Placental histology should be routine for all deliveries prior to 34 weeks gestation and these examinations should be undertaken by a specialist perinatal histopathologist to assess for signs of infection/inflammation and ischaemia/infarction.

NB If Trusts outside of MFT intend to send placentas for specialist examination to the MFT Histopathology laboratory, please first contact lead Histopathologist Dr Gauri Batra to confirm anticipated referral numbers (Laboratory telephone number: 0161 701 2240). See information sheet for more details.

- MFT Placental histology information sheet
- Request Form for Histopathological Examination of Placenta

In addition, psychological support should be available where required. Women with a history of extreme PTB (<28 weeks) despite the placement of a transvaginal cervical cerclage should be counselled about the option of placing an abdominal cervical cerclage before the next pregnancy (laparoscopic or open), to reduce the risk of PTB.

Centres offering this are listed below:

- Saint Mary's Hospital at Wythenshawe: Mr Andy Pickersgill – written referral
- Saint Mary's Hospital Oxford Road Campus: Mr Edmund Edi-Osagie; Mr Kingshuk Majundar; Mr Ken Ma – written referral
- Stepping Hill Hospital: Mr Suku George – written referral

11 Audit

Monitoring Compliance

Process indicators

- percentage of singleton live births (less than 34+0 weeks) receiving a full course of antenatal corticosteroids, within seven days of birth.
- percentage of singleton live births (less than 34+0 weeks) occurring more than seven days after completion of their first course of antenatal corticosteroids.
- percentage of singleton live births (less than 30+0 weeks) receiving magnesium sulphate within 24 hours prior to birth.
- percentage of women who give birth in an appropriate care setting for gestation (in accordance with local ODN guidance).

Outcome indicators (SBLCB2)

- the incidence of women with a singleton pregnancy giving birth (liveborn and stillborn) as a % of all singleton births:
  - in the late second trimester (from 16+0 to 23+6 weeks).
  - preterm (from 24+0 to 36+6 weeks)

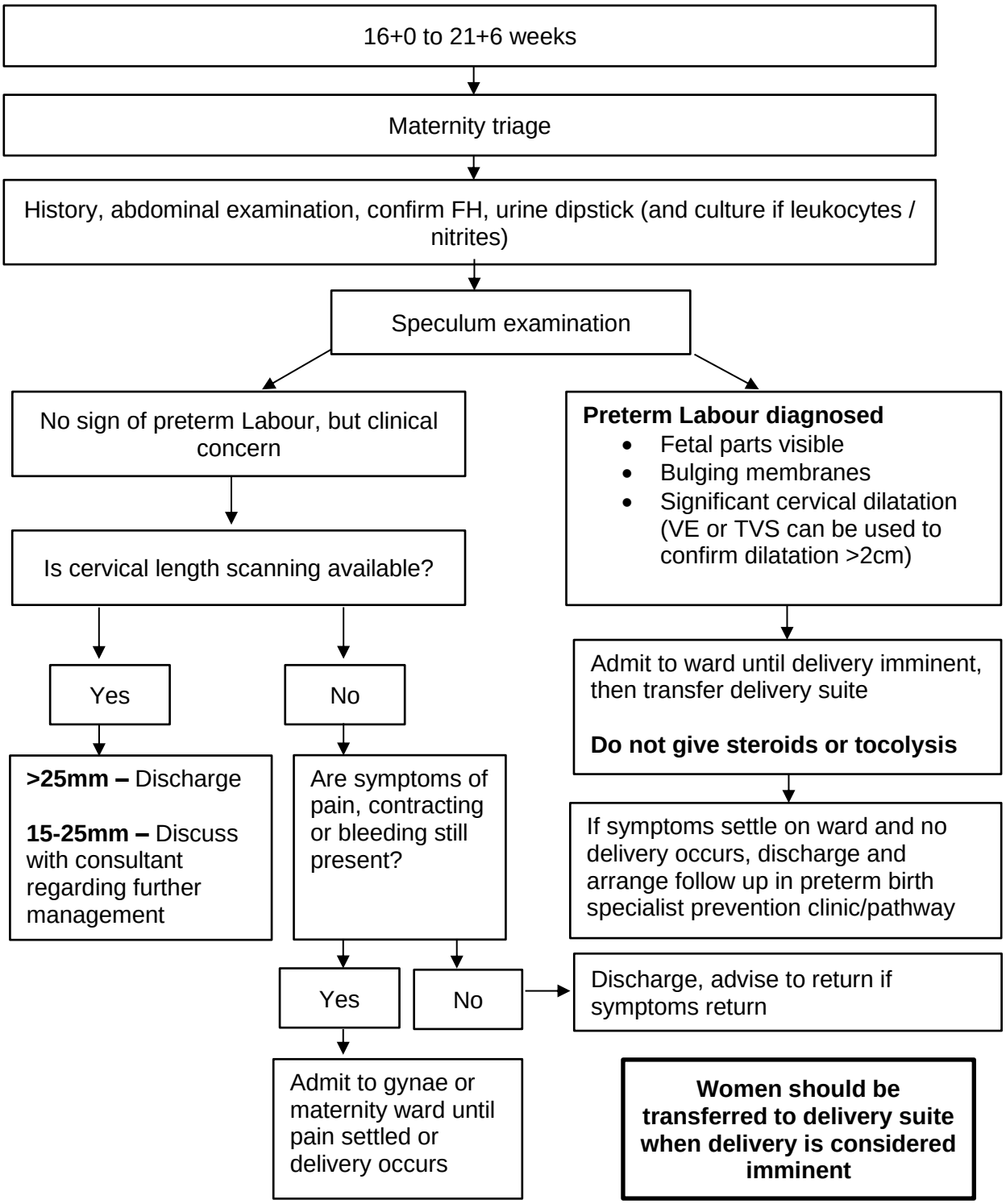
Audit results will be presented at the Women's Services Clinical Governance and Audit meeting and an action plan developed as necessary. A lead will be appointed for monitoring of the action plan, including re-audit, and the status of the action plan reported to the Women's Services Clinical Governance and Risk Management Forum (WSCG&RMF) quarterly.

12 Telephone numbers of the NWNODN Neonatal Units

	Unit Tel No:	Unit Level
Saint Mary's Hospital Oxford Road, Manchester University NHS FT	0161 901 2700	NICU
Royal Oldham Hospital	0161 627 8151	NICU
Saint Mary's at Wythenshawe, Manchester University NHS FT	0161 291 2932	LNU
North Manchester General Hospital	0161 625 8227	LNU
Royal Albert Edward Infirmary, Wrightington, Wigan & Leigh NHS FT	01942 778504	LNU
Royal Bolton Hospital , Bolton NHS FT	01204 390748	NICU
Stepping Hill Hospital, Stockport NHS FT	0161 419 5520	LNU
Tameside General Hospital, Tameside & Glossop Integrated Care NHS FT	0161 922 6079	LNU

For clinical advice refer to the NWNODN Clinical advice guideline

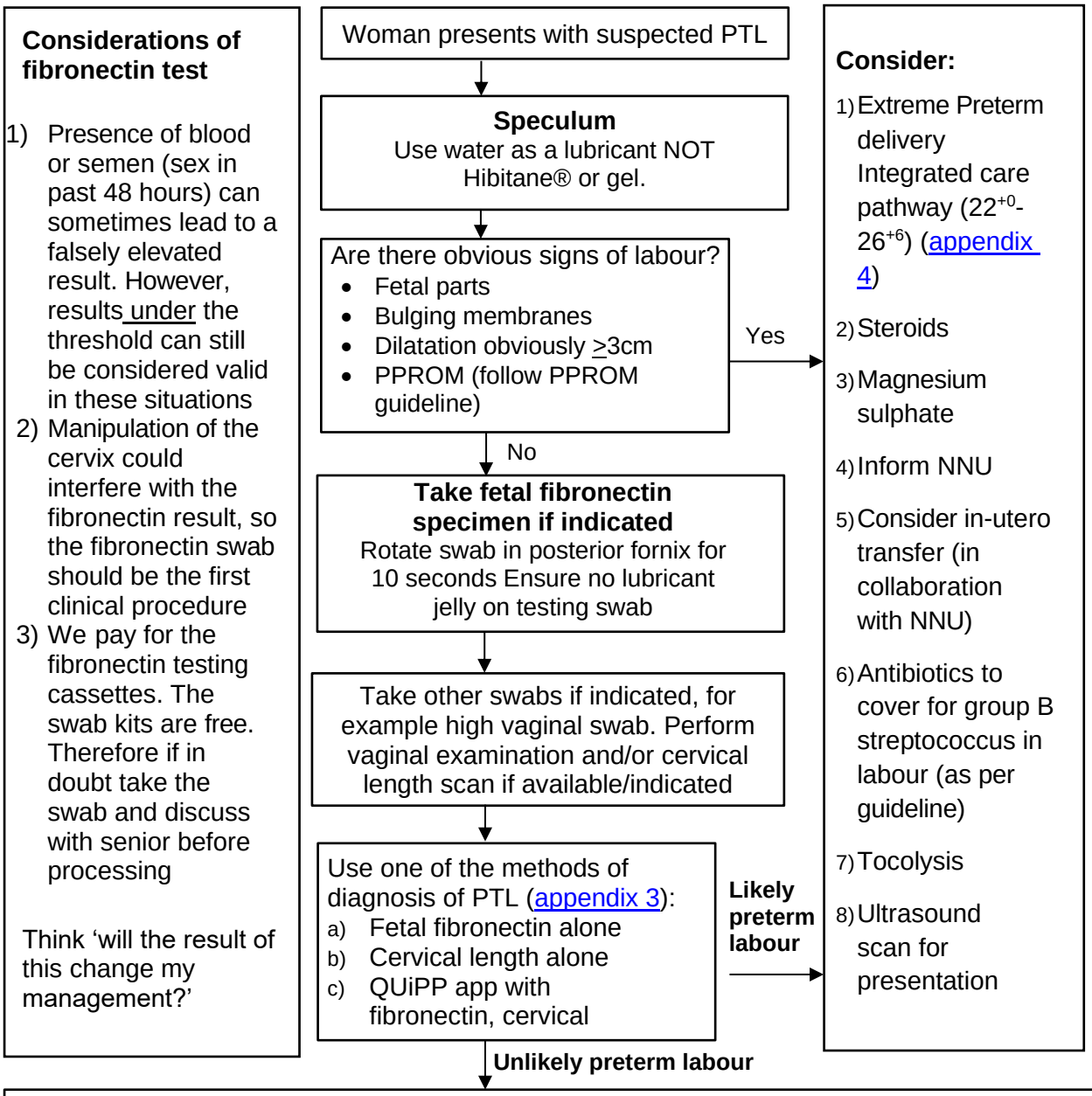
Appendix 1: Diagnosis & Management of threatened preterm labour 16+0 – 21+6 (Intact membranes)



Appendix 2: Diagnosis & Management of threatened preterm labour 22+0 – 34+6 (Intact membranes)

Confirm symptoms of preterm labour

Note: Preterm labour (PTL) can present with subtle pressure sensation, back pain, vaginal bleeding, symptoms of urinary tract infection as well as classical abdominal tightening. If in doubt – offer examination



PTL is unlikely, consider alternative diagnoses.
Discharge is usually appropriate, with safety net advice to return if symptoms continue or worsen Follow up:

1) If patient is <24+0 weeks gestation and risk of preterm birth under 34 weeks is ≥10%, or cervical length is <25mm then offer follow up in preterm specialist prevention clinic/pathway within in 1-2 weeks

Appendix 3: Methods for assessing risk to assist diagnosis (likelihood of preterm labour)

There are three options for diagnosis of likely preterm labour:

a) Quantative fetal fibronectin (qfFN)
b) Cervical length assessment
c) QUiPP app using a combination of maternal history, qfFN and/or cervical length

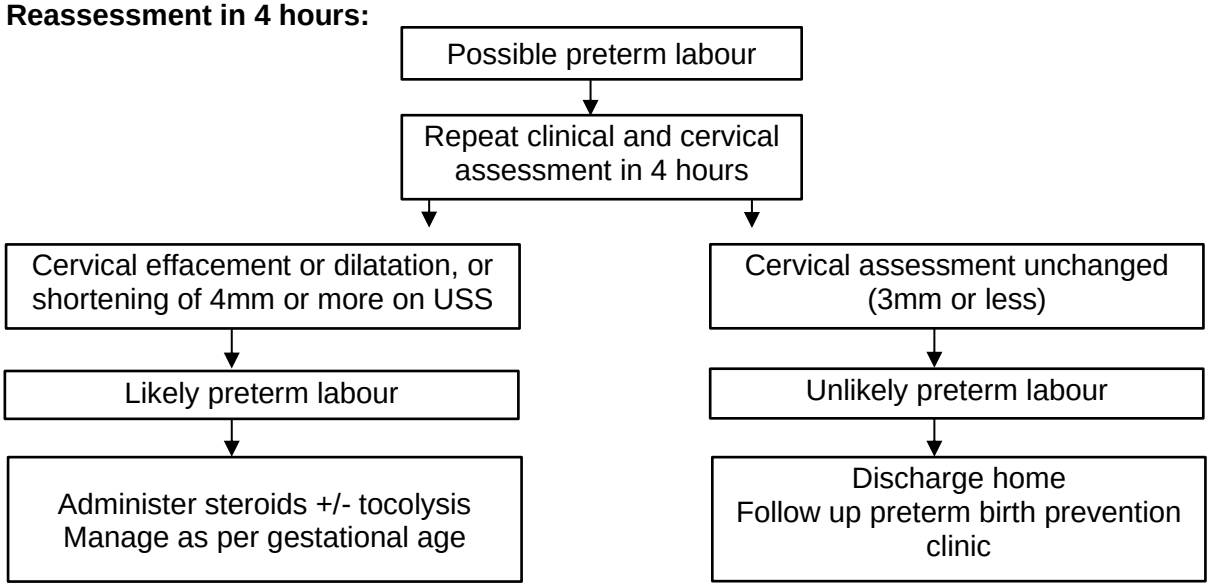
a) Quantitative fetal fibronectin results and management

Fetal Fibronectin only
<50ng/ml – Unlikely PTL, consider discharge
50-199ng/ml – Review by a senior obstetrician (ST3+). Discharge is normally appropriate unless high-risk history. Recommend cervical length scan within 10 days for women <30^{+0} weeks gestation.
200-499ng/ml – Admit to presenting hospital. Recommend either cervical length scan when available or VE and reassess in 4 hours. If cervical changes manage as likely PTL.
>500ng/ml – Manage as likely preterm labour

Stratification of Preterm Birth Risk by fFN Concentration (manufacturer's (HOLOGIC) data)

fFN Level	(%)	Delivery ≤ 7 days	Delivery ≤ 14 days	Delivery before 34 wks, 0 days
< 10 ng/mL	-57%	1%	1.80%	1.50%
10 to 49 ng/mL	-21%	0%	1.60%	8.20%
50 to 199 ng/mL	-14%	0%	7.70%	11.50%
200 to 499 ng/mL	-5%	14%	29%	33%
≥ 500 ng/mL	-4%	38%	46%	75%

Reassessment in 4 hours:



b) Cervical length scan

If a cervical length alone is performed base management on the cervical length. If the cervical length is ≤15mm manage as likely preterm labour. If the cervical length is >15mm manage as unlikely preterm labour and consider discharge.

If a woman has a cervical length >15mm but <25mm at less than 24+0 weeks gestation she should be seen in a preterm birth specialist prevention clinic/pathway and management offered as per section 3.

c) QUiPP app

This is available at https://quipp.org/symptomatic.html or available free to download from the app store for Apple and Android devices.

Instructions:

1. Use the 'symptomatic' option
2. Input the woman's risk factors and either one or both of cervical length or QfFN value
3. If the risk of delivery within 1 week is <5% manage as unlikely preterm labour and consider discharge. If the risk of delivery within 1 week ≥5% manage as likely preterm labour. It is appropriate to discuss this with the woman and adjust management dependent on her circumstances

QUiPP app assessment can be documented on a sticker as below:

QUiPP		
Date:	Time:	Gest:
Calculated using cx length □	Fibronectin □	
Probability of spontaneous delivery within 1 week		%
Risk of delivery within 1 week ≥5% **Treat as pre-term labour**	Yes □	No □
Risk of delivery within 1 week <5% **Unlikely pre-term labour**	Yes □	No □
Name:		Designation:
Signature:		

.

Appendix 4 : Extreme Preterm Delivery Integrated Care Pathway (22+0 to 26+6)

Mother's Name:	Place patient identifier sticker here
Date of Birth:	
Hospital Number:	
NHS Number:	
Partner's name	

Please note: this pathway should be commenced when the obstetric and midwifery team, in collaboration with the family and members of the Multi-Disciplinary Team (MDT) have agreed in partnership that the baby is at risk of being born preterm. Further Guidance: https://www.bapm.org/resources/80-perinatal-management-of-extreme-preterm-birth-before-27-weeks-of-gestation-2019

If mother presents at an LNU or SCU then an early discussion with the potential NICU is essential. Depending on gestation and any further identified risks a joint conference call, which includes the neonatal & obstetric leads and the parents, with the potential NICU is recommended with Consultant to Consultant communication as appropriate. Whilst this is best practice, especially for babies <24 weeks gestation, it is acknowledged that a joint call with parents may not always be appropriate or logistically possible

SUMMARY OF AGREED PLAN OF CARE Date _____

ACTIVE CARE (survival focussed) ☐			**PALLIATIVE CARE**(Comfort focused) ☐		
Obstetric Consultant at First Review		Neonatal Consultant at First Review			
Review should be triggered if Suspected onset of labour, Signs of infection, Reaching 22 weeks gestation or weekly if still in hospital					
Reason(s) for potential delivery:					
Date and time of review 1		Gestation		Change in view	Yes / No
Date and time of review 2.		Gestation		Change in view	Yes / No
Date and time of review 3.		Gestation		Change in view	Yes / No
EDD					
Antenatal plan					
Antenatal corticosteroids		Date 1. Date 2.			
Magnesium sulphate		Date & Time			
Maternal Antibiotics commenced		Yes/No. If Yes give date & time of first dose			
Antenatal monitoring		Nil / Auscultation / Daily CTG			
Plan for labour					
Intrapartum monitoring		☐ Nil ☐ Intermittent Auscultation – how often _____ ☐ CTG			
Response to cord prolapse /pathological CTG/ prolonged bradycardia in the first stage of labour		☐ For CS ☐ Not for CS			
Plan for resuscitation: Ensure text includes options on intubation, ventilation, UVC, drugs, cardiac massage					

Initial Joint Counselling

Counselling should be by the most senior Obstetric and Neonatal doctors available.
Unless time prevails when outside of a NICU a joint conference call between the referring LNU/SCU and receiving NICU if <24 weeks gestation, or at the discretion of the referring team dependent upon clinical factors, should be arranged as soon as possible with a collaborative approach to counselling parents.

Date of assessment	……/……../……..	Time of Assessment	……..
Estimate of gestational age today	…….. WEEKS …… DAYS	Sex of fetus(es) if known	
Basis for estimate of gestational age	Scan at …… weeks on …./…./……. LMP		
Number of fetuses	Estimated fetal weight(s) ……g, ……..g	Date of scan	
Obstetric discussion led by	Print	Sign	Role
Neonatal discussion led by	Print	Sign	Role
Midwife	Print	Sign	
People present (tick)	Mother ☐	Partner ☐	
	Other		

Assessment of fetal condition today

No evidence of compromise ☐	Potentially compromised ☐	Compromised ☐
Details of fetal compromise		
Maternal conditions contributing to potential outcome		

The information on this page must be reviewed weekly

Is there evidence of maternal infection?	Yes/No
Is there evidence of Intrauterine infection?	Yes/No

Neonatal Unit status GREEN / AMBER RED (NICU only)
Does transfer out need to be considered at any point?
If baby is below 27 weeks gestation then where possible the delivery should take place at a unit with a Level 3 NICU

Record of discussion

Current wellbeing of fetus

BAPM risk category: (see Appendix 5)	Extremely high risk ☐	High risk ☐	Moderate risk ☐

General discussion points

OBSTETRIC DISCUSSION
Risks and benefits of preterm CS

Risks and benefits of normal birth

Explain triggers for further review e.g. change in situation – labour/ change in gestation

Use of fetal monitoring antenatally
No monitoring □ Auscultation only □ CTG □ Frequency of monitoring

Use of fetal monitoring in labour
No monitoring □ Auscultation only □ Continuous CTG □ How often?

Indications to expedite delivery

Reasons a CS may be considered

Summary of neonatal discussion

Has a copy of the neonatal discussion and supporting parent information (see Appendix 7) been given to parents? Yes / No If not, why?

Has a follow-up conversation taken place with the Medical Team following the initial neonatal discussions and giving of parent information? Yes / No

This is to allow parents time to digest the information given and raise any questions.

REVIEW 1

OBSTETRIC		
Review date	Time of assessment	
Reason for review		
Current Gestation		
Obstetrician / trainee completing	Print	Role
Has maternal condition changed?	Yes	No
Has fetal condition changed?	Yes	No
Have parental views on management changed?	Yes	No

NOTES	
Print	**Sign**

NEONATAL		
Review date	Time of assessment	
Obstetrician / trainee completing	Print	Role
Have parental views on delivery room management changed?	Yes	No

If YES to change in delivery room management please indicate the change below.
If LNU/SCU has receiving NICU been updated? Yes / No

Plan for resuscitation: Ensure text includes options on intubation, ventilation, UVC, drugs, cardiac massage

ADDITIONAL NOTES		
Print	Role	Sign

REVIEW 2

OBSTETRIC		
Review date	Time of assessment	
Reason for review		
Current Gestation		
Obstetrician / trainee completing	Print	Role
Has maternal condition changed?	Yes	No
Has fetal condition changed?	Yes	No
Have parental views on management changed?	Yes	No

NOTES	
Print	**Sign**

NEONATAL		
Review date	Time of assessment	
Obstetrician / trainee completing	Print	Role
Have parental views on delivery room management changed?	Yes	No

If YES to change in delivery room management please indicate the change below.
If LNU/SCU has receiving NICU been updated? Yes / No

Plan for resuscitation: Ensure text includes options on intubation, ventilation, UVC, drugs, cardiac massage

ADDITIONAL NOTES		
Print	Role	Sign

REVIEW 3

OBSTETRIC		
Review date	Time of assessment	
Reason for review		
Current Gestation		
Obstetrician / trainee completing	Print	Role
Has maternal condition changed?	Yes	No
Has fetal condition changed?	Yes	No
Have parental views on management changed?	Yes	No

NOTES	
Print	**Sign**

NEONATAL		
Review date	Time of assessment	
Obstetrician / trainee completing	Print	Role
Have parental views on delivery room management changed?	Yes	No

If YES to change in delivery room management please indicate the change below.
If LNU/SCU has receiving NICU been updated? Yes / No

Plan for resuscitation: Ensure text includes options on intubation, ventilation, UVC, drugs, cardiac massage

ADDITIONAL NOTES		
Print	Role	Sign

Appendix 4 : Extreme Preterm Delivery Integrated Care Pathway (22+0 to 26+6)

CHECKLIST FOR LABOUR

Date of assessment	____/____/____	Time of assessment	
Estimate of gestational age today	_____ weeks _____ days	Sex of fetus if known	
Basis for estimate of gestational age	Scan at _____ weeks on ____/____/____	LMP	
Number of fetuses		Estimated fetal weight(s) _____g, _____g	Date of scan ____/____/____

Onset of labour		cm dilated		
Rupture of membranes		Date		
Maternal MEWS				
Partogram commenced				
Magnesium sulphate given		Y/N		
Steroids complete		Y/N		
Obstetric Review by		Name		Sign
Name of obstetric consultant informed				Sign
Neonatal Unit Shift leader informed				Sign
Name of Neonatal consultant informed				Sign

Assessment of maternal condition

Maternal concerns	Yes/No	Is there any evidence of maternal or fetal infection?	Yes/No
If yes, please detail			

Assessment of fetal condition today

No evidence of compromise □		Potentially compromised □	Compromised □
Fetal concerns			
Review of care: Active / Palliative			
Active Care		**Palliative Care**	
Fetal monitoring IA □ CTG □ C □		Fetal monitoring at parents request? Y / N	
Frequency of monitoring		Frequency of monitoring	
Initial		Initial	
CS If concerns with FH		No CS	
CS only if bradycardia or cord prolapse			
CS only for maternal reasons		Perinatal palliative care pathway in place	
Life start in room			
Deferred cord clamping (ideally 60 sec) Please state duration ……			
Use of plastic bag			
Parent's wishes following birth		Parent's wishes following birth	

Key points to discuss during counselling conversations:

- Gestation
- Anticipated place of delivery & need for in-utero transfer if LNU or SCU
- Prognosis (use of risk assessment tool)
- Antenatal steroids
- Magnesium sulphate
- Management at delivery
- Opportunity for review if pregnancy progresses
- What active or palliative care will involve
- The potential need to reconsider care if baby is born in a poorer condition than expected
- Potential management during baby's stay on NICU
- Offer of the opportunity to visit the neonatal unit
- Opportunity for parental questions
- Information for parental information sheet to be given

Appendix 5: Risk based practice framework for preterm management from 22 weeks

Background

Emerging data from UK and international neonatal units have shown increased survival in extreme prematurity with similar rates demonstrated at 22 weeks of gestation as compared to 23 weeks. Hence this framework is about moving away from a purely "gestational age based" approach to a "risk based" framework when deciding on management of the extreme preterm. Recent UK data, for babies born in 2016, indicate survival to one year of 38% of those babies 23+0 to 23+6 weeks of gestation who received active treatment after birth. Survival in babies born below 22 weeks is underreported or has a bias as only a small number at this gestation are offered active treatment at this moment, however data suggests one third of babies at 22 weeks who are actively treated survive to discharge.

Steps in decision making (taken from BAPM Framework for Practice for Perinatal Management, 2019)

1. Assessment of the risk for the baby if delivery occurs, incorporating both gestational age and factors affecting fetal and/or maternal health.
2. Counselling parents, and their involvement in decision-making
3. Agreeing and communicating a management plan

Factors which increase risk (categorised as unfavourable risk factors)

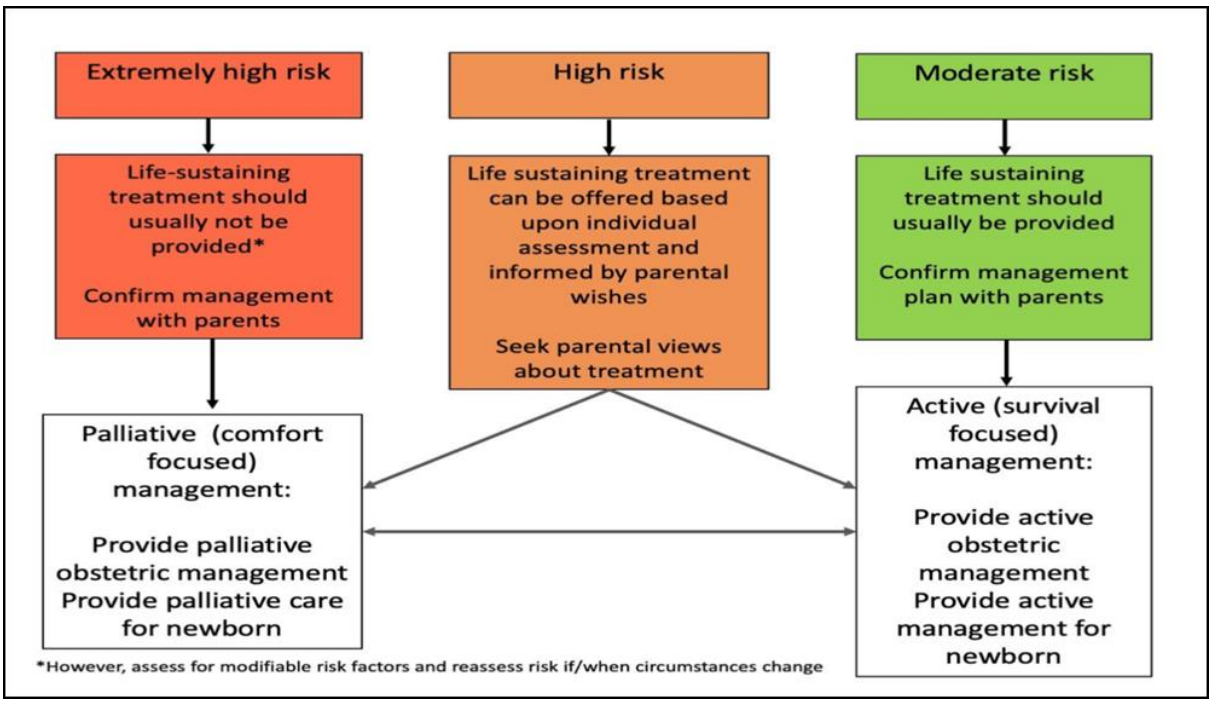
Fetal factors	Male sex, multiple pregnancy, congenital anomaly and poor fetal growth
Clinical conditions	Prolonged pre-labour rupture of membranes, < 24 weeks of gestation and clinical evidence of chorioamnionitis
Therapeutic strategies	Mother not receiving antenatal steroids and/or magnesium sulfate
Clinical Setting	Born in at a neonatal unit without a level 3 NICU

BAPM Risk category

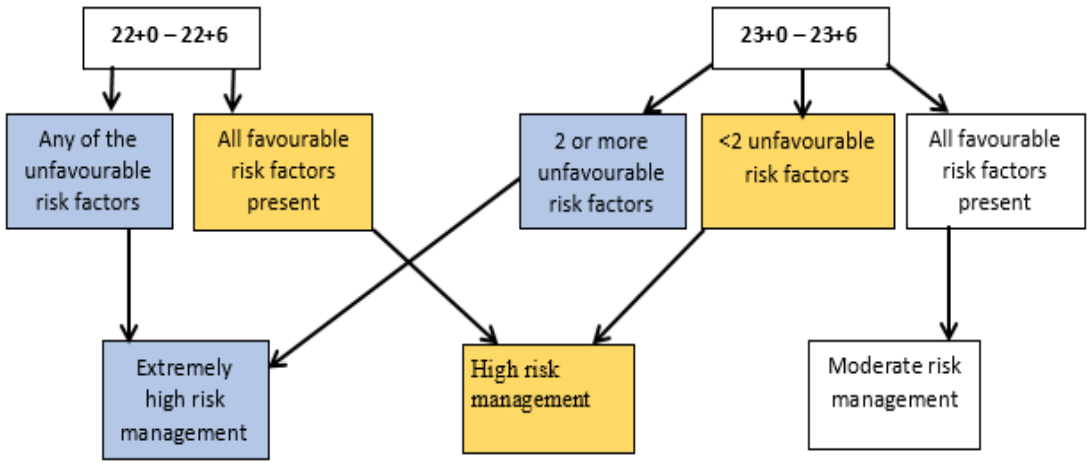
Extremely high risk: The BAPM Working Group considered that babies with a > 90% chance of either dying or surviving with severe impairment if active care is instigated would fit into this category.	**For example** • babies 22+0 - 22+6 weeks gestation with unfavourable risk factors • some babies at 23+0 - 23+6 weeks of gestation with **unfavourable risk factors**, including severe fetal growth restriction • babies ≥ 24+0 weeks of gestation with significant unfavourable risk factors, including severe fetal growth restriction (rarely)
High risk: The Working Group considered that babies with a 50-90% chance of either dying or surviving with severe impairment if active care is instituted would fit into this category.	**For example** • babies at 22+0 - 23+6 weeks of gestation with favourable risk factors • some babies ≥ 24+0 weeks of gestation with unfavourable risk factors and/or co-morbidities
Moderate risk The Working Group considered that babies with a < 50% chance of either dying or surviving with severe impairment if active care is instituted would fit into this category.	**For example**: • most babies ≥ 24+0 weeks of gestation • some babies at 23+0 – 23+6 weeks of gestation with favourable risk factors.

Visual Toolkit for Risk Assessment

Decision making around management of Delivery, following risk assessment and after consultation with parents

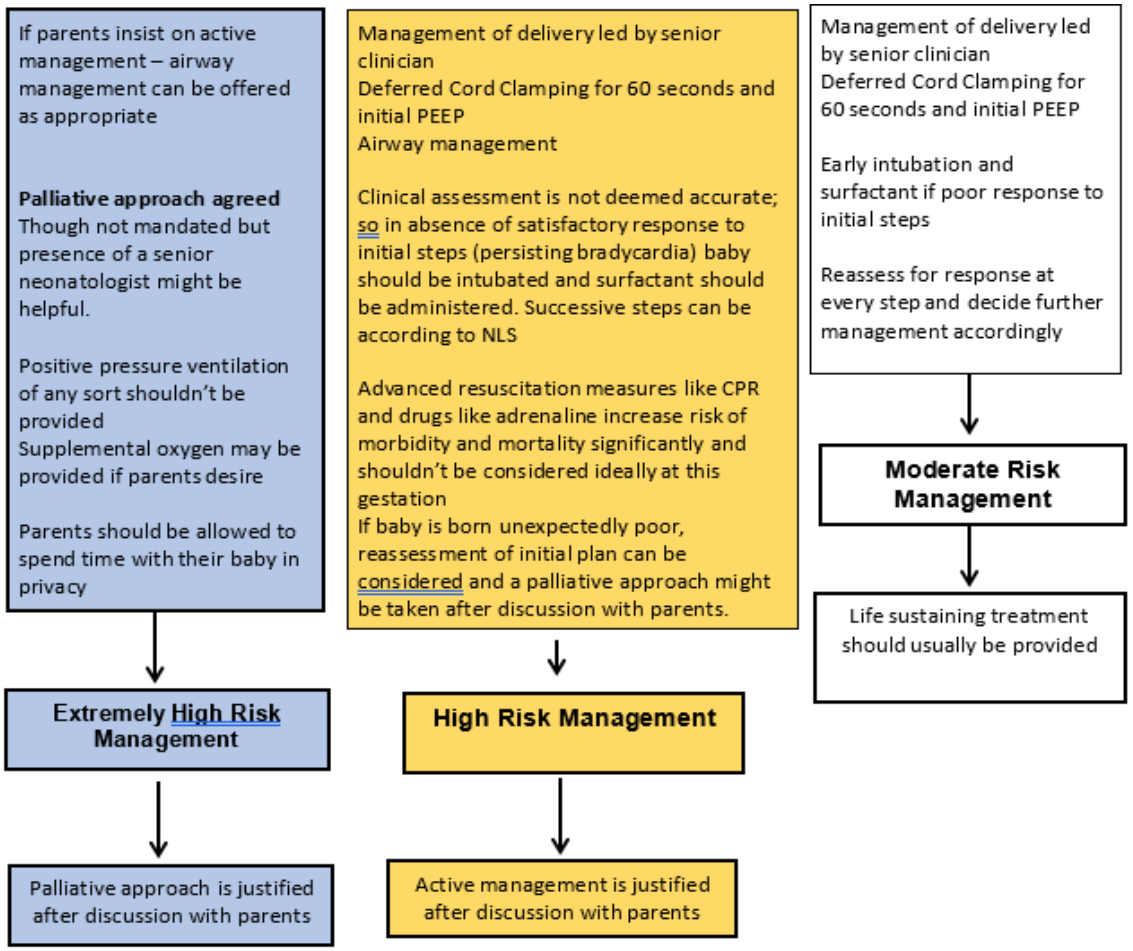


Risk Assessment Flowchart



Note: Further guidance for professional consulting with families at risk of extreme preterm delivery is included in the BAPM Framework for Practice (P.23) https://www.bapm.org/resources/80-perinatal-management-of-extreme-preterm-birth-before-27-weeks-of-gestation-2019

Agreeing a Management Plan



If the agreed approach is palliative care, the NWNODN Palliative Care Guideline, care plans and other supporting documents, including when to refer to the coroner, can be accessed at: https://www.neonatalnetwork.co.uk/nwnodn/palliative-care/

Appendix 6: Initial Discussion with Maternity Unit with Level 3 NICU

The team should aim to discuss with a Senior Obstetric and Neonatal doctor at the receiving unit

Date of discussion	____/____/____	Time of discussion	
Estimate of gestational age today	_____ weeks _____ days	Sex of fetus if known	
Basis for estimate of gestational age	Scan at _____ weeks on ____/____/____	LMP	
Number of fetuses		Estimated fetal weight(s) _____g, _____g	Date of scan ____/____/____
LNU/SCU Obstetric discussion led by	Print	Sign	Role
NICU Obstetric input	Name		Role
LNU/SCU Neonatal discussion led by	Print	Sign	Role
NICU Neonatal input	Name		Role
Midwife	Print	Sign	
Other People Present			

Assessment of fetal condition today

No evidence of compromise	☐	Potentially compromised	☐	Compromised	☐
Details of fetal compromise					
Maternal conditions contributing to potential outcome					
Is there evidence of maternal infection?					
Is there evidence of Intrauterine infection?					
Local Neonatal Unit status GREEN/AMBER/RED Receiving NICU status GREEN/AMBER/RED					

Copy to tertiary centre with summary of discussion

Record of discussion

In utero Transfer out: Appropriate ☐ If not currently appropriate give details					
Maternal Antibiotics given	Yes/No	Antenatal steroids	Yes/No	Magnesium sulphate	Yes/No
Transfer to be reconsidered on __/___/___					
BAPM risk category: (see Appendix 5)	Extremely high risk	☐	High risk	☐	Moderate risk ☐
General discussion points including resuscitation plan if delivery expected at LNU.					

Conversations between the LNU & NICU should ideally be Consultant to Consultant where possible, with joint counselling to ensure consistency of information. (Please refer to main pathway pro-forma for more detailed information)

Appendix 7: Information for parents

Helping parents to understand extreme preterm birth.

Who is this information for?

You have been given this information because your healthcare team think that you may have your baby extremely early (prematurely). You and your family need to know what is likely to happen for you and your baby if this occurs. The maternity team and neonatal (specialist baby doctors and nurses) team will talk to you about this in detail as well as giving you this information and you will have the opportunity to ask any questions that you wish.

What does this mean?

A pregnancy usually lasts for about 40 weeks. How many weeks you are along in your pregnancy (gestation) is usually worked out from an ultrasound scan at around 12 weeks (your dating scan).

Babies born before 22 weeks are so small and fragile that they do not survive. Their lungs and other organs are not ready for them to live outside the womb. Such tiny babies may show signs of life for a short time after birth but even with the very best neonatal care they cannot survive for more than a few minutes or hours.

Most babies born at 22 weeks are not strong enough to survive, and may even die during labour or birth. If they are born alive, and are a good weight, they may be able to survive if they receive intensive medical treatment. 23 week babies have somewhat better chances of survival. However, often these extremely premature babies sadly die despite intensive care treatment. The earlier the baby is born, the less likely it is that they will be able to survive. Babies who are born extremely early are also at increased risk of problems with health and development as they grow up. These risks get higher the earlier (more prematurely) a baby is born, and are more common in those children born before 25 weeks of gestation. Health problems may include breathing difficulties, gut problems (including difficulties with feeding) and sight problems. Developmental problems may include problems with movement, learning and behaviour that can range from mild to severe; such problems are described on the following page.

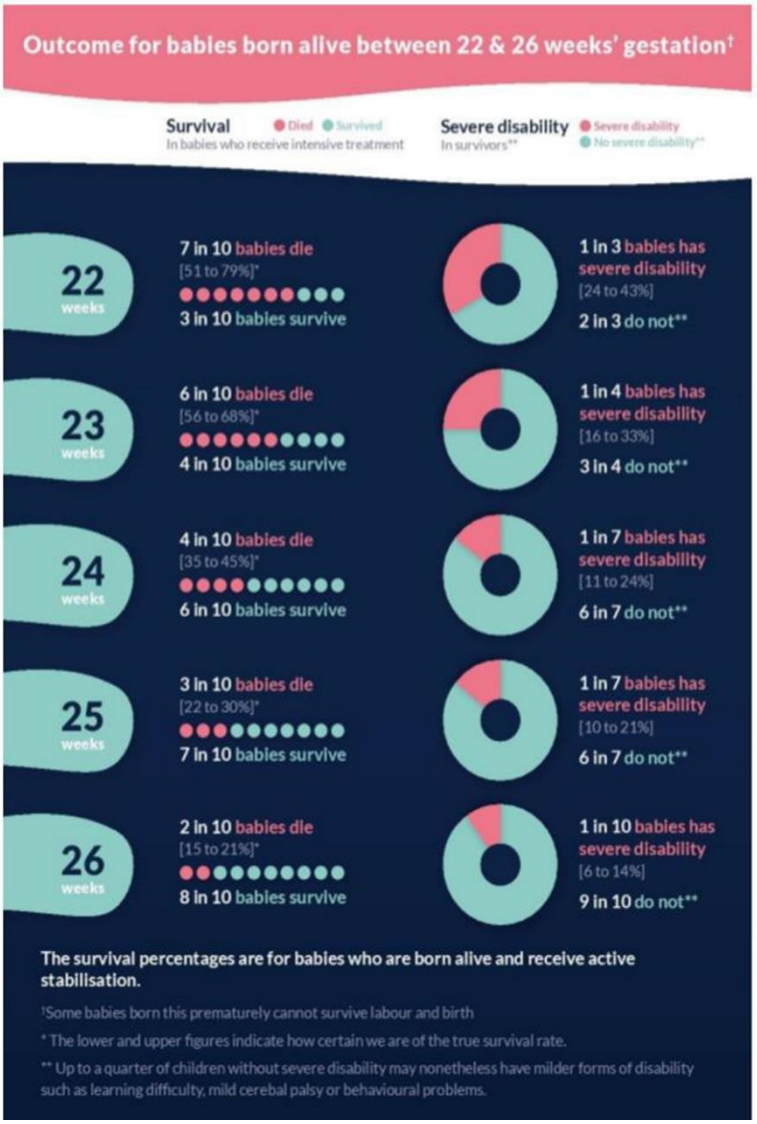
In some situations, there are difficult decisions to be made around the care for you and your baby before and after birth. The right thing to do can be different for different families. That is why it is important that you are fully informed and feel able to let the doctors and midwives know your wishes for your baby.

'Outcome'

These pictures below are based on what we know about the small number of babies born extremely prematurely in the UK. They show how many babies survive out of every 10 babies born alive this early, and of those who do survive, how many are likely to have a 'severe disability' as they grow up.

A proportion of these children will develop other problems as they grow up which may mean, for example, that they need extra help in school or have problems with walking or moving around. Some may have social and emotional problems. The frequency with which children have these problems is greatest the earlier they are born, and problems are most common in children born at 22 to 24 weeks of gestation.

The outcomes for your baby depend on a number of different factors. As well as how early they are born, it also matters how much your baby weighs when it is born, whether it is a boy or girl, whether it is a multiple birth, whether you have received steroids antenatally and also how well you and your baby are around the time of birth.



What does 'severe disability' mean?

Disability can mean different things to different people. When talking about babies who have been born extremely prematurely, the term severe disability could include problems such as:

- Not being able to walk or even get around independently (this includes conditions such as severe cerebral palsy)
- Being unable to talk, or see or hear properly
- Difficulties with swallowing or feeding safely
- Having multiple health problems with frequent visits to hospital
- Needing to attend separate school for children with special educational needs
- Needing assistance to care for themselves or difficulties living independently as they grow up

What does this mean for your baby?

It is difficult to predict the outcomes for your baby. Every baby is different and there will be specific information about your own and your baby's condition that you, as parents will need to consider

What can parents do?

What is right for your baby and your family is very individual to you. Your doctors will discuss with you about your situation and seek to understand what is important for you and your family. They will help you to make decisions about treatment for your baby. Discussing your hopes, your wishes, and your fears about your baby can help the team to support you in the best way possible.

What may happen with my baby?

Stillbirth: Some babies who are born this early may not survive labour and delivery. If this happens your baby will be given to you to hold for as long as you would like. You will have the opportunity to spend as much time with them as you would like and to make memories with them. Occasionally, where babies have died very close to being born, they may make brief reflex movements that disappear very quickly.

Comfort Care: You and the team may decide that it will be best to provide comfort care to your baby, either because there is an extremely high risk that your baby will not survive or he/she is likely to suffer from life-long disability even with the very best treatment. Comfort care is also known as palliative care and is special care for babies whose time is precious but short. It means providing treatments that will make their time as comfortable as possible. We will help you to be part of this care if you would like. Holding your baby close to you and talking to your baby may be very comforting. More information about comfort care or 'palliative care' for babies is available from Together for Short Lives or by accessing the NW Neonatal Network website at https://www.neonatalnetwork.co.uk/nwnodn/palliative-care/

Neonatal Intensive Care: You and the team may decide that starting neonatal intensive care would be best for your baby. This will mean you will need some extra medication before your baby is born. You will be given steroids to help your baby's lungs and brain and magnesium which may also help to protect your baby's brain. You may need to be transferred to a specialist centre, ideally before you have your baby, but there may not be time to do this safely. The team will also talk to you about the treatment that will be given to your baby immediately after birth and what may happen next depending on how your baby reacts to any treatment. The neonatal team will be present at the delivery and their focus will be to stabilise baby prior to transferring to neonatal unit. If you and the team decide that intensive care is an option for your baby, you should be offered the opportunity to be shown around the neonatal unit (if there is time for this) as it may help to see the neonatal unit and meet the people that work there before your baby is born. You can also talk to staff about expressing breast milk as early expression of colostrum and continued milk expression has many benefits for both mother and baby, which can make such a big difference for premature babies.

What if my baby isn't born yet?

If your baby isn't born in the next few days their outcomes may improve. Ideally, they will stay in the womb for as long as possible (depending on the health of you and your baby). If that happens there may be different options for you and your baby around the time of birth. That will depend on when your baby is born and on other things that affect your baby's response to treatment. If this is the case, your healthcare team will continue the conversation with you about what has changed and what different options may be available depending on when your baby is likely to be born, and you will be able to discuss and revise your agreed plans accordingly.

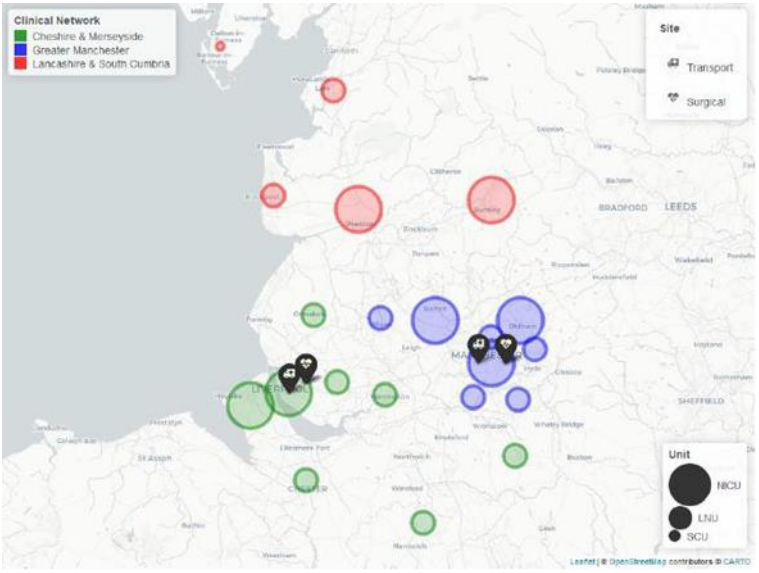
What might my baby look like?

Babies born this early can weigh less than half a kilogram (1 small packet of sugar) and can look quite different to how we imagine a new-born baby. Their skin is shiny and thin and covered with fine hair. Sometimes babies can be quite bruised from the birth. So your baby's colour may not be as expected initially. If your baby is born alive, they may take a breath and make a small cry, although it is also common for a very premature baby not to cry or make any noise at delivery, or they may not breathe. Their eyes may not be able to open yet.

Transfer to a different hospital

When you have decided with the obstetric and neonatal care teams that starting neonatal intensive care would be best for your baby, research shows that for babies born before 27 weeks of gestation it is best, whenever possible, to be born in a specialist maternity unit with a specialist Neonatal Intensive Care Unit (sometimes called a 'Level 3 NICU'). If a baby born before 27 weeks of gestation is born in a maternity unit (or at home) where there is not a specialist NICU, then we know that the baby will generally do better if moved to a specialist NICU after birth.

Details of all the neonatal units within the North West can be found on the NWNODN website: https://www.neonatalnetwork.co.uk/nwnodn/



Information on the hospitals within the three localities across the North West (Lancashire & South Cumbria, Greater Manchester and Cheshire & Merseyside) can be found at: https://www.neonatalnetwork.co.uk/nwnodn/publications- and-downloads/

If your hospital does not have a specialist NICU, this may mean that you will be offered transfer to one of these centres before your baby is born. We understand that this can be a very anxious time and that you may be moved quite some distance from home but transferring is in the best interests of the baby. It can be very difficult to predict which mothers will deliver early and so some mothers may be moved to another hospital and their baby not born early.

It may also be the case that you are considered too unwell or too far on in labour to be safely moved to another hospital before your baby is born. When it is not possible to transfer you before the baby has been born your baby may be transferred by a specialist Neonatal Transport Team after the birth. Your own health needs may mean you will be unable to travel immediately with your baby but your local maternity team will do everything they can to move you to the same unit as your baby as soon as it is safe to do so. It is recognised that partners may have to make the difficult decision of whether to stay at the local maternity unit with the mother, travel to the NICU where the baby transfers to or care for other children at home. This is something you may wish to discuss and agree on as a family, remembering all choices are appropriate.

We appreciate that moving to another hospital can be distressing for you and your family, especially if you are separated from your baby for a while. We will talk to you about this in more detail if it is decided that this is the best option for your family.

What if I have more questions?

This information has been provided to you as part of the conversation that your healthcare team will have with you about your baby. If you have any other questions do make sure you ask your doctors and nurses to answer them, so you have all the information you need about your situation and the options available to you. Your healthcare team want to work with you make the best decision for your baby and for your family. This space is for the health care team who are discussing this with you to write extra details about your baby or babies.

Many families find it useful to have follow-up discussions, so please ask to speak to the neonatal and maternity team again at any point.

You may want to use this space to write down some questions to discuss with the team.

Useful contact details

Bliss - Premature and sick baby charity http://www.bliss.org.uk/

Together for Short Lives Charity for babies and children with life-limiting conditions https://www.togetherforshortlives.org.uk, Helpline: 0808 8088 100

Sands - Stillbirth and neonatal death charity
https://www.uk-sands.org, Helpline: 0808 1643332, email helpline@sands.org.uk

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