Ashford and St. Peter's Hospitals
NHS Foundation Trust

Neonatal Resuscitation at Birth

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Guideline History		
Date	**Comments**	**Approved By**
July 2011		Women's Health Guidelines Group NICU consultant

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Neonatal Resuscitation

Introduction

Introduction & purpose

Approximately 1 - 5% of the newborn term population requires some degree of active resuscitation at birth, and this need can often, but not always be predicted.

This policy covers neonatal resuscitation at birth at St. Peter's Hospital, including Labour ward, Joan Booker ward and the Accident and Emergency department.

Anticipation of Resuscitation Need

Personnel

- A person trained in the basic skills of resuscitation at birth should be in attendance at every delivery.
- A person trained in advanced life support techniques should be available for normal low risk deliveries and in attendance for all deliveries considered high risk. This is usually the Neonatal SHO and/or Neonatal Registrar.
- A neonatal Consultant is available 24 hours a day for the labour ward if required and the named consultant for the day is documented on the Neonatal Rota (*Safer Child Birth Guidelines)* This rota is also held by switchboard , as are home and mobile phone numbers for out of hour deliveries

Be prepared

- The room should be warm and windows/doors closed to minimise draughts.
- A Resuscitaire should be available in the room, checked, switched on and set to pre – warm.
- If resuscitation of the baby seems likely, the midwife should inform the shift leader. They should inform the neonatal SHO (**bleep 5125**) and if there are particular concerns, the shift leader or Obstetric registrar should liaise directly with the Neonatal Registrar (**bleep 5302**). If necessary the registrar will inform the Consultant.
- Consultant presence (within 20 minutes) is available 24 hours a day. This will be the attending Consultant from 9am-6pm, Monday to Friday and the on-call neonatal consultant out of these hours. Contact can be made via switchboard dial (0).

Resuscitaires and Equipment

Labour ward: 8
Labour ward theatres: 2
Joan Booker: 1
Each has a numbered logbook for daily checks to be documented. A checklist detailing what to check and stock to ensure it is fit for use is attached to each resuscitaire.
There should be one resuscitaire for each expected baby in multiple pregnancies.

Essential equipment for each resuscitaire:

- Dry clean towels (x2), blankets, hats
- Neonatal stethoscope
- T-piece – set pressure to 30cm for term and 20cm for preterm babies
- Face masks (3 sizes)
- Oropharyngeal airways (size 0 and 01)
- Endotracheal tubes, introducers and connectors (2 of each size2.0, 2.5, 3.0)
- Straight bladed laryngoscope
- Yanker suction catheter sizes 6-10 and suction tubing
- Cord clamps (x2)
- Baby name bands
- 2 x plastic bags for preterm delivery

Additional equipment

Further advanced equipment including drugs is available on the **neonatal resuscitation trolley** kept in room 1 on NICU. This will be used for preterm deliveries, or where advanced resuscitation is needed. This is checked daily.

Lifestart is stored on Labour Ward and should be used for all preterm deliveries.

There is also an orange neonatal emergency “crash” box on Labour ward and Joan Booker ward. This contains extra intubation equipment (ETT, laryngoscope), drugs and fluids and cannulation equipment. This should be checked weekly and documented on the checklist.

Anticipated Resuscitation

The neonatal SHO should attend any delivery where there are concerns the baby may require resuscitation. Examples include:

- < 35 weeks gestation
- Operative vaginal deliveries and emergency caesarean section (not elective caesarean sections);
- Abnormal deliveries e.g. breech, shoulder dystocia
- Multiple births (one Resuscitator per baby- may require 2 per baby if extreme prematurity)
- Known fetal malformations likely to cause compromise at birth – some cardiac, pulmonary and neuromuscular problems,
- Significant meconium stained liquor (thick/tenacious/lumps – attendance not necessary for thin meconium)
- Abnormal CTG – how abnormal? (I discussed with MW and generally if abnormal itll go to instrument/ CS and we’ll be ingormed anyway
- (MW I talked to have not seen one in 3 years) Severe Intrauterine Growth Restriction (IUGR) ?less than 9%ile (no consensus re this- I’ll discuss with NNU cons)
- Reduced fetal movements (with concerns about fetal wellbeing)
- Suspected chorioamnionitis
- Maternal factors including significant APH
- Any other cases where there are concerns the baby may need resuscitation
- This is not an exhaustive list

- If NICU presence is known to be required at birth this should be documented in the AN birth plan- if unsure please ask well in advance of delivery so NICU team has time to prepare.

- If there are significant concerns, the Neonatal Registrar +/- Neonatal nurse should also be asked to attend. This includes all deliveries <30 weeks or more mature babies if the neonatal junior feels they may need help

General Care at Birth

- At delivery, babies >32 weeks should be placed skin to skin/collected in a clean warm towel. (For babies <32 weeks – see *Resuscitation - use of polythene bags in labour ward* guideline)
- Assess
    - Colour
    - Tone
    - Breathing effort
    - Heart rate – assessed with a stethoscope
- The baby should be dried and, the wet towel removed and replaced with warm towel.

- Delayed cord clamping (3 mins) should be done unless baby needs to be moved for resuscitation.

- This initial assessment will categorize the baby into one of the three following groups:

    1. *Regular breathing, fast heart rate (more than 100 beats/min - bpm) pink, good tone.*
       Healthy baby- continue DCC, leave baby on mum covered with towels.

    2. *Irregular or inadequate breathing, slow heart rate (less than 100 bpm), blue, normal or reduced tone.*
       Stimulate and dry. If the baby responds then no further resuscitation is needed. A premature baby may need the early application of mobile vapotherm to support breathing. If there is no response, the baby should be transferred to the resuscitaire, and then proceed as for group 3 – see below.

    3. *Not breathing, slow or absent heart rate (less than 100 bpm), blue or pale, floppy.*
       This baby requires urgent help. Transfer the baby to the resuscitaire and start the clock. Summon help using the emergency bell and crash call.

- The Apgar score is recorded at 1 and 5 minutes, but this is done retrospectively and is not useful to guide resuscitation.
- Cord blood gases should be taken if resuscitation required and results phoned through to NNU team.

RESUSCITATION PROCEDURE – see also Appendix 1 for NLS algorithm

At delivery

- Start the clock on resuscitaire/ note delivery time
- Place on the warmed resuscitaire, dry and stimulate and discard wet towel
- Assess tone, breathing and HR.

At every stage ask: Do I need help?

How to get help

If NNU SHO or Reg not present at delivery-crash call 2222 saying neonatal emergency and location, this will bleep the NNU SHO, Registrar and NNU Nursing team with the crash trolley. The NNU consultant **DOES NOT** carry a crash bleep

If NNU Consultant is not present and is required:

In working hours (9-6) the NICU sister in charge will inform the attending consultant of the resus call.

Out of hours 6pm -9am – assign team member to phone switch to ask for NNU consultant on call. Use SBAR handover so consultant knows whether you are phoning for advice or if they need to travel in quickly. I.e. 'I am calling from Labour ward. We need you as soon as possible for a term neonatal resuscitation in room X"

If the Neonatal consultant has not been called and you think they are needed, prompt the resuscitating team 'do you want me to phone/get the consultant?'

Airway (A)

- If the baby is gasping or not breathing adequately open the airway.
- Hold head in neutral position with chin support
- Airway can be obstructed by- hyper extended/flexed neck, floppy tongue falling backwards, or mechanical obstruction - meconium, mucus or blood.
- If no good chest rise or response with increasing HR with inflation breaths reassess airway and use 2 person technique jaw thrust. If no good chest rise is achieved consider
  -using an airway adjunct (oropharyngeal airway)

- suctioning the oropharynx under direct vision using a laryngoscope and wide bore suction catheter. The negative pressure of suction should not exceed 80mmHg.
- Securing airway with ETT – If trained to do so

Breathing (B)

- If baby gasping or not breathing
- Give 5 x inflation breaths (2-3s each) using the appropriate size Neopuff mask and pressures of 30cm (term) or 20cm (preterm) with fiO2 21%
- Observe the chest wall for movement.
- Once 5 inflation breaths have been given, reassess heart rate.
- **If the heart rate has increased (>100bpm),** the inflation breaths were successful.
- Reassess breathing effort- if inadequate give 30s ventilation breaths and reassess, continue ventilation breaths until regular resps established/ Neonatal team support arrives
- **If the heart rate has not increased** then the baby's airway was probably not open.
- The baby should be re-positioned and a jaw thrust applied. It may be necessary for a second person to assist if a single person jaw thrust is ineffective.
- Give 5 further inflation breaths – looking for chest rise
- If these do not result in an increase in heart rate, and no chest wall movement is seen, the airway is not open- consider airway adjuncts as above.
- Continue giving rounds of inflation breaths until you see good chest rise with interventions to open the airway.
- Apply saturation monitoring when available, titrate oxygen to expected saturations for age of baby.

Circulation (C)

- If there is adequate chest movement on the 1st set of inflation breaths, but the heart rate remains low (<60 bpm),
- Give 5 further inflation breaths- if good chest rise but no response in HR
- Give 30s ventilation breaths.
- If HR remains <60 perform cardiac massage.
- Compress the sternum over its lower third, by about one third of the depth of the chest.
- The two methods accepted are using two fingers on the sternum, or (the more effective method) encircling the whole chest.
- Compressions and ventilations should be in a ratio of 3:1, to achieve 90 compressions and 30 breaths in one minute.
- Assess HR every 30 seconds, and cardiac massage discontinued once the heart rate increases >60 bpm.
- If the heart rate does not respond to adequate ventilation and effective chest compressions, administration of drugs will be necessary.

SEE NLS ALGORITHM

Drugs (D)

- Necessary if HR does not respond to adequate ventilation and cardiac massage.
- This is rare and indicates the baby has been significantly compromised.
- The baby will be intubated to secure the airway in the prolonged resuscitation.
- The drugs can be used in any order, although research suggests that epinephrine works better in a non acid environment
- Umbilical venous catheter should be inserted to administer them. If umbilical venous access impossible to establish, the intraosseus route is acceptable and effective in both term and preterm infants.
- Sodium Bicarbonate 4.2% 2 – 4 ml/kg, followed by a 2ml flush of 0.9% Sodium Chloride
- Epinephrine (adrenaline) 1:10,000 (0.1ml/kg)
    - This can be administered via the endotracheal tube if access is not yet established, however its efficacy is unproven, a repeat dose can be given intravenously if required, once access is established.
    - Repeat doses of epinephrine should be considered following administration of bicarbonate and dextrose, as it may not work in an alkaline environment, or where the heart has exhausted its glycogen and glucose supply.
- Dextrose 10% 2.5 ml/kg

- 0.9% Sodium Chloride 10 ml/kg

Special Situations

Volume loss

History of acute blood loss? (think hidden bleeding) the HR may only respond to volume expansion.

O negative blood is available for emergency situations in LW blood fridge, if this is used the blood bank must be informed immediately afterwards so it can be replaced.

Meconium (See Management of Meconium Stained Liquor Guidelines)

- Passage of meconium may indicate fetal compromise, and is more common in term and post dates babies.
- The neonatal SHO should only attend deliveries where there is significant meconium.
- The initial resuscitation approach as above – the baby should be dried, wrapped, and assessed for colour, tone, breathing effort and heart rate.
- Do not suction the head on the perineum, or babies who are crying and vigorous at birth.
- If the oropharynx has thick/tenacious meconium present, careful suction of the upper airway may be performed.
- If the baby has depressed vital signs at delivery, the airway should be suctioned under direct vision (using a laryngoscope) prior to the administration of inflation breaths.
- If the baby is significantly compromised (floppy with a low or absent heart rate) suction then give inflation breaths. Inflation breaths should not be delayed whilst rigorous suction is performed.

Premature babies- see also:

DCC <32 weeks

http://trustnet/docsdata/paed/Guidelines_Neonatal/SOP%202%20Less%20than%2032%20Weeks%20DCC%20Jun%202019.pdf

DCC >32 weeks

http://trustnet/docsdata/paed/Guidelines_Neonatal/SOP%201%2032%20to%2037%20Weeks%20Delayed%20Cord%20Clamping%20Jun%202019.pdf

Use of polythene bags

http://trustnet/docsdata/paed/Guidelines_Neonatal/Polythene%20bag%20use%20in%20thermal%20care.doc

- The Neonatal SHO should attend all deliveries <35 weeks, and all deliveries <30 weeks should usually be attended by both the Neonatal SHO, Registrar and nursing team with crash trolley and mobile Vapotherm.
- Establish if Lifestart is appropriate.
- Ensure the room is warm, that the resuscitaire is switched on and has a plentiful supply of warm towels and blankets.
- The T-piece/neopuff should be set initially at 20cm water/ 5 PEEP
- Babies <32 weeks, or older babies with IUGR < 1500g should be routinely placed in a plastic bag on Lifestart for initial resuscitation.
- Babies 32-35 weeks should be placed on Lifestart in warmed towels.
- Delayed cord clamping for 3 minutes if baby stable- see DCC pathway
- Preterm babies should be resuscitated in minimum oxygen initially approximately 21%, and then in sufficient oxygen to maintain their saturations as per NLS guide.
- All babies <32 weeks should have mobile VT 6.0lpm 21% started at birth.
- Babies who are being admitted to NNU should have a birthday cuddle with parents prior to transfer if stable.

Congenital malformations

- Congenital malformations are increasingly detected antenatally.
- Most babies with congenital malformations do not require active resuscitation at birth.
- Facial anomalies including choanal atresia and Pierre Robin sequence may require oro/nasopharyngeal airways.

Maternal Opioid Use

- Naloxone is not a drug used in immediate resuscitation at birth.
- It may be used if opiates have been given to mother during labour and the baby who was previously pink develops a persistently inadequate respiratory effort but a good heart rate.
- Dose is 100µg/kg i.m.
- If administered the baby's respirations need to be monitored over the next few hours, as the effects of the Naloxone wear off.
- Naloxone use is not recommended in babies of women who abused opiates in pregnancy, as there have been previous reports of seizures or withdrawal in newborn babies apparently from this cause.

Babies who do not respond to resuscitation

- Causes include congenital diaphragmatic hernia, intrapartum pneumonia, pneumothorax, cyanotic congenital heart disease, and meconium aspiration syndrome with persistent pulmonary hypertension of the newborn.
- Babies who have suffered significant hypoxia may not respond to resuscitation.
- The outlook for babies with no heart rate after 20 minutes of effective resuscitation, or no regular respiration by 30 minutes of age is extremely poor. Resuscitation past 20 minutes in a baby with no signs of life is unlikely to have a good outcome, and at this point the most senior member of the team should consider stopping.

Documentation

- For preterm births and use of Lifestart use the 'Neonatal resuscitation record' **http://trustnet/docsdata/paed/Guidelines_Neonatal/Resuscitation%20Record%20Neonatal%20SEC%20Aug%202016.doc**

- During active resuscitation designate a scribe to accurately record events

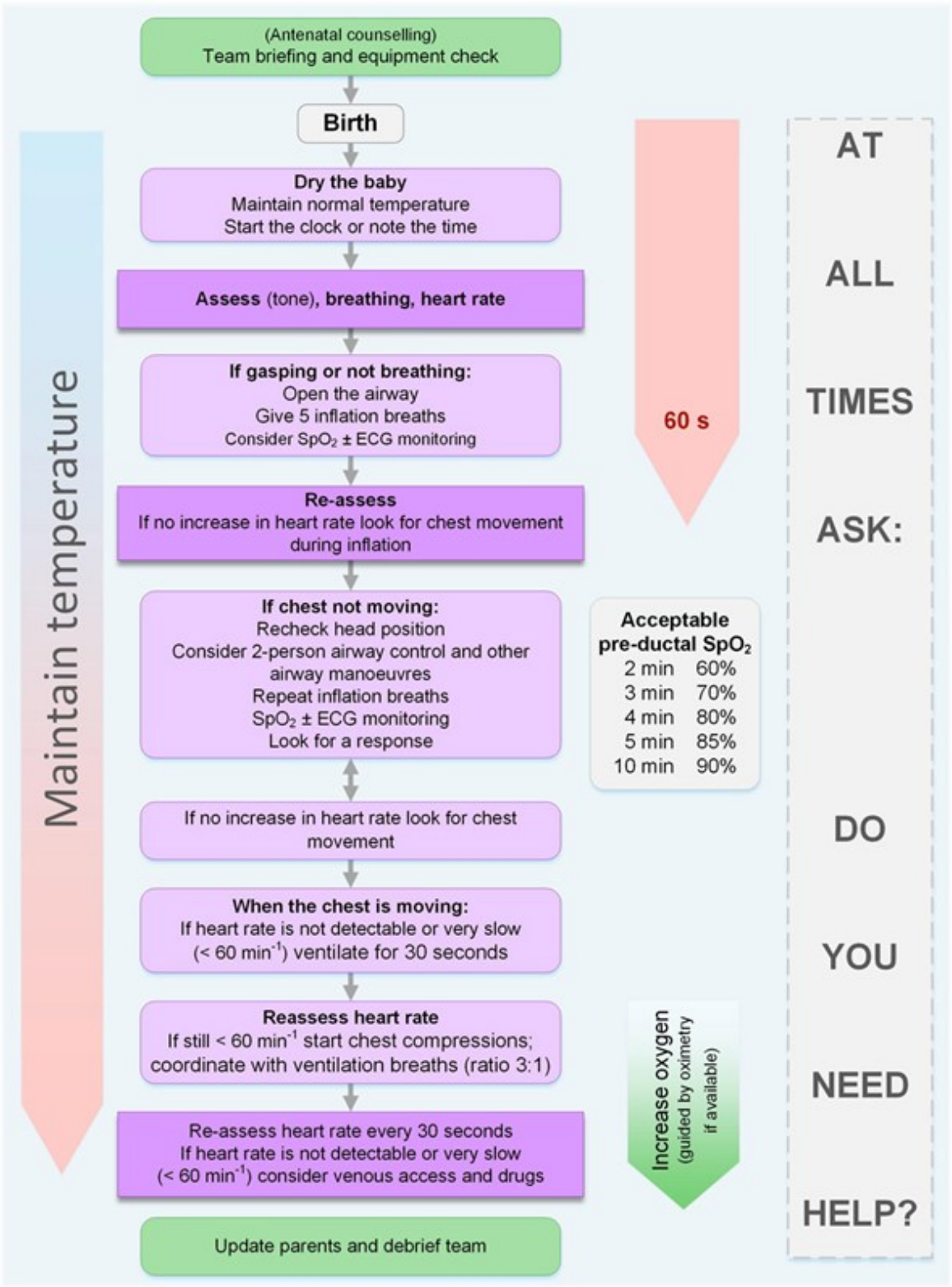
- This can be used following the resuscitation, to record events accurately, particularly the times of the first gasp, onset of regular respiration, and the time the baby's HR first exceeded 100 bpm.
- The record should demonstrate the chronology of events, and all significant consultations, assessments, observations, decisions, interventions and outcomes.
- Record the facts, not opinions or assumptions of causation.
- It is also important to record information given to parents on the yellow "Communication with Parents" sheet.

Staff Training

All staff neonatal medical staff, obstetricians, midwives and NICU nurses are expected to receive neonatal resuscitation annual update (see training needs analysis).

This policy will be available for review on the Maternity Department intranet.

Appendix: 1.
NLS algorithm



2. Supporting References

"Newborn Life Support" Fourth Edition 2016

NICE – Intrapartum care – care of healthy women and their babies during childbirth.

3. Supporting relevant trust guidelines

Neonatal resuscitation record
http://trustnet/docsdata/paed/Guidelines_Neonatal/Resuscitation%20Record%20Neonatal%20SEC%20Aug%202016.doc

DCC SOP <32 weeks
http://trustnet/docsdata/paed/Guidelines_Neonatal/SOP%202%20Less%20than%2032%20Weeks%20DCC%20Jun%202019.pdf

DCCSOP >32 weeks
http://trustnet/docsdata/paed/Guidelines_Neonatal/SOP%201%2032%20to%2037%20Weeks%20Delayed%20Cord%20Clamping%20Jun%202019.pdf

Use of polythene bags in preterm delivery
http://trustnet/docsdata/paed/Guidelines_Neonatal/Polythene%20bag%20use%20in%20thermal%20care.doc

Birthday cuddle guideline
http://trustnet/docsdata/paed/Guidelines_Neonatal/Birthday%20Cuddle%20Guideline%20Oct%202018.doc

4. Guideline Governance

a. Scope

This guideline in relevant to all staff caring for babies across neonatal intensive care, transitional care and maternity.

b. Purpose

i. This guidelines aims to facilitate a common approach to the management of babies admitted under neonatal care. At times deviation from the guideline may be necessary, this should be documented and is the responsibility of the attending consultant.

ii. This guideline is subject to regular review to ensure ongoing evidence based practice.

c. Duties and Responsibilities

What is expected from the health care professionals using this guideline to look after infants.

d. Approval and Ratification

This guideline will be approved and ratified by the Neonatal Guidelines Group.

e. Dissemination and Implementation

i. This guideline will be uploaded to the trust intranet 'Neonatal Guidelines' page and thus available for common use.
ii. This guideline will be shared as part of ongoing education within the Neonatal Unit for both medical and nursing staff.
iii. All members of staff are invited to attend and give comments on the guideline as part of the ratification process.

f. Review and Revision Arrangements

a. This policy will be reviewed on a 5 yearly basis.
b. If new information comes to light prior to the review date, an earlier review will be prompted.
c. Amendments to the document shall be clearly marked on the document control sheet and the updated version uploaded to the intranet. Minor amendments will be ratified through the Neonatal Guidelines Group. A minor amendment would consist of no major change in process, and includes but is not limited to, amendments to documents within the appendices.

g. Equality Impact Assessment

Background • Who was involved in the Equality Impact Assessment
Methodology • A brief account of how the likely effects of the policy was assessed (to include race and ethnic origin, disability, gender, culture, religion or belief, sexual orientation, age) • The data sources and any other information used • The consultation that was carried out (who, why and how?)
Key Findings • Describe the results of the assessment • Identify if there is adverse or a potentially adverse impacts for any equalities groups
Conclusion • Provide a summary of the overall conclusions
Recommendations • State recommended changes to the proposed policy as a result of the impact assessment • Where it has not been possible to amend the policy, provide the detail of any actions that have been identified • Describe the plans for reviewing the assessment

h. Document Checklist

To be completed (electronically) and attached to any document which guides practice when submitted to the appropriate committee for approval or ratification.

Title of the document:

Policy (document) Author:

Executive Director:

		Yes/No/ Unsure/NA	Comments
1.	**Title**		
	Is the title clear and unambiguous?		
	Is it clear whether the document is a guideline, policy, protocol or standard?		
2.	**Scope/Purpose**		
	Is the target population clear and unambiguous?		
	Is the purpose of the document clear?		
	Are the intended outcomes described?		
	Are the statements clear and unambiguous?		
3.	**Development Process**		
	Is there evidence of engagement with stakeholders and users?		
	Who was engaged in a review of the document (list committees/ individuals)?		
	Has the policy template been followed (i.e. is the format correct)?		
4.	**Evidence Base**		
	Is the type of evidence to support the document identified explicitly?		

		Yes/No/ Unsure/NA	Comments
	Are local/organisational supporting documents referenced?		
5.	**Approval**		
	Does the document identify which committee/group will approve/ratify it?		
	If appropriate, have the joint human resources/staff side committee (or equivalent) approved the document?		
6.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?		
	Does the plan include the necessary training/support to ensure compliance?		
7.	**Process for Monitoring Compliance**		
	Are there measurable standards or KPIs to support monitoring compliance of the document?		
8.	**Review Date**		
	Is the review date identified and is this acceptable?		
9.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for coordinating the dissemination, implementation and review of the documentation?		
10.	**Equality Impact Assessment (EIA)**		
	Has a suitable EIA been completed?		

Committee Approval (Neonatal Guidelines Committee)			
If the committee is happy to approve this document, please complete the section below, date it and return it to the Policy (document) Owner			
Name of Chair		**Date**	
Ratification by Management Executive (if appropriate)			
If the Management Executive is happy to ratify this document, please complete the date of ratification below and advise the Policy (document) Owner			
Date: n/a			