Extreme Preterm Birth - Obstetric and Neonatal Management - Full Clinical Neonatal Guideline

Reference no.: NIC RE 02/ June 2024

Contents

1. Introduction

This guideline includes:

- Singleton pregnancies between 22^{+0}-26^{+6} weeks gestational age;
- Multiple pregnancies between 22^{+0}-27^{+6} weeks gestational age;
- Anticipated birth weight <800 grams

Management of the delivery of an extremely preterm baby is one of the most challenging aspects of perinatal medicine. The ethical, social, economic and legal issues have been reviewed by the Nuffield Council on Bioethics (1). The ethical principles that formed the basis for previous guidelines have not changed but perinatal care has continued to advance with steadily improving outcomes for extreme preterm babies (2). In response BAPM has recently issued a Framework for Practice to guide managing extreme preterm birth (3). The report forms the basis for this guideline. It is recommended that those accessing this guideline familiarise themselves with the report, including the appendices which give useful background information and important additional resources.

2. Purpose and outcome

For medical staff to optimise the care of these babies, support the families and provide evidence based information

To ensure a standardised approach in attending and managing babies born, or expected to be born extremely preterm

3. Key responsibilities and Duties

Care of the mother, her fetus and the baby, will always need to be individualised and should be led by senior staff in all disciplines. The parents' hopes and expectations need to be explored with honesty and compassion in a realistic way, drawing upon the available evidence. **Communication and agreed plans must be documented in full using the proforma (Appendix 2), filed in the patient notes and signed/dated legibly.** These plans may need to be revised frequently

4. Abbreviations

BAPM	-	British Association Paediatric Medicine
EDD	-	Expected date of delivery
GMFCS	-	Gross Motor Function Classification System
MBRRACE-UK	-	Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK
RCPCH	-	Royal College College of Paediatrics and Child Health

5. Approach to decision making

When it appears that a mother will deliver her baby at a very early gestational age the relevant clinical information needs to be reviewed to guide management. The obstetric history and antenatal care must be considered carefully with particular attention to the ultrasound dating scan(s). Those dated by ultrasound at 10 to 13+6 weeks have an EDD accurate to within 4 days (4). Those pregnancies dated later than this will have a wider range of possibility for EDD. The best estimation of gestational age should be agreed with the parents.

The approach to decision making involves:

1. Assessment of the risk for the baby if delivery occurs
2. Counselling the parents and involving them in decision making
3. Agreeing and communicating a management plan

6. Assessment of the risk for the baby

Assessment of the risk for the baby if delivery occurs should consider:

- the gestation-based risk, including mortality and survival with severe impairment
- a modified risk assessment.

6.1. Gestation based risk

Survival of extremely preterm infants has increased steadily since 2006 with greater willingness to offer neonatal intensive care. Outcomes are continually changing and management should always be based on the most recent data available. The most up to date data available in September 2019 is detailed in the BAPM report (See Appendix 1 of the Report (3).

Table 1 below gives a summary of the gestation based survival.

Assessment of the risk of severely disabling conditions among survivors is problematic and it is acknowledged there are differences in views about acceptable levels of disability. What for one individual or family may be an acceptable outcome may not be acceptable for another. BAPM consider that in decisions about provision of potentially life-sustaining treatment, the

ethically relevant consideration is the risk of disabilities that could affect whether it is in the baby's best interests to survive and should focus on the most severe disabilities (3).

To facilitate discussion about disability it is helpful to use an established framework. The report from the BAPM/RCPCH Working group in 2008 set out definitions for severe nueurodevelopmental disability (5). Severe impairment includes:

- 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 (6)) grade 3 or greater
- blindness or profound hearing impairment.

The BAPM Framework (3) gives the following estimated prevalence rates of severe impairment in survivors as follows:

22+0 - 22+6 weeks: 1-in-3 survivors has severe impairment
23+0 - 23+6 weeks: 1-in-4 survivors has severe impairment
24+0 - 25+6 weeks: 1-in-7 survivors has severe impairment
26+0 - 26+6 weeks: 1-in-10 survivors has severe impairment

Table 1: Number and percentage of births, including births where the fetus was alive at onset of labour, live births, births receiving active care, admissions for neonatal care and survival to 1 year of age for births in 2016 in the UK. Recording of active care on the MBRRACE-UK database commenced during 2016 and thus rates are inferred from recording of a total of only 292 deaths (2).

Gestational Week	**22 weeks**	**23 weeks**	**24 weeks**	**25 weeks**	**26 weeks**
All births	486	510	656	664	832
Births alive at the onset of labour	290	362	497	508	674
Live births	183	301	456	486	662
% live births alive at the onset of labour	63 (57-69)	83 (79-87)	92 (90-94)	96 (94-98)	98 (97-99)
Delivery room deaths	155	78	26	19	16
% deaths before admission	85 (80-90)	26 (21-31)	6 (4-8)	4 (2-6)	2 (1-3)
Live birth receiving active care	43	264	449	486	662
% receiving active care (of all live births)	23	88	98	100	100
Admitted for neonatal Care	28	223	430	467	646
%admitted for neonatal care of births receiving active care	65 (51-79)	85 (81-89)	96 (94-98)	96 (94-98)	98 (97-99)
Death <1 year	13	122	160	108	106
Survivors to 1 year	15	101	270	359	540
Survival					
Of those alive in labour	5 (2-8)	28 (23-33)	54 (50-58)	71 (67-75)	80 (77-83)
Of live births receiving active care	35 (21-49)	38 (32-44)	60 (55-65)	74 (70-78)	82 (79-85)
Of those admitted to intensive care	54 (36-72)	45 (38-52)	63 (58-68)	77 (73-81)	84 (81-87)

6.2. Modified Risk Assessment

The information available for the current pregnancy can help refine the gestation based risk. A range of factors are associated with increased or decreased risk (3):

Fetal factors which may increase risk include male sex, multiple pregnancy, congenital anomaly and poor fetal growth.

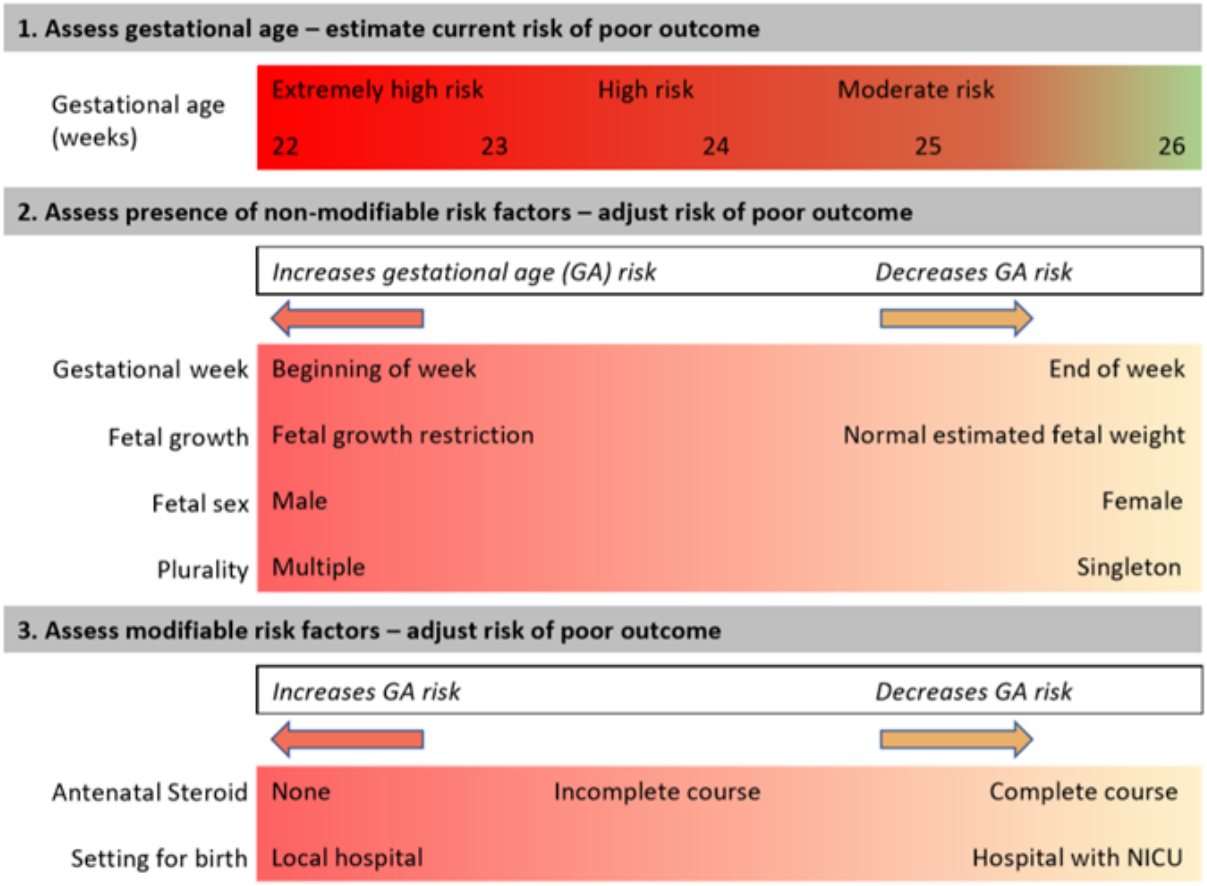
Clinical conditions which pose additional risk and have been associated with increased mortality and morbidity include prolonged pre-labour rupture of membranes before 24 weeks of gestation and clinical evidence of chorioamnionitis (7) (8)

Therapeutic strategies: administration of antenatal steroid and magnesium sulphate are associated with improved survival and neonatal outcomes as well as reduced risk of childhood impairment, even before 24 weeks of gestation (9) (10)

Clinical Setting: survival is highest at these extreme preterm gestations in centres with experienced staff and higher patient numbers and antenatal transfer to a NICU is recommended

The agreed risk for the baby has ethical and practical implications for the options that should be available. Extremely high risk: For babies with an extremely high risk of death or of survival with unacceptably severe impairment despite treatment, palliative (comfort-focused) care would be in the best interests of the baby and life-sustaining treatment should not be offered. There is no absolute indication for paediatric attendance at the birth although for individual families this may be helpful. High risk: For babies with a > 50% risk of death or of surviving with unacceptably severe impairment despite treatment, it is uncertain whether active (survival focused) management is in the best interests of the baby and their family. Parents should be counselled carefully and parental wishes should inform a joint decision to provide either active or palliative treatment. Ideally, a senior neonatal clinician who has previously met the parents will be available to attend the birth and supervise implementation of the agreed plan. Moderate risk: For babies with a < 50% risk of death or of survival with unacceptably severe impairment, active management would be in the best interests of the baby. A senior neonatal clinician should attend the birth

The following pictorial representation of this is taken from the BAPM framework (3)



There is no objective way of defining risk. It is important that individual circumstances are considered and that families are involved and supported in the joint decision making. Reaching a decision on agreed risk for a baby influences the ethical and practical management options that should be available. The working group gives examples to consider that illustrate the principles (3).

Extremely high risk: babies with a > 90% chance of either dying or surviving with severe impairment if active care is instigated would fit into this category. Examples:

- *babies at 22+0 - 22+6 weeks of gestation with unfavourable risk factors*
- *some babies at 23+0 - 23+6 weeks of gestation with unfavourable risk factors, including severe fetal growth restriction*
- *(rarely) babies ≥ 24+0 weeks of gestation with significant unfavourable risk factors, including severe fetal growth restriction*

For babies with an extremely high risk of death or of survival with unacceptably severe impairment despite treatment, palliative (comfort-focused) care would be in the best interests of the baby and life-sustaining treatment should not be offered. There is no absolute indication for paediatric attendance at the birth although for individual families this may be helpful.

High risk: babies with a 50-90% chance of either dying or surviving with severe impairment if active care is instituted would fit into this category. Examples:

- 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

For babies with a > 50% risk of death or of surviving with unacceptably severe impairment despite treatment, it is uncertain whether active (survival focused) management is in the best interests of the baby and their family. Parents should be counselled carefully and parental wishes should inform a joint decision to provide either active or palliative treatment. Ideally, a senior neonatal clinician who has previously met the parents will be available to attend the birth and supervise implementation of the agreed plan.

Moderate risk: babies with a < 50% chance of either dying or surviving with severe impairment if active care is instituted would fit into this category. Examples given were:

- most babies ≥ 24+0 weeks of gestation
- some babies at 23+0 – 23+6 weeks of gestation with favourable risk factors.

For babies with a < 50% risk of death or of survival with unacceptably severe impairment, active management would be in the best interests of the baby. A senior neonatal clinician should attend the birth.

7. Counselling the parents and involving them in decision making

Whenever possible, parents should be involved. The planning consultation should include senior clinical staff from the obstetric, midwifery and neonatal teams. The assessed category of risk to the baby and the uncertainty around this should be conveyed sympathetically and with clarity. The hopes and expectations of parents should be explored honestly and compassionately but also in a realistic way. Clear, balanced information should be shared and management options discussed. Ideally there will be time for clarification and questions, and parents given the opportunity to revisit discussions.

The risk of severe impairment category should be used to inform parents when discussing risk following extremely preterm birth:

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

In utero transfer to a maternity facility co-located with a NICU should be considered at the earliest opportunity when active management is planned. All such transfers should be discussed with the receiving team, and parents should be made aware that the prognosis (and therefore management) may be revised following in utero transfer to a centre with greater experience of managing extremely preterm birth. Communication and agreed plans should be documented in full (including in the maternity Electronic Patient record) and, when relevant, clearly communicated with the receiving centre. The agreed plan of management

should be revised regularly if pregnancy continues. Parents should also be helped to appreciate that the baby may be born in unexpectedly poor, or unexpectedly good condition, and the implications of this for what care might be appropriate.

When active care is planned and time allows, parents should be given an opportunity to visit the neonatal unit and to meet staff and should receive information and support regarding expressing breast milk. Where appropriate, the practicalities of commencing, withholding and/or withdrawing intensive care and the positive role of palliative care strategies should be described to the parents. This will help prepare them for possible outcomes after the birth. Parents may find the advice and support of their family, friends, spiritual advisers and/or local and national support organisations to be of great value at this time and should be signposted appropriately.

8. Agreeing and documenting a management plan

Whenever possible, parents should be involved in planning an extremely preterm birth. The planning consultation should include senior clinical staff from the obstetric, midwifery and neonatal teams who will be caring for the mother and her baby before, during and after the birth.

The assessed category of risk to the baby (including the inherent uncertainty around this) should be conveyed.

Clear, balanced information should be shared and management options discussed. Time should be allowed for clarification and questions, and parents offered the opportunity to revisit discussions with the perinatal team at any point, acknowledging the challenging nature of the information that they are being asked to receive and the decisions that are being made.

Following consultation with parents, initial management of the birth will follow one of two pathways (see figure below): “active (survival focused)” or “palliative (comfort focused)”. It is challenging to make a binary decision from a continuum of risk and categorisation of risk should always be undertaken by the most senior clinicians available.

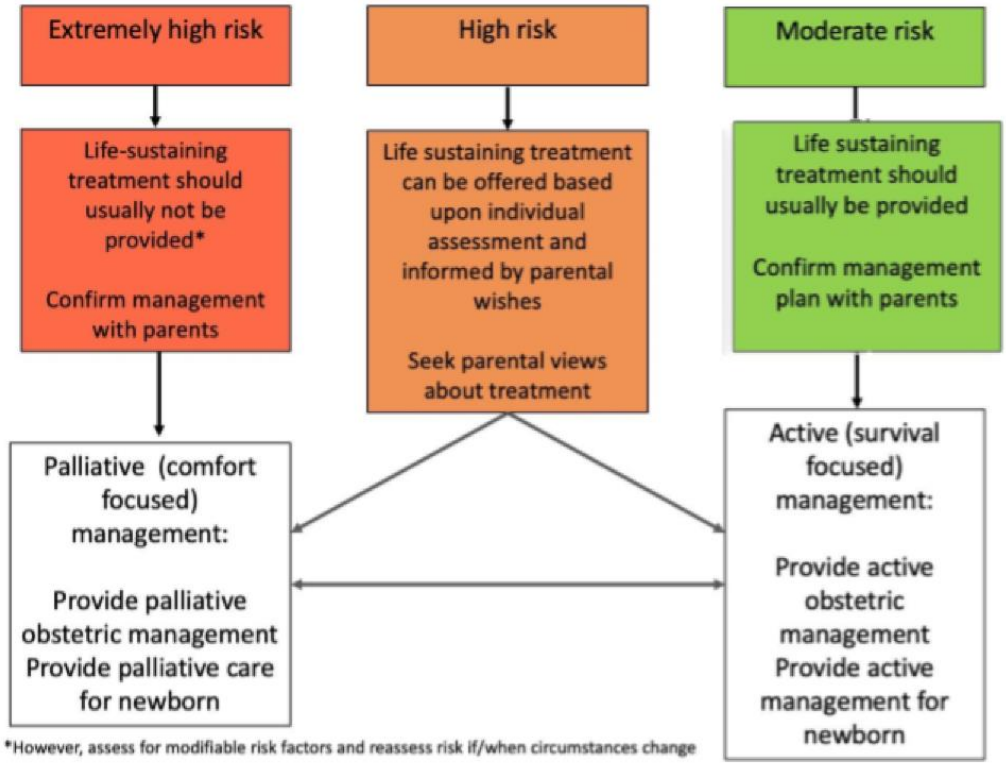
Parents should be counselled that the plan for management will be reviewed and may need to change based on the clinical condition of the baby before, at or after birth, or subsequently in a NICU. Consistency in obstetric and neonatal management is essential, either to ensure that the baby is born in the best possible condition or to avoid unnecessary intervention. The agreed plan should be clearly documented and communicated to all members of the obstetric and neonatal teams who may be involved in care of the family.

Where appropriate, the practicalities of commencing, withholding and/or withdrawing intensive care and the positive role of palliative care strategies should be described to the parents.

Where there is an extremely high risk of a poor outcome for the baby, it would be considered in the best interests of the baby, and standard practice, not to offer active neonatal management.

An Extreme Preterm Care Pathway booklet (Appendix 2) is to be used to document. Incorporated within this booklet is the East Midlands Intrauterine Transfer form that needs to be completed for all attempted in-utero transfers for <27 weeks singleton or <28 weeks for multiple pregnancies whether successful or unsuccessful.

Communication and agreed plans should be documented in full (including in the maternity Electronic Patient record). Following consultation with parents, initial management of the birth will follow one of two pathways: “active (survival focused)” or “palliative (comfort focused)” (Figure 2). Consistency in obstetric and neonatal management is essential, either to ensure that the baby is born in the best possible condition or to avoid unnecessary intervention. The agreed plan should be clearly documented and communicated to all members of the obstetric and neonatal teams who may be involved in care of the family.



9. Principles of Obstetric Management

9.1. Survival focused neonatal care agreed

Once a commitment to active neonatal care has been agreed obstetric management should focus on ensuring the baby is born in the best condition possible given the individual set of circumstances. The potential for each obstetric intervention to improve the baby’s condition at birth should be considered and kept under review as the clinical picture and gestational age changes.

9.1.1 In utero transfer to tertiary centre

It is important to refer to current Network agreed pathways for Derby and Burton sites. These are different particularly in respect of gestational thresholds for IUT.

- Transfers should be to a Level 3 NICU:
  - <27 weeks gestational age singleton pregnancies
  - <28 weeks gestational age multiple pregnancies
  - Anticipated birth weight <800g
- Consider at earliest opportunity if no risk of imminent delivery or risk to maternal wellbeing

Contraindications for IUT:

- Pregnancy <22 weeks (if transfer is for fetal condition or threatened labour). Neonatal stabilisation may be considered for babies born from 22 weeks gestation following assessment of risk and a multi professional discussion with parents
- Potentially lethal condition where active intervention of the fetus is not being considered even if live born. In cases of fetal abnormalities the cases should be discussed with a fetal medicine specialist
- Active labour where the chance of delivery in the ambulance en route is considered likely
- Maternal condition which may require intervention during transfer (for example antepartum haemorrhage or uncontrolled hypertension) or relevant to the place of delivery for maternal reasons
- Known fetal or maternal compromise requiring immediate delivery, including abnormal cardiotocography (CTG)

Decision for IUT:

All potential transfers must be authorised by the on call consultant obstetrician, following discussion with the on call neonatologist/paediatrician of the referring hospital.

9.1.2 Steroids and magnesium sulphate

Parents need to be informed that there is a lack of clear evidence of magnitude of benefit and risk when used below 24 weeks.

For operational detail on the administration refer to preterm birth guideline.

Offer intravenous MgSO4 for neuroprotection of the baby to women between 24^{+0} and 29^{+6} weeks of pregnancy who are:

- In established preterm labour or
- Having a planned preterm birth within 24 hours

Consider intravenous MgSO4 for neuroprotection of the baby to women between 22^{+0} and 23^{+6} weeks of pregnancy who are:

- In established preterm labour or having a planned preterm birth within 24 hours
- Where there is a plan for active management of the pregnancy and where potentially life-sustaining care for the baby is considered appropriate

9.1.3 Tocolysis

Consider any time from 22 weeks if used to facilitate administration of steroids and MgS04 and in utero transfer – Consultant decision. For operational detail on the administration refer to preterm birth guideline.

9.1.4 Intrapartum FHR monitoring

Recommend CEFM from 26+0 weeks

Below 26 weeks there is a lack of evidence to inform practice and the decision to recommend or withhold FHR monitoring needs to be discussed as part of the wider agreed package of care. A senior obstetrician should be involved in decisions around intra-partum fetal heart rate monitoring as there is a lack of evidence to inform practice (20). The family

should be made aware of the rationale for either recommending or withholding fetal heart rate monitoring

eg. it may be appropriate not to monitor if delivery by C/S is not part of the agreed package

24-25+6 weeks

IA for most babies

Consider CTG only if would surgically intervene for fetal reasons (see below)

There is a lack of evidence to support the use of CTG before 26 weeks due to fetal autonomic immaturity so interpretation can be difficult. Decision to use should only be made by Consultant Obstetrician.

< 24 weeks use IA if FHR monitoring thought to be appropriate

When a decision is made for palliative (comfort focused) management of the baby at birth, only interventions for maternal benefit are appropriate. Intrapartum fetal heart rate monitoring is not advised.

9.1.5 Surgical intervention

The decision to surgically intervene at extreme preterm gestations requires careful consideration of the balance between the benefits to fetal and neonatal survival versus the impact of C/S for the mother which may require hysterotomy or classical C/S. Such decisions should only be made by a Senior Obstetrician after discussion with the parents. Where delivery by C/S has been agreed it should only be undertaken after labour is established unless fetal or maternal wellbeing dictates otherwise. The increased risks of classical C/S should be discussed with the parents: increased pain; haemorrhage; infection; thrombosis; other injury; future pregnancy/delivery. Delivery by hysterotomy for fetal indications ideally should be avoided.

In the absence of labour and where delivery should be expedited for maternal reasons (e.g. pre-eclampsia or chorioamnionitis) or, more rarely, for fetal reasons (e.g. severe fetal growth restriction) delivery by caesarean section may be the only option to ensure timely delivery for mother and/or baby. Induction of labour is unlikely to be appropriate in such circumstances where there is maternal or fetal compromise and a commitment to potentially life-sustaining care for the baby has been agreed with the parents.

< 24 weeks

There is no evidence to support C/S for fetal benefit although it may be required for maternal reasons eg major haemorrhage

24- 26 weeks

Evidence unclear but delivery by C/S is usually not considered for fetal reasons less than 25-26 weeks

Breech presentation. Consider delivery by C/S after 26 weeks as risk of head entrapment is 10% if delivered vaginally.

9.2. Palliative neonatal care agreed

The only obstetric interventions appropriate are those of maternal benefit.

FHR monitoring is not advised other than to establish viability to help with expectations around birth.

Parents should be made aware that their baby may show signs of life after birth, including visible heartbeat, gasping and/or movement of limbs.

10. Principles of Neonatal Management

10.1. Active (survival focused) neonatal management

Management of the extreme preterm baby will be challenging and ideally the attending team will be experienced in stabilisation of extremely preterm babies and led by a consultant neonatologist or the most senior member of the neonatal/paediatric team available at the time of birth, and in accordance with Resuscitation Council UK guidance, noting specific recommendations for preterm infants. The team should be aware of parental wishes, but when the baby is born in unexpectedly poor condition it is reasonable for the attending neonatologist to proceed with care in the baby's best interests.

Stabilisation should normally be undertaken in the same room as the parents, who should be offered the opportunity to see, touch and photograph their baby. Following successful stabilisation of the baby, the mother should be supported to express breast milk as early as possible, with ongoing facilitation of parental contact and family involvement as partners in care.

The most important intervention is establishment of adequate lung recruitment, and the most important measure of success is heart rate. There should be particular attention to maintenance of normothermia, with the use of a plastic bag and/or other methods of delivering thermal care, and skin protection. Stabilisation and supported transition with lung inflation, using an appropriately sized facemask, should be initiated. Care should be taken not to over distend the lungs. If there is concern about the adequacy of ventilation and no response to mask inflation, proceed to intubation. Use of advanced measures for resuscitation including cardiac massage and endotracheal or intravenous adrenaline are rarely required following extreme preterm birth. Deferred cord clamping for at least 60 seconds should be routine practice (unless contraindicated).

If there is no response to mask ventilation, and any doubt around the adequacy of ventilation, the baby should be intubated and surfactant administered.

Use of advanced measures for resuscitation including cardiac massage and endotracheal or intravenous adrenaline are rarely required following extreme preterm birth. In the absence of sufficient evidence to justify a different approach in extremely preterm babies, if advanced resuscitation is considered appropriate, the Working Group recommends applying newborn resuscitation algorithms as used in more mature babies.

Unexpectedly poor condition

When the baby is born in unexpectedly poor condition, it is the responsibility of the most senior attending neonatal professional to decide if ongoing attempts at stabilisation and/or resuscitation are in the baby's best interests. This should be conveyed sympathetically but unambiguously to parents, and palliative care offered. Absent heart rate or severe bradycardia persisting despite effective cardiopulmonary resuscitation for more than a few minutes is associated with high rates of mortality and neurodevelopmental impairment in extremely preterm babies (11).

10.2. Palliative (comfort focused) neonatal management

Where there is an extremely high risk of a poor outcome for the baby, it would be considered in the best interests of the baby, and standard practice, not to offer active neonatal management. The aim is to support the parents and their baby and to avoid interventions that may cause discomfort, pain or separation of the baby from the parents. There should be agreement on the most appropriate location to deliver this care and it should not necessitate in utero transfer. There should be an emphasis on family centred care, with opportunities for parents to create positive memories of their baby. Plans should be individualised.

A senior neonatologist or paediatrician may be present at delivery to provide a brief assessment of the baby's condition at birth and to support midwifery staff and the family. Respiratory support (including provision of positive pressure ventilation) should not be provided. Parents should be offered the opportunity to hold and to spend as much time as they wish with their baby in a quiet and private location. After the baby has died a parent-led bereavement care plan should be put in place for the family, including communicating with parents and creating memories.

After discharge home, optimal communication with all professionals involved (and in particular the GP, health visitor and community midwife) is essential.

Parents should be offered bereavement counselling and the opportunity to meet with perinatal staff for a follow up consultation in an outpatient setting. Where possible, this meeting should be conducted by the same staff that counselled the family in the peripartum period.

Unexpectedly good condition

In the rare circumstance where palliative (comfort focused) care has been agreed, but a baby is born in unexpectedly good condition, attending midwifery and/paediatric medical staff should discuss with parents whether the estimated gestation and prognosis were accurate and whether the planned palliative approach is still appropriate. Stabilisation should not be delayed if deemed in the baby's best interests.

11. Monitoring Compliance and Effectiveness

Data will be collected centrally through the call handling service and this will be downloaded on a monthly basis and sent to a nominated Preterm Birth lead at each Trust. Each referring unit will also keep a record of all the in-utero transfer records and completed decision making tools. The Preterm Birth lead will be responsible for following up the outcome of each case and a review of all cases will take place on a quarterly basis with the Neonatal ODN and Maternity Clinical Network.

12. References

1. *The Nuffield Council on Bioethics Report - Critical care decisions in fetal and neonatal medicine: Ethical issues.* London : Royal Society of Medicine Press Ltd, 2007.

2. **Smith LK, Draper ES, Manktelow BN, Fenton A, Kurinczuk J on behalf of the MBRRACE-UK Collaboration.**

3. **British Association of Perinatal Medicine.** *Perinatal Management of Extreme pretem Birth before 27 weeks of gestation; A framework for Practice.* 2019.

4. **National Institue for Health and Care Excellence.** Antenatal Care for uncomplicated pregnancies. [Online] 4 February 2019. https://www.nice.org.uk/guidance/cg62 Accessed 28/5/19.

5. **British Association of Perinatal Medicine.** *Report of a BAPM/RCPCH Working Group Classification of health status at 2 years as a perinatal outcome.* 2008.

6. *www.canchild.ca.* [Online] https://www.canchild.ca/en/resources/42-gross-motor-function-classification-system-expanded-revised-gmfcs-e-r.

7. *Short-term outcomes comparison between preterm infants with and without acute hypoxic respiratory failure attributable to presumed pulmonary hypoplasia after prolonged preterm premature rupture of membranes before 25 gestational weeks.* **Park GY, Park WS, Yoo HS, Ahn SY et al.** 2018, J Matern Fetal Neonatal Med (13), pp. 1-8.

8. *Maternal chorioamnionitis and neurodevelopmental outcomes in preterm and very preterm neonates: A meta-analysis .* **Xiao D, Zhu T, Qu Y, Gou X, Huang Q, et al.** 2018, PLOS ONE 13(12): e0208302. https://doi.org/10.1371/journal.pone.0208302 .

9. *Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth.* **Roberts D, Brown J, Medley N, Dalziel SR.** 2017, Cochrane Database of Systematic Reviews 2017, Issue 3. Art. No.: CD004454. DOI: 10.1002/14651858.CD004454.pub3.

10. *Magnesium sulphate for women at risk of preterm birth for neuroprotection of the fetus.* **Doyle LW, Crowther CA, Middleton P, Marret S, Rouse D.** 2009, Cochrane Database of Systematic Reviews 2009, Issue 1. Art. No.: CD004661. DOI: 10.1002/14651858.CD004661.pub3.

11. *Population-based study shows that resuscitating apparently stillborn extremely preterm babies is associated with poor outcomes.* **Haines M, Wright IM, Bajuk B, Abdel-Latif ME et al.** 2016, Acta Paediatrica , pp. 1305-11.

12. *Neurologic and Developmental Disability at Six Years of Age after Extremely Preterm Birth.* **Neil Marlow, D.M., Dieter Wolke, Ph.D., Melanie A. Bracewell, M.D., and Muthanna Samara, M.Sc., for the EPICure Study Group.** 2005, N Engl J Med ., Vol. 352, pp. 9-19.

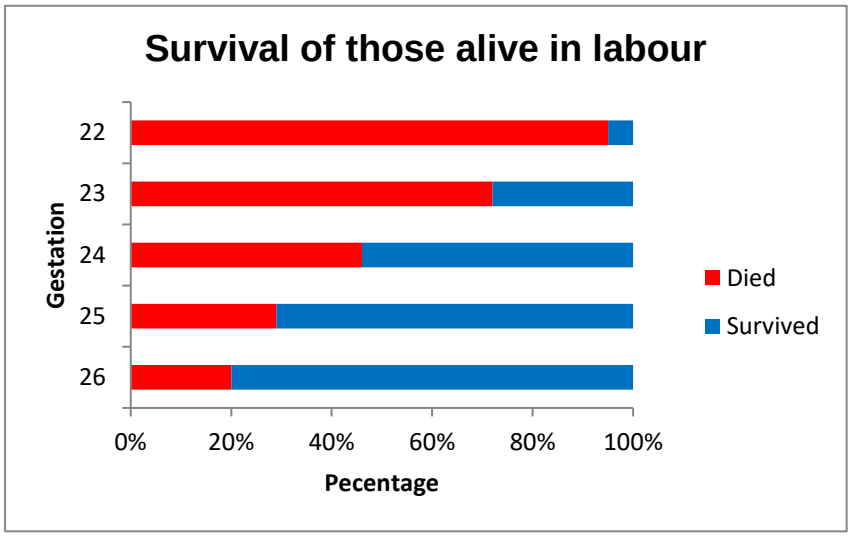
13. *The EPICure study: Outcome to discharge from hospital for infants at the threshold of viability.* **Kate Costeloe, Enid Hennessy, Alan T. Gibson, Neil Marlow, Andrew R. Wilkinson.** 2000, Pediatrics 106, pp. 659-671.

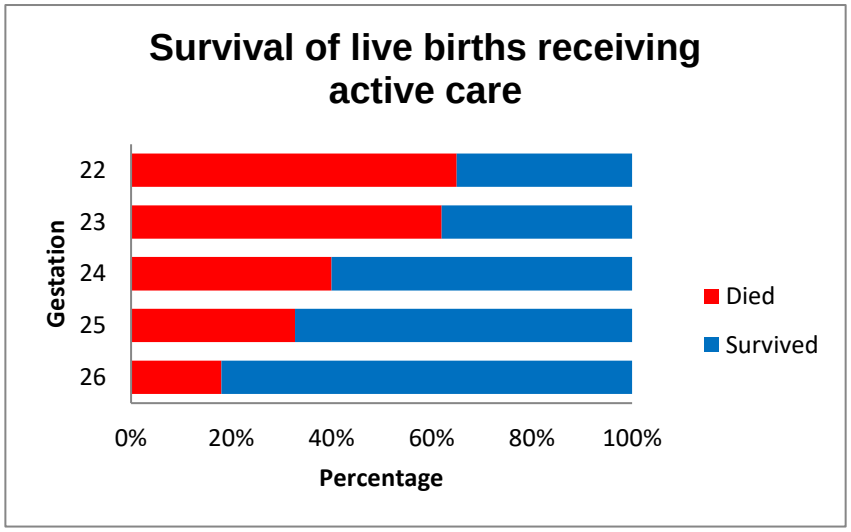
14. *Management of babies born extremely preterm at less than 26 weeks of gestation: a framework for clinical practice at the time of birthArchives of Disease in Childhood - Fetal and Neonatal Edition 2009;94:2-5.* **Wilkinson AR, Ahluwalia J, Cole A, et al.** 2009, Archives of Disease in Childhood - Fetal and Neonatal Edition 94, pp. 2-5.`

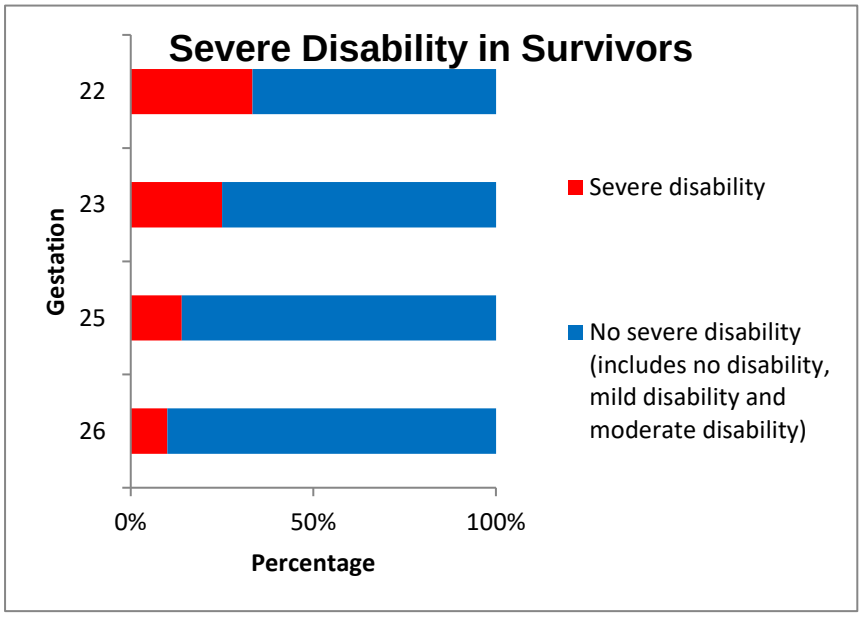
15. East Midlands Neonatal Operational Delivery Network; In utero transfer (IUT) guideline for pregnancies <27 weeks singleton or <28 weeks for multiple gestation. NHS England and NHS Improvement; Final version 09 12 20; (Jenny Brown, Don Sharkey, Linda Hunn)

Appendix 1: Outcome for babies born at 22-26 weeks' gestation

See Table 1 for details







University Hospitals of Derby and Burton
NHS Foundation Trust

Extreme Preterm Birth (22—26+6 weeks gestational age)
Risk assessment, Agreed Obstetric/Neonatal Care Pathway & In-utero transfer

Please affix patient's sticker here (to include name, address, GP, D.O.B., NHS number and Hospital No.)

Date / time: ____/____/20__ : ____

Proposed review date: ____/____/20__

Gestational age: _____ **weeks** ____ **days**

GA based on: ☐ EDS ☐ 2nd Trimester ☐ 3rd Trimester ☐ LMP

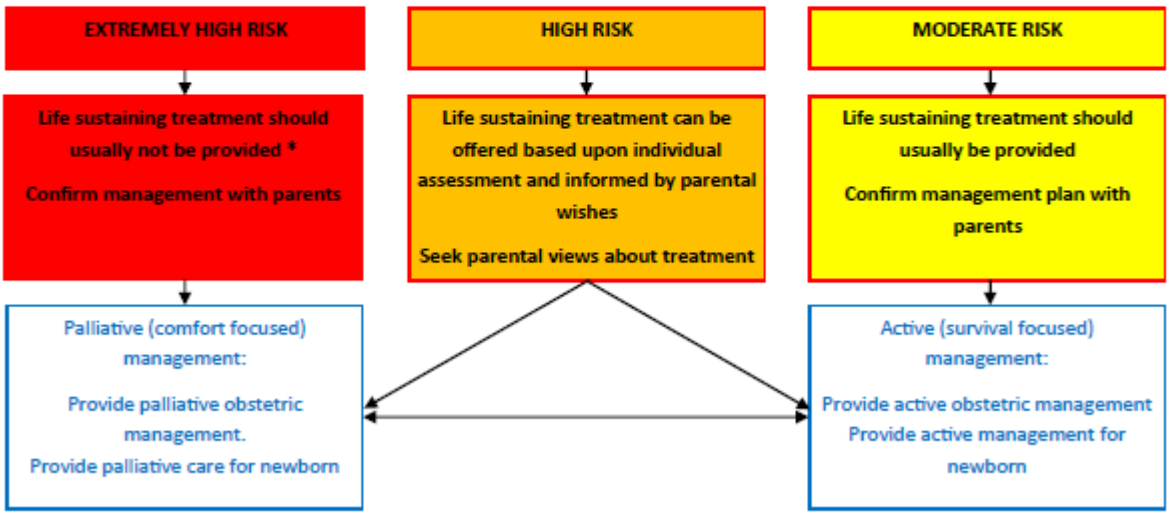
Estimated Fetal Weight: _____ **grams**

Named Obstetric consultant:
Named Neonatal consultant:

RISK ASSESSMENT	
Favourable factors present	**Unfavourable risk factors present**
☐ Female baby	☐ Male baby
☐ Normal estimated fetal weight	☐ Multiple pregnancy: number of live fetuses:
☐ Singleton	☐ Fetal Growth Restriction: document estimated fetal weight
☐ End of week	☐ Congenital anomaly (document below)
☐ Steroids course completed already	☐ Prolonged Preterm Ruptured membranes <24 weeks
	☐ Chorioamnionitis
	☐ Other co-morbidities (document below)
Additional comments:	

Agreed modified risk assessment for baby		
☐	**Extremely high risk** 90 % death / severe impairment	☐ 22^{+0}—22^{+6} + unfavourable risk factors ☐ 23^{+0}—23^{+6} (some babies) + unfavourable risk factors (e.g. severe FGR) ☐ $\geq 24^{+0}$ (rarely) + significant unfavourable risk factors (e.g. severe FGR)
☐	**High risk** 50-90 % death / severe impairment	☐ 22^{+0}—23^{+6} + favourable risk factors ☐ $\geq 24^{+0}$ (some babies) + unfavourable risk factors / co-morbidities
☐	**Moderate risk** <50 % death / severe impairment	☐ 23^{+0}—23^{+6} (some babies) + favourable risk factors ☐ $\geq 24^{+0}$ (most babies) + favourable risk factors
Additional comments:		

Senior sign off				
Obstetrician	Name		Level	
	Signature		Date	
Neonatologist	Name		Level	
	Signature		Date	



*However, assess for modifiable risk factors and reassess risk if/when circumstances change

AGREED NEONATAL CARE PACKAGE				
☐ Survival focused	☐ Palliative	☐ Neonatal attendance at birth		
Document discussion with parents:				
Senior sign off				
Neonatologist	Name		Level	
	Signature		Date	

AGREED OBSTETRIC CARE PACKAGE			
☐ $MgSO_4$	☐ Steroids	☐ Tocolysis	☐ Intrapartum antibiotics
☐ Delivery by caesarean section for fetal reasons		☐ In-utero transfer *	☐ Intrapartum CEFM
All potential transfers must be authorized by the on-call obstetric consultant, following discussion with the on-call consultant neonatologist/paediatrician. It is imperative that a decision is made without delay to ensure those that require transfer are transferred quickly.			
If not considered suitable for In-utero transfer, document reasons why:			
Document discussion with parents:			
Senior sign off			
Obstetrician	Name	Level	
	Signature	Date	

Threatened preterm labour predictive test performed:		
Assessment	Yes / No:	Value:
Cervical length		
Actim Partus		☐ Positive ☐ Negative
Fetal Fibronectin		☐ Positive
QUIPP App		% risk in 7 days:
AmniSure		☐ Positive ☐ Negative
Antenatal Steroids administered		☐ Yes ☐ No
First dose given: Date: Time: If not given, please provide reason:		
First dose given: Date: Time: If not given, please provide reason:		
Magnesium Sulphate given:		☐ Yes ☐ No
Time started: Date: Time:		

INTRA UTERINE TRANSFER (to be completed for every intended transfer, whether successful or not)		
Maternal agreement obtained:	☐ Yes	☐ No:
Written information provided:	☐ Yes	☐ No:
Verbal information provided:	☐ Yes; obstetric staff	☐ Yes; neonatal staff

Finding a neonatal cot and maternity bed: call 365 Call Handling Service (East Midlands Neonatal Call ODN) 0300 300 0038

Call the East Midlands Cotline to obtain cot status of appropriate neonatal unit and maternal bed availability. State that this is for a <27 week singleton or <28 week multiple pregnancy and a NICU cot is required at Nottingham University Hospitals or University Hospitals of Leicester, ideally following the network referral pathways. The call handlers will take brief details. See page 7 for alternative contact details if no appropriate transfer can be offered via the call handling service.

Unit contacted	Time	Discussed with	NICU accepted. If no, why?	Labour ward accepted? If no, why	Indication for not accepting transfer and comments

REFUSAL OF TRANSFER

- A decision to refuse an appropriate transfer by a tertiary neonatal team should be made only after consultation with the neonatal consultant on duty
- A decision to refuse an appropriate transfer by a maternity unit should be made only after consultation between the senior midwife in charge of the labour ward and the obstetric consultant on duty/call
- If for any reason one tertiary centre is unable to take an IUT there should be a discussion between tertiary centres with the neonatal consultant, obstetric consultant on duty and the senior midwife in charge of the labour ward. Every effort should be made to keep a baby in the network

Ambulance services (for RDH call EMAS on 0115 9675099; for QHB call WMAS on 01785 270320)

- Once an in-utero transfer has been accepted by the receiving neonatal and maternity unit, organise the transfer through the ambulance service
- In-utero transfer will require Hospital Category 1 priority which provides a 7-8 minute response. You will be asked if you need their clinical help right now to deliver an immediate life-saving intervention or are you declaring an obstetric emergency? The answer should be 'Yes' giving the reason of obstetric emergency if time critical
- If the patient is not time critical the above question should be answered 'No'. You will be taken through a scripted algorithm, please ask for a category of call to ensure understanding of the time frames for the specific call:

Category 1	7 - 8 minutes
Category 2	18 - 40 minutes
Category 3	120 - 240 minutes
Category 4	4 - 4½ hours

Provision of an escort from the maternity team for the transfer will be made on a case by case basis. This decision should be made by a senior member of maternity staff on duty. There may not be a paramedic on the vehicle in which case the unit must send an appropriately trained member of staff. (Ambulance have no responsibility to return member of staff).

Transfer checklist

Indication for transfer:

Maternal history:

Transfer discussed and agreed with UHDB obstetric consultant and receiving unit:
If yes: date and time:

If no: why?

Time IUT decision made	Time ambulance requested	Time ambulance arrived & transferred

In the case of a delay with ambulance transfer (over 4 hours) please state why:

Documentation

To accompany the mother at transfer:

- Photocopy of mother's obstetric notes
- Mother's handheld records

Filing of this proforma:

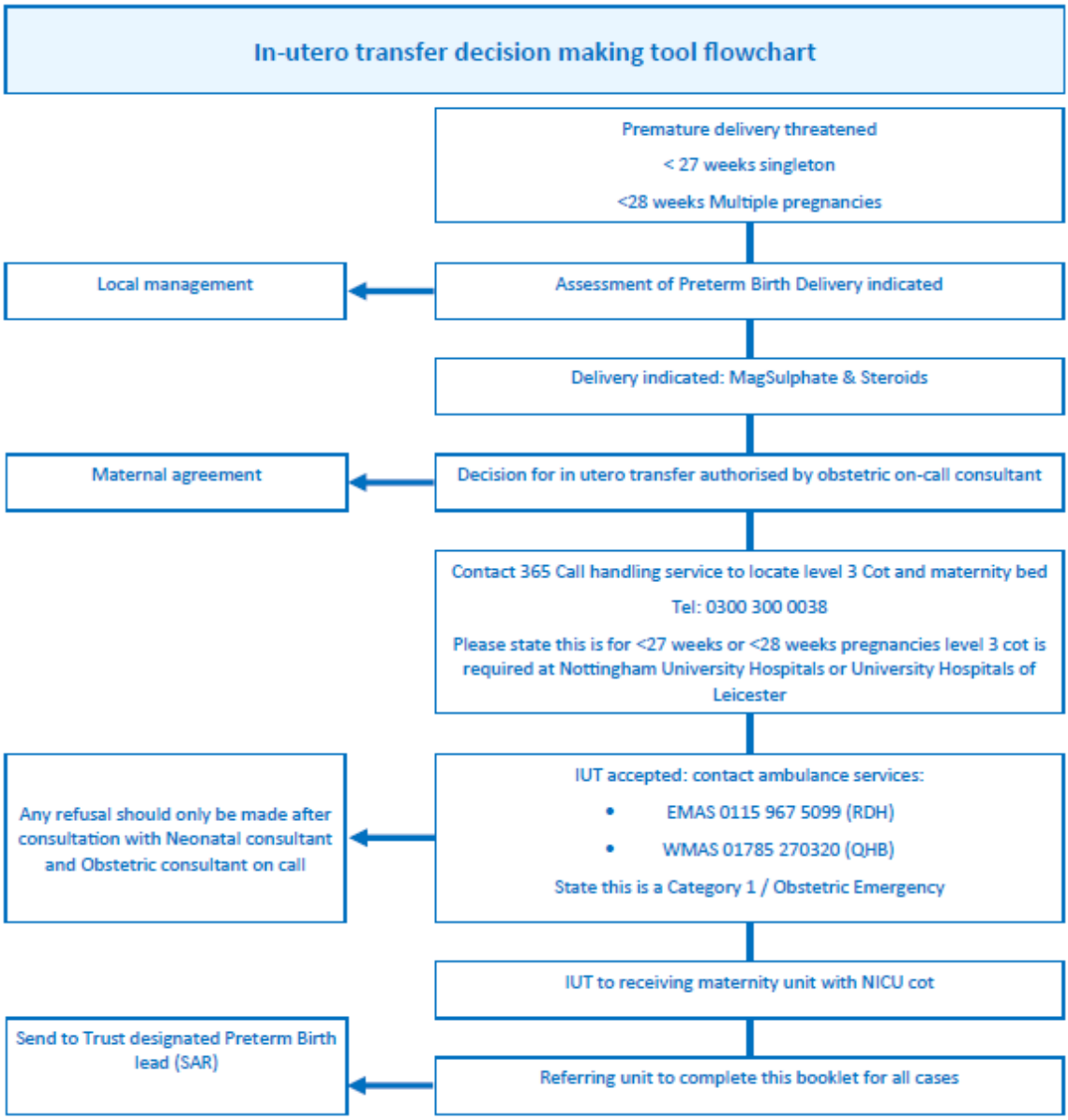
- In the obstetric medical notes
- Copy to go to Preterm Birth lead consultant for them to follow up the outcome of each case

Safeguarding

Where there are safeguarding issues, any transfer of care must include information about the case and details of all key professionals (lead consultant, midwife, health visitor, social worker, GP and Safeguarding lead). It should be ensured that all staff who take over the care of the woman are aware of what the issues are and who the key professionals are. All issues and contacts should be clearly documented in the handover notes.

OUTCOMES			
	Tick	**Date**	**Time**
In-utero transfer			
Ex-utero transfer			
Pregnant woman stayed in local unit			
Date baby delivered:			
Where was the baby transferred to:			
If transfer did not take place, please complete below table:			
Reason:			**Tick relevant box:**
Pregnant woman unwilling to accept			
Clinical change (e.g. maternal deterioration/improvement/advanced labour)			
No maternal bed found			
No neonatal cot found			
Unable to locate 2 or more cots for multiples			
Delivered prior to transfer taking place			
Delivered prior to transfer taking place due to ambulance delay			
Escort unavailable			
Other, please state:			
NOTES			
Date:	Time:		
Name:	Designation:	Signature	

CONTACT NUMBERS		
First line to obtain NICU cot status and maternal bed availability (state IUT for extreme preterm birth with cot needed in Nottingham or Leicester: 365 Handling Service (East Midlands Neonatal ODN footprint): **0300 300 0038**		
Every effort should be made to keep baby within the Network, direct contact numbers as below		
Level 3 (NICU)		
Nottingham City Hospital Hucknall Road; Nottingham NG5 1PB **0115 969 1169 extension 55216 or 55215**	Queen's Medical Centre Derby Road; Nottingham NG7 2UH **0115 924 9924 extension 64120**	Leicester Royal Infirmary Infirmary Square; Leicester LE1 5WW **0116 258 6464**
Additional Level 3: Only to be used in case IUT to none of the above can be accepted		
Birmingham Heartlands Hospital Neonatal: 0121 4243508 Maternity: 0121 4243514	Birmingham Womens Hospital Neonatal: 0121 3358190 Maternity: 0121 3358220	University of North Midlands Neonatal: 01782 672400 Maternity: 01782 672333
New Cross Wolverhampton Neonatal: 01902 694032 Maternity: 01902 694031	University Hospital Coventry Neonatal: 02476 966668 Maternity: 02476 967333	Sheffield Jessops Wing Neonatal: 0114 2268356 Maternity: 0114 2261035
Hull University Hospital Neonatal: 01482 604391 Maternity: 01482 604490	Bradford Royal Infirmary Neonatal: 01274 364522 Maternity: 01274 364515	Leeds General Hospital Neonatal: 0113 3927443 Maternity: 0113 3927445
St Marys Hospital Manchester Neonatal: 0161 7012700 Maternity: 0161 2766556	Arrowe Park Hospital Birkenhead Neonatal: 0151 6047108 Maternity: 0151 6047130	Royal Oldham Hospital Neonatal: 0161 6278151 Maternity: 0161 6278255
John Radcliffe Hospital Oxford Neonatal: 01865 223201 Maternity: 01865 221651	Royal Bolton Hospital Neonatal: 01204 390748 Maternity: 01204 390579	Liverpool Womens Neonatal: 0151 7024193 Maternity: 0151 7089988 ext1162


In-utero transfer decision making tool flowchart
Premature delivery threatened
< 27 weeks singleton
<28 weeks Multiple pregnancies
Assessment of Preterm Birth Delivery indicated
Local management
Delivery indicated: MagSulphate & Steroids
Decision for in utero transfer authorised by obstetric on-call consultant
Maternal agreement
Contact 365 Call handling service to locate level 3 Cot and maternity bed
Tel: 0300 300 0038
Please state this is for <27 weeks or <28 weeks pregnancies level 3 cot is required at Nottingham University Hospitals or University Hospitals of Leicester
IUT accepted: contact ambulance services:
EMAS 0115 967 5099 (RDH)
WMAS 01785 270320 (QHB)
State this is a Category 1 / Obstetric Emergency
Any refusal should only be made after consultation with Neonatal consultant and Obstetric consultant on call
IUT to receiving maternity unit with NICU cot
Referring unit to complete this booklet for all cases
Send to Trust designated Preterm Birth lead (SAR)

Documentation Control

Version: **UHDB Version 2**		**Status: FINAL**	**Reference Number:** NIC RE 02 June 2024
Latest Royal Derby prior to merged document:			
Version	Date	Author	Amendment
V004	October 2017	Dr Bala Subramaniam	Consultant Neonatologist
Version control for UHDB merged document:			
1	04/05/21	J McIntyre – Neonatal Consultant R Hamilton – Obstetric consultant	Guideline reflecting Regional guidance and BAPM guidance. Introduction of the extreme preterm birth care pathway booklet to assist documention of shared care.
1.1	July 2023	Cindy Meijer - Lead Digital Midwife	To be inline with neonatal Critical Care Pathway
1.2	Nov 2023	Joanna Harrison-Engwell - Lead Senior Midwife for Guidelines, Audit and QI	To ensure full compliance with Baseline Assessment Tool
1.3	June 2024	Lauren Wilkinson - Risk Support Midwife	To remove reference to MHHR due to the implementation of Badgernet
2	May 2024	Miss S Raouf - Consultant Obstetrician	Triannual review
Intended Recipients: All staff involved in the care of (threatened) extreme preterm birth			
Training and Dissemination: Email, KOHA, App notification			
To be read in conjunction with: Preterm guideline			
Keywords: preterm, PPROM			

Consultation with:	FMMC team RDH, Obstetric team, neonatal team, East Midlands extreme preterm workgroup
Business Unit sign off:	04/06/2024: Maternity Guidelines Group: Miss A Joshi – Chair 15/07/2024: Maternity Governance Group/CD – Mr R Deveraj
Notification Overview sent to TIER 3 Divisional Quality Governance Operations & Performance: 16/07/2024	
Implementation date:	22/07/2024
Review Date:	May 2027
Key Contact:	Joanna Harrison-Engwell