Trust Guideline for the Management of Babies Born Extremely Preterm
(at less than 26 weeks’ gestation)

A clinical guideline recommended for use

<table>
<thead>
<tr>
<th>For Use in:</th>
<th>Delivery Suite, NICU, Antenatal Clinic</th>
</tr>
</thead>
<tbody>
<tr>
<td>By:</td>
<td>Obstetricians, Midwives, Neonatal unit medical and nursing staff</td>
</tr>
<tr>
<td>For:</td>
<td>Premature babies and their families</td>
</tr>
<tr>
<td>Division responsible for document:</td>
<td>Women and Children</td>
</tr>
<tr>
<td>Key words:</td>
<td>Premature, Infant, Limit of Viability, Extreme immaturity, Neuroprotection, Magnesium Sulfate.</td>
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<td>Assessed and approved by the:</td>
<td>Clinical Guidelines Assessment Panel</td>
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<td>Date of approval:</td>
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<td>Clinical Standards Group and Effectiveness Sub-Board</td>
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<td>David Booth</td>
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<td>Description of changes:</td>
<td>Changes made to ensure this agrees with revised GBS Guideline <a href="#">Group B Streptococcus in Pregnancy Trust Docs ID 845</a> – Antibiotics paragraph added page 6.</td>
</tr>
<tr>
<td>Compliance links:</td>
<td>Specialist neonatal care: quality standard NICE 4 November 2010</td>
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<tr>
<td>If Yes - does the strategy/policy deviate from the recommendations of NICE?</td>
<td>No deviation</td>
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</table>
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Quick reference guideline

Established preterm labour

Discussion with parents

Accurate gestational age?
Consider Magnesium Therapy – senior clinician decision – see AO23

Yes

No but likely <23+0

Clinician experienced in assessment + resuscitation present at birth

Call for assistance

Resuscitate and assess

Comfort care

<23^0

Resuscitation would not normally be carried out

23^0 – 23^6

Assessment and care consistent with parents’ wishes

24^0 – 24^6

Resuscitation followed by reassessment

Palliative Care

25^0 – 25^6

Resuscitation followed by intensive care
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Objectives

Advances in perinatal care have seen the limits of human viability move towards less mature and smaller babies. There is increased survival of babies born prematurely, although considerable morbidity and mortality persist with social, ethical, medical and economic implications.

In the perinatal period there are complex and demanding decisions to be made at various stages, which can be broadly categorised as:

- The care of a fetus and mother before the birth – including decisions on monitoring, mode of delivery and administration of steroids and magnesium sulfate (see guideline AO23 on Trust Docs ID: 875).
- Whether to resuscitate a newborn baby and admit him or her to neonatal intensive care.
- Whether to continue invasive intensive care or replace active treatment with palliative care.

This guideline focuses mainly on the second point and aims to provide a pathway of care for the management of such babies (based on consensus views, best practice and available evidence) in order to support clinicians faced with difficult decisions, at times when immediate action may be required.

Rationale

Relevant UK publications have provided guidance and an evidence base to support decision-making. These include:

- Perinatal Management of Pregnant Women at the Threshold of Infant Viability– the Obstetric Perspective (Scientific Impact Paper No. 41) RCOG Feb 2014


- Specialist neonatal care: quality standard NICE 4 November 2010

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Broad recommendations:

**Individualisation of Care**

Care of the mother, her fetus and the baby should always be individualized and should be led by senior staff in all disciplines. Parental hopes and expectations should be explored in a realistic way, drawing upon the available evidence.

**Prior to delivery**

When it appears that a mother will deliver her baby at a very early gestational age, all clinical information must be reviewed by the most senior available obstetric and neonatal staff. The obstetric history and antenatal care must be considered carefully. Antenatal management decisions should involve the parents and the clinical staff who will be responsible before and after the delivery.

**Documentation**

All communication with parents and agreed plans must be documented in full and the plans revised as needed.

**Estimation of gestational age**

To avoid discrepancy in gestational age estimation, an early (between 10 weeks and 13 weeks + 6 days) dating scan should be used as the most accurate estimate of the gestational age. When carried out by an experienced ultrasonographer, these scans are the most accurate tool for estimation of gestational age available.

*The best estimation of gestational age should be agreed with the parents and clearly documented.*

Having estimated gestational age, other information about the well-being of the fetus which may affect outcome should also be considered (including multiple pregnancy, estimated fetal weight and growth, fetal abnormalities, antenatal interventions, vascular Doppler flow velocity waveforms, antenatal steroids and risk factors for infection).

**Antenatal Corticosteroids (ACS) & Magnesium Sulfate (Mg SO4)**

Treatment of women with threatened preterm birth with antenatal corticosteroids decreases neonatal mortality and morbidity. Current guidance from NICE on pre-term birth (https://www.nice.org.uk/guidance/ng25) recommends that clinicians should offer a single course of antenatal corticosteroids to women between 26\(^{+0}\) and 33\(^{+6}\) weeks of gestation who are at risk of preterm birth, consider between 24\(^{+0}\) to 25\(^{+6}\) and 34\(^{+0}\) to 35\(^{+6}\), and individualise between 23\(^{+0}\) and 23\(^{+6}\). Our local policy would be to routinely give steroids between 24\(^{+0}\) and 33\(^{+6}\).

The decision to administer corticosteroids at gestations less than 24+0 weeks should be made at a senior level taking all clinical aspects into consideration.'
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There is growing evidence that ACS are of benefit to preterm infants born at less than 24 weeks gestation and therefore, local policy at this unit is that:

- If, following discussion with parents (and where delivery is anticipated) resuscitation of the infant born between 23+0 and 23+6 is to be offered, then antenatal steroids should form part of this package of care.
- Below 23 weeks gestation, steroids should not be given.
- Steroids should not be given in the presence of signs of infection

Note caution with giving steroids in diabetic patients. See diabetic guidelines for more information.

Magnesium Sulfate has been shown to be neuroprotective against cerebral palsy and cystic periventricular leucomalacia (PVL).

- MgSO4 is recommended in women with imminent delivery between 24 and 30 weeks (Guideline AO23 Trust Docs ID: 875).
- Use at extreme prematurity (under 24 weeks) should be made on a case by case basis by a senior clinician. Similar principles to steroid administration for decision-making should be made, i.e. if a decision has been made for active resuscitation, MgSO4 would seem a logical next step.
- When a decision to give Mg SO4 has been made, it should be administered if the birth is expected within the next 4-24 hours and should be continued for 24 hours or to delivery, whichever occurs first. This would be expected in a woman with regular uterine contractions with a cervical dilatation of 4 cm or more.
- Such treatment is recommended regardless of mode of delivery and corticosteroid administration.
- An intravenous loading dose of 4g over 20-30 minutes followed by a maintenance dose of 1g/hr should be given. If the woman weighs under 50kg, the doses should be halved.
- Monitoring should include maternal BP, PR, RR and patellar reflexes done hourly.
- The urine output should be monitored with a strict input output chart to ensure the output is more than 100ml per 4 hours. Consider use of an indwelling catheter to monitor output.
- Discontinuing the infusion and seek medical review if the RR<16/min, UOP <100mL/ 4 hours or the patellar reflexes are absent.
- Antidote for suspected Mg Toxicity
  - Calcium gluconate (1 gram (10 mL of 10% solution) slowly via intravenous route over 10 minutes) should be given if there is clinical concern over respiratory depression

Although the benefit of corticosteroids at extreme early gestations is limited to the neuroprotective effects, if the decision is made to administer corticosteroids, consideration should be given to tocolysis.
Antibiotics

All women in established preterm labour (i.e. regular uterine activity and ≥4cm dilated) should receive GBS antibiotics see Group B Streptococcus in Pregnancy Trust Docs ID 845

Plastic Bags and Wraps

During initial resuscitation, stabilization and transfer of preterm newborns, use of plastic bags/wraps should be undertaken to prevent hypothermia.

Discussion with parents

- An agreed, accurate gestational age estimate should form the starting point for a detailed discussion with parents, which should also include other factors affecting outcome.
- If there are difficulties in reaching an agreed gestational age estimate with parents, a further discussion with another senior member or members of the perinatal team should be offered.
- Outcome predictions should be based on the best available figures for mortality and morbidity. It is especially important that parents are given consistent information - guidance on this is included in Appendix a. All staff members involved in counselling regarding expected outcomes should use these locally agreed data in their discussions with parents.
- To help parents prepare for the different possible outcomes after delivery, the practicalities of commencing, withholding and withdrawing intensive care, and the positive role of palliative care (where appropriate) should be included in the discussion.
- A clear plan for the delivery and subsequent care of the baby must be made and documented.
- Parental wishes, following the discussion, should be sought, discussed and clearly documented within the plan for delivery and subsequent care. Appendix b is a proforma for prenatal consultation and management plan undertaken by neonatal staff.
- If appropriate, parents should be offered the opportunity to visit the Neonatal Unit.
Management at specific gestations:

Below, guidance for specific situations is given. In addition, general guidance on assessing the condition of the infant at birth and guidance on how to proceed if gestation is uncertain is also outlined.

1. Continuous fetal monitoring and caesarean section in the fetal interest is rarely appropriate at <26 weeks gestation, though in some cases a second opinion may be helpful to the parents. Management and decision-making will be individualized and follow careful discussion with parents. These discussions should be fully documented.

2. Any monitoring of the FH should be done sensitively (for example: without audible sound), and with the prior agreement of the parents.

For all gestations less than 26 weeks

Antenatally, the decision to resuscitate or not should be based on the most recent management plan, in conjunction with the available clinical information.

At birth, a decision should then be made, based on the condition of the baby, as to whether resuscitation should proceed - once begun, the response of heart rate to lung inflation will be crucial in judging how long to continue resuscitation.

If there has been insufficient time to hold a detailed discussion with parents, the available clinical information, to include the best available estimate of gestational age, should be used to guide the decision. In the absence of a pre-existing management plan, the condition of the infant at birth (apparent maturity, extent of bruising, spontaneous activity level, respiratory effort and heart rate) should be used to guide the decision to start resuscitation or not.

In situations where the most senior member of staff in attendance remains uncertain, it is reasonable to proceed with resuscitation and evaluate further with other senior colleagues.

Resuscitation

In most situations, lung inflation with a mask is the most appropriate means of resuscitation in infants less than 26 weeks gestation.

This should be carried out as described in the Newborn Life Support course handbook (https://www.resus.org.uk/EasysiteWeb/getresource.axd?AssetID=811&type=Full&servicetype=Attachment).

Experienced practitioners may decide that the most appropriate method for lung inflation is via an endotracheal tube and they may wish to proceed directly to intubation. This is an acceptable approach to initial lung inflation – repeated attempts at intubation should not delay lung inflation and repeated attempts at this stage of resuscitation are discouraged.
Response to resuscitation

If the heart rate increases rapidly and the colour improves, appropriate ventilatory support, including intubation and surfactant therapy, should be given and the baby transferred to the neonatal unit for further assessment.

In a baby who does not respond to adequate resuscitation efforts, the duration of resuscitation should not exceed 10 minutes – the decision to stop should be made by the most senior member of the team present, in discussion with others present.

Chest compressions

There is no evidence to support the use of chest compressions, during resuscitation at gestational age <26 weeks.

Adrenaline

There is no evidence to support the use of adrenaline (by any route) during resuscitation at gestational age <26 weeks.

Uncertain gestational age

- If gestational age is uncertain, (i.e. no dating ultrasound scan) an ultrasound scan by an experienced sonographer should be carried out, if time permits.

- If the fetal heart is heard during labour, a team experienced in resuscitation should be called to attend birth.

- At birth, a decision should then be made, in the best interests of the baby, as to whether resuscitation should proceed - once begun, the response of heart rate to lung inflation will be crucial in judging how long to continue resuscitation.

- For an infant already born (e.g. rapid delivery following arrival on delivery suite or delivery en route to hospital) where gestational age is uncertain, the neonatal team should be informed and should attend immediately to assess the baby and make a decision on whether to proceed with resuscitation.

Less than 22 weeks

Manage on the gynaecology ward. The obstetric team should counsel parents that at these gestations a fetus is pre-viable and cannot live. Neonatal team input should be sought if the parents require further reassurance. The parents should be informed that, even though the baby is pre-viable, it may still show some signs of life at delivery and in these circumstances it should be registered as a live birth.

22 +0 to 22 +6 WEEKS

If the gestational age is certain and less than 23 +0 (i.e. at 22 weeks) it would be considered in the best interests of the baby, and standard practice, for resuscitation not to be carried out.
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Parents should have the opportunity to discuss outcomes with a senior member of the neonatal team. Senior neonatology presence at the delivery can be offered.

*Resuscitation should only be attempted and intensive care offered, if, after thorough discussion with an experienced neonatologist about the risks and long-term outcomes, the clinicians and parents agree that it is in the baby's best interests.*

**23±0 to 23±6 WEEKS**

If gestational age is *certain* at 23±0 – 23±6 (i.e. at 23 weeks) a senior member of the NICU medical team or ANNP experienced in resuscitation should be available to attend the birth.

The decision to initiate resuscitation should be based on an assessment of the baby at birth.

In the best interests of the baby a decision **not** to start resuscitation is an appropriate approach if the parents have expressed this wish.

**24±0 to 24±6 WEEKS**

If gestational age is *certain* at 24±0 – 24±6 resuscitation should be commenced unless the parents and clinicians have considered that the baby will be born severely compromised. If the baby is assessed to be more immature than expected, and / or born in poor condition, it may be appropriate not to start resuscitation.

**25±0 to 25±6 WEEKS**

When gestational age is 25±0 weeks or more, it is appropriate to resuscitate babies routinely at this gestation.

**Care for babies in whom resuscitation was not started or was discontinued**

The baby should be given all the care needed for his/her comfort and the parents encouraged by appropriate staff to hold and spend time with their baby, if they wish, in a quiet and private location.

The parents should be offered bereavement counselling, including advice about post mortem examination. At the appropriate time the prognosis for future pregnancies should also be discussed.

**Clinical audit standards**

- Documentation: all discussions regarding premature birth, prior to the birth, should be clearly documented in the maternal hospital records using the agreed proforma.
- Survival and morbidity: discussion with parents that include morbidity and mortality statistics should be based on the agreed figures outlined in appendix a.
- Antenatal corticosteroids: decisions not to administer antenatal corticosteroids for threatened preterm birth should be clearly documented in maternal hospital records.
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- Resuscitation: use of chest compressions and adrenaline in the context of resuscitation at birth in infants of less than 26 weeks gestation.

Summary of development and consultation process undertaken before registration and dissemination

Draft versions of this guideline on behalf of were circulated for comment to all consultant neonatologists and to the Department of Obstetrics and Gynaecology. Draft versions were discussed at guideline meetings within each department. Survival and morbidity figures were discussed and reviewed jointly by neonatology and obstetric colleagues. This version has been endorsed by the Clinical Guidelines Assessment Panel.

Distribution list/ dissemination method

Trust intranet.

References/ source documents


6 Patterns of Outcome at Borderline Viability: Epicure 2 survival and early morbidity Kate Costeloe: Arch Dis Child Fetal Neonatal Ed 2008;93:Fi-Fviii (abstract from RCPCH meeting, York, 2008)


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10 Specialist neonatal care: quality standard NICE 4 November 2010


12 WHO recommendations on interventions to improve preterm birth outcomes. ISBN 978 92 4 150898 8, WHO 2015, FRANCE
Appendix A: Survival and Morbidity: results of the EPICure studies

Two studies of extremely premature births have taken place, looking at all deliveries of extremely premature babies (less than 26 weeks gestation) in the UK and Republic of Ireland. These studies (EPICure 1\textsuperscript{(3)} and EPICure 2\textsuperscript{(6)}) were carried out in 1995 and 2006 and gathered information from all maternity units for a 10 month and 1 year period, respectively.\textsuperscript{(3,4,5)}

**Survival:** Survival of extremely premature babies at all gestational ages has increased from 1995, statistically significant for 24 and 25 weeks gestation.

**EPICure 2** (2006 data)

<table>
<thead>
<tr>
<th>Gestational age at birth (weeks)</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alive at birth (%)</td>
<td>56</td>
<td>81</td>
<td>89</td>
<td>95</td>
</tr>
<tr>
<td>% Alive at birth who were admitted to NICU</td>
<td>13</td>
<td>64</td>
<td>86</td>
<td>96</td>
</tr>
<tr>
<td>% Alive at birth who survived to discharge</td>
<td>2</td>
<td>19</td>
<td>40</td>
<td>66</td>
</tr>
<tr>
<td>% Admitted to NICU who survived to discharge</td>
<td>16</td>
<td>30</td>
<td>47</td>
<td>69</td>
</tr>
</tbody>
</table>

**Survival and Disability**

**EPICure 2** (2006 data)

Children were classified as having severe, moderate, or no/mild impairment.

Outcomes of infants discharged home
(Excluding those born at 26 weeks gestation)

63% had no or mild disability
35% had moderate to severe disability
In contrast to EPICure 1, prevalence of neurodevelopmental impairment was significantly associated with gestation, with greater impairment as gestational age decreased.

There is an inverse relationship between gestational age and prevalence of moderate or severe impairment; affecting 66% of survivors at 22 weeks, 47% at 23 weeks, 40% at 24 weeks and 30% at 25 weeks.
6 years old:

A further assessment of surviving children at 6 years of age.

This assessed prematurely born children against standard assessment tools and also compared them to classmates born at term. They were assessed in 4 domains – neuromotor, cognition, hearing and vision.

The main result was that cognition (thinking and learning skills) was more severely affected than expected, with 41% of preterm children having scores 2 SD below the mean. Boys are twice as likely as girls to have severe cognitive problems or cerebral palsy at 6 years.

<table>
<thead>
<tr>
<th>Percentage of Children with different degrees of disability</th>
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<tbody>
<tr>
<td><strong>Gestation at Birth</strong></td>
</tr>
<tr>
<td>------------------------</td>
</tr>
<tr>
<td>No Disability</td>
</tr>
<tr>
<td>Mild Disability</td>
</tr>
<tr>
<td>Moderate Disability</td>
</tr>
<tr>
<td>Severe Disability</td>
</tr>
</tbody>
</table>

Mild disability - e.g. low normal IQ scores, wears glasses & has a squint, mild hearing loss, minor neurological abnormalities.

- Moderate disability - e.g. moderate learning problems, cerebral palsy but walking, hearing aids, some vision deficit.

- Severe disability - e.g. severe learning problems, cerebral palsy & not walking, profound deafness, blindness.
## Disability in the 2006 Cohort

<table>
<thead>
<tr>
<th>Gestational age at birth (weeks)</th>
<th>22</th>
<th>23</th>
<th>24</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>At birth - % going on to survive <em>without</em> serious disability</td>
<td>2</td>
<td>12</td>
<td>27</td>
<td>47</td>
</tr>
<tr>
<td>After admission to NICU - % going on to survive <em>without</em> serious disability</td>
<td>5</td>
<td>15</td>
<td>30</td>
<td>49</td>
</tr>
</tbody>
</table>
# Prenatal Consultation: NICU

## Maternal Details

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
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<tbody>
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</table>

Reason for consultation:

Consultation with: (name + designation)

Maternal Age: ___ G___ P___ Blood group: ___ Antibodies:

PMH + problems in this pregnancy:

## Overview

- a. Listened to parents’ understanding of situation
- b. Discussed survival odds / morbidity & mortality
- c. Discussed uncertainty of dates / Prognosis
- d. Explained NICU team presence / Role at delivery

## Immediate morbidities/treatments

- e. Risk of RDS / Intubation / Surfactant
- f. Risk factors for infection / Need for antibiotics
- g. Access / Verbal consent obtained for UAC / UVC
- h. Anaemia / Possible transfusion

## Long-term morbidities

- a. Risk of chronic lung disease
- b. Risk of intraventricular haemorrhage
- c. Risk of NEC
- d. Risk of cerebral palsy / intellectual impairment
- e. Risk of blindness and deafness

## Other

- a. Benefits of breast milk / Nutrition
- b. Location of NICU / Visiting policy
- c. Approximate length of stay
- d. Parental questions and concerns addressed
Summary / Plan

Agreed gestational age:

- Parents told that plan may need to be modified after baby has been born and examined

Signature