University Hospitals Sussex
NHS Foundation Trust

Neonatal Resuscitation Newborn life support (Term and Pre-term)

Maternity protocol: MP066

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Manager responsible:	Ryan Watkins
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Cross reference:	**MP020** Multiple Pregnancy **MP037** Fetal heart monitoring **MP038** Fetal Blood Sampling **MP046** Breech & ECV **MP048** Shoulder Dystocia **MP049** Operative Vaginal delivery **MP050** Caesarean Section (LSCS) **MP068** Admission to Neonatal Unit (NICU/SCBU) **MP069** Care of the Newborn Immediately after Birth

Contents

Key Principles

A protocol is a set of measurable, objective standards to determine a course of action.
Professional judgement may be used in the application of a protocol.

Scope

This protocol applies to:

- Any newborn babies who require resuscitation at birth
- Any babies born with meconium stained liquor

Responsibilities

Maternity, neonatal and A&E staff:

- To access, read, understand and follow this guidance
- To use their professional judgement in application of this protocol

Management:

- To ensure the protocol is reviewed as required in line with Trust and National recommendations
- To ensure the protocol is accessible to all relevant staff
- To ensure the protocol is available to service users on request

Link Paediatrician for Labour ward and Neonatal Service:

- Responsible for the clinical standards in relation to care of the newborn

1.0 Introduction

1.2 Resuscitation is called for when the circulation or established regular breathing is suboptimal or both. In adults collapse is usually a primary cardiac arrest, however in newborn babies the problem is nearly always initially a respiratory one.

1.3 A healthy newborn baby is designed to undertake the passage through the birth canal and the newborn baby's brain can withstand lack of oxygen for very much longer than the adult brain. Birth is a relatively hypoxic experience for the fetus, since respiratory exchange is interrupted for the 50 – 75 second duration of the average contraction Though most babies tolerate this well, some do not and these few may require help to establish breathing at birth.

1.4 Healthy babies who have shown no signs of hypoxia during labour and have a good colour (centrally pink) and tone at birth should be kept with their mothers or birthing parent to promote bonding and a physiological response from mother or birthing parent and baby. Oxygen will continue to flow to the baby through the umbilical cord, if left intact, until the baby establishes breathing. It is recommended to keep the cord intact for at least a minute following birth in well babies. Skin to skin contact will keep the baby warm and promote the establishment of breastfeeding or chestfeeding.

1.5 To resuscitate a baby it is usually sufficient to merely inflate the lungs with air (or oxygen, if air not available), and only in rare cases will the heart need to be 'bump started' through cardiac massage or drugs. However, every newborn baby should be individually assessed at birth.

2.0 Preparation & Equipment

2.1 Preparation and anticipation will aid a successful resuscitation and appropriate equipment and a warm environment should be available for all births:

2.1.1 Shut all doors and windows

2.1.2 Switch on heater (above and below baby, if available) and turn off fans

2.1.3 *Minimum* equipment required in all areas where birth may occur:

- Clean flat surface
- Light source
- Towels, preferably warmed
- 500mls Ambi-bag with size 00, 01 & 02 masks
- Guedel airways
- I-gels or LMA

2.2 Availability of resuscitation equipment in all care setting:

2.2.1 There should be continual availability of neonatal resuscitation equipment in all care settings. At BSUH this includes Royal Sussex County Hospital Maternity unit and Princess Royal Hospital Maternity unit.

2.2.2 Labour wards: resuscitaires are available in the corridors on the labour wards. These can be brought into the room when required

2.2.3 Obstetric theatres: there is a designated resuscitaire in each obstetric theatre. Additional resuscitaires can be brought in if required.

2.2.4 Homebirth: there are resuscitation kits for homebirths which are kept on the labour wards. It is expected that midwives attending a home birth will pick up the required kit, including resuscitation equipment when they are called to attend.

2.2.5 There is a neonatal resuscitaire available in CED at RACH. There is neonatal resuscitation kit available in the resuscitation area at PRH

2.3 Process for documenting that the resuscitation equipment used by the maternity service is checked, stocked and fit for use in all care settings:

2.3.1 Resuscitation equipment on the ward and in obstetric theatre should be checked, stocked and fit for use as ready for use. The person undertaking the check is required to check the equipment against a checklist, sign and date it. The records are kept as evidence of this. The ward co-ordinator on for each shift is responsible for ensuring these checks are carried out in their area. Completion of all checks will be logged in the 'daily checklist'.

2.3.2 On labour ward and postnatal wards this check should be carried out on every shift (twice a day).

2.3.3 Homebirth resuscitation equipment in pool cars must be checked daily by the community midwife using the vehicle and documented in the homebirth checking log in the vehicle. Homebirth resuscitation equipment on delivery suites must be checked daily and documented in the delivery suite equipment checking log

3.0 Homebirth

3.1 All midwives undertaking home birth should be competent to carry out first line treatment in regards to neonatal resuscitation (attendance at neonatal resuscitation update on the mandatory annual rolling programme see MD084 BSUH Maternity & Obstetric Training Needs Analysis & Skills and Drills). In the event of the baby being born in poor condition and requiring resuscitation and transfer into hospital, the midwife or other person in attendance will dial 999 for a paramedic ambulance. The labour ward will be informed by the midwife and a request for emergency resuscitation team to be available in A&E.

3.2 On arrival of the paramedics, the midwife will ask for assistance and should accompany the baby in the ambulance. A second ambulance should be called for the mother or birthing parent.

3.3 The midwife will give a full report to the neonatal staff at the hospital on arrival. Documentation in the maternal or parental notes must be completed and an incident form (Datix) must be completed.

4.0 Process for Availability of Staff Trained in Advanced Neonatal Resuscitation

4.1 All midwives are trained in newborn life support skills at the point of qualification. Every 12 months midwives will attend 2 mandatory training sessions updating them in newborn life support (see TNA document). Therefore all deliveries will be attended by midwives with newborn life support skills.

4.2 At home, 2 midwives will attend for the birth; this ensures 1 midwife will always be available for newborn life support if required. If the birth is rapid and the second midwife has not yet arrived, the first midwife is expected to call for a paramedic ambulance (paramedics all have newborn life support training). In hospital, a second midwife is available should newborn life support be required (the midwife can call for assistance via the normal or emergency buzzer as appropriate)

4.3 For details on which deliveries should be attended by clinicians with basic or advance newborn life support skills see MP068 Admission to Neonatal Unit (NICU / SCBU) (page 5)

4.4 RSCH

4.4.1 There is a tier 1 member of the neonatal staff (ST3, clinical fellow or ANNP) available at all times to attend planned deliveries or emergencies. They may be contacted via the dedicated pager or will attend following a neonatal crash call.

4.4.2 There is a tier 2 member or the neonatal staff (ST4 or above, clinical fellow Staff Grade or ANNP) available at all times to attend planned deliveries or emergencies. They may be contacted via the dedicated pager or will attend following a neonatal crash call.

4.4.3 **Process for 24hr availability in obstetric units of a consultant paediatrician:** There is a consultant responsible for the labour ward at all times in office hours (0800-1700h Mon – Fri). They may be contacted by telephone call to Trevor Mann Baby Unit (TMBU) ext 64377.

4.4.4 There is a consultant neonatologist on call at all times out of hours and available to attend emergencies within 30 minutes. They may be contacted by telephone call (landline or mobile).

4.5 PRH

4.5.1 There is a member of the neonatal staff (ANNP or Staff Grade) available at all times to attend planned deliveries or emergencies. They may be contacted via the dedicated pager or will attend following a neonatal crash call.

4.5.2 A neonatal nurse will attend emergencies if a neonatal crash call is issued.

4.5.3 There is a consultant responsible for PRH at all times in office hours (0800-1700h Mon – Fri). They may be contacted by telephone call to SCBU or TMBU or their mobile phone.

4.5.4 There is a consultant neonatologist on call at all times out of hours and available to attend emergencies within 30 minutes. They may be contacted by telephone call (landline or mobile)

5.0 Resuscitation Process (See Appendix)
https://www.resus.org.uk/library/2021-resuscitation-guidelines/newborn-resuscitation-and-support-transition-infants-birth

5.1 If the newborn fails to establish respiration, or is in distress prior to birth then proceed as far as it is necessary down the following list:

5.1.1 Dry and cover the baby
5.1.2 Assess the situation
5.1.3 Call for help if required
5.1.4 **A**irway – establish a patent airway
5.1.5 **B**reathing – support breathing using inflation/ventilation breaths
5.1.6 **C**irculation – support the heart using chest compressions
5.1.7 **D**rugs

5.2 Note the time of delivery

5.3 Dry the baby quickly and effectively. Remove the wet towel and wrap in a fresh, dry, warm towel.

5.4 During this period assess the baby

5.4.1 Colour
5.4.2 Tone
5.4.3 Breathing
5.4.4 Heart rate

5.5 If the heart rate is good (more than 100bpm) and the baby is breathing then no further resuscitation is required. It is usually clear that the heart rate is slow or fast, and an accurate count is not necessary. The heart should be auscultated using a stethoscope.

5.6 If the baby is requiring resuscitation then call for assistance:

5.6.1 If in hospital: pull the emergency buzzer

- **Phone 2222 and state 'neonatal emergency' and state location**
- Gain assistance from other health professionals

5.6.2 If at home:

- **Phone 999 and ask for paramedic ambulance**
- Contact the maternity unit; inform them of the situation and request second midwife

5.7 If the baby is not breathing and has a slow heart rate then the airway must be opened. This can be done by lying baby in the neutral position with the head in line with the body and checking inside the baby's mouth. If thick meconium or blood can be seen blocking the airway then this can be removed by suction under direct vision.

5.8 Reassess the baby's condition:

5.8.1 Breathing
5.8.2 Heart rate

5.9 If there is no change and the baby is still not breathing then the lungs need to be inflated. Until birth the lungs are filled with fluid and in order to clear this fluid inflation breaths are required. For a term baby, initial pressures of 30cm of water would be reasonable if sustained for 2-3 seconds. 5 inflation breaths are required. Observe the chest movement during the procedure to check the lungs are being inflated successfully. If there is no increase in heart rate and no chest movements then re-position the baby's head, check airway and re-position mask. Attempt the 5 inflation breaths again.

5.10 Reassess the baby's condition:

5.10.1 Breathing
5.10.2 Heart rate
5.10.3 Chest Rise

5.11 If the heart rate is increasing then continue with ventilation support at around 30 breaths per minute. Reassess baby's condition every 30 seconds. If the heart rate does not respond then check the lungs have been properly inflated. Consider changing to i-gel or Guedel, suction or two person techniques.

5.12 If the lungs have been successfully oxygenated for 30 seconds and there is a slow heart rate then it will be necessary to commence chest compressions. This will aim to move oxygenated blood from the lungs to the heart and coronary arteries. Chest compressions should be positioned just below the imaginary line joining the baby's nipples and aim to depress the sternum by a third at least. Aim for a rate of approximately 90 compressions per minute

5.13 Proceed with chest compressions and ventilation breaths on a 3:1 ratio

5.14 Reassess baby's condition every 30 seconds:

5.14.1 Breathing
5.14.2 Heart rate

5.15 Continue with ventilation breaths and cardiac compressions whilst neonatal assistance arrives. Inform parents of what is happening and the possible plan of care, be honest.

5.15.1. If there is no increase in heart rate or saturations remain low, despite effective ventilation, increase the oxygen concentration to achieve adequate pre-ductal oxygen saturations

5.16 If at home transfer the baby by ambulance as swiftly as possible. It is vital to maintain a good airway during transfer so ventilation breaths and cardiac compressions can continue: consider using the I-gel or Guedel airway in this situation. Also ensure the baby is kept as warm as possible during transfer. Label the baby appropriately

5.17 Following any resuscitation ensure contemporaneous and comprehensive documentation of the techniques and procedures used, including accurate times and details of who was present. Present factual information and use Apgar scores where appropriate. Debrief with the parents and attending health professionals

5.18 Newly born infants born at term or near term with evolving moderate to severe hypoxic – ischaemic encephalopathy should be consider for therapeutic hypothermia. Do not passively cool.

5.19 Placental histology

Refer to Placental Histology proforma and remember to send form in MP035 Care of Women or People in Labour to Histopathology with placenta

6.0 Resuscitation Drugs

GESTATION	ADRENALINE *1:10,000* 0.2 ml/kg	BICARBONATE 4.2% 2-4 ml/kg	VOLUME NaCl 0.9 % or Packed cells 10-20 ml/kg	DEXTROSE 10% 2.5 ml/kg
< 28 WKS	0.1 ML	2 ML	10 ML	2 ML
28-34 WKS	0.2 ML	4 ML	20 ML	4 ML
34-37 WKS	0.3 ML	6 ML	30 ML	6 ML

> 37 WKS	0.4 ML	8ML	40 ML	8 ML

6.1 If adrenaline is given then the intravenous route is recommended using a dose of 20mcg/kg. If the tracheal route is used, it is likely that a dose of at least 100mcg/kg will be needed.

7.0 Babies Born in Meconium Stained Liquor

7.1 Meconium stained liquor occurs in 10 – 20% of deliveries and increase to over 20% after 42 weeks gestation. Meconium aspiration syndrome occurs in 2-5% of babies born through meconium stained liquor.

7.1.1 **At delivery**

A neonatologist or advanced neonatal nurse practitioner (ANNP) to be called to attend all births with meconium. Call Neonatal emergency team on **2222** if needed.

7.1.2 **Vigorous screaming baby**

- Do not suction the airway, there is no evidence that this improves outcome.
- If heart rate over 100, baby crying with normal respirations and spontaneous movements – dry and hand to mother

7.1.3 **Non- vigorous baby & not breathing well**

- **Dry and wrap the baby**
- Assess: colour, tone, heart rate, breathing
- Place baby into neutral position
- If no meconium present follow resuscitation protocol
- If meconium present – suction only if you are unable to inflate the chest.
- **Do not** lavage trachea.
- Take paired cord samples for blood gas analysis.

See Maternity protocol MP069 Care of the Newborn Immediately after Birth for information on postnatal care of babies born in meconium stained liquor.

8.0 Guidelines for Resuscitation of Extremely Premature Infants

8.1 The decision regarding initiation of intensive care for these babies requires consideration of the chances of survival and also the chance of survival without major handicap. Parents should be counselled before birth by a Senior Neonatologist, that is a registrar or consultant, whenever possible. A Senior Neonatologist should be present at the delivery at 22 – 27+6 weeks' gestation neonates.

8.2 Therefore adequate warning must be given to the Trevor Mann Baby Unit and neonatal registrar. If there is uncertainty about the gestational age a senior neonatologist should be present below 23 weeks' gestational age.

8.3 Preterm babies less than 32 weeks gestation should receive blended oxygen and air judiciously (≤ 30% O_2) and its use guided by pulse oximetry. If a blend of oxygen and air is not available use what is available.

8.4 Preterm babies of less than 30 weeks gestation should be completely covered up to their necks in a food-grade plastic wrap or bag, without drying, immediately after birth. They should then be nursed under a radiant heater and stabilised. They should remain wrapped until their temperature has been checked after admission. For these infants delivery room temperatures should be at least 26°C.

8.5. Follow neonatal guideline for delivery room management and resuscitation of extremely pre term infants available on the neonatal website.

10.0 Staff Training
(MD084 BSUH Maternity & Obstetric Training Needs Analysis & Skills and Drills)

10.1 All Midwives, MCAs, MSW, NN, neonatal nursing staff, Obstetric SHOs and all grades of obstetricians potentially or actually involved in deliveries and neonatal resuscitation should attend annual updates relating to the theory and practice of neonatal resuscitation. Training attendance will be logged centrally and co-ordinated by the Practice Development Lead Midwife

10.2 All neonatal ST3s, middle grades, staff grades and ANNPs are expected to attend a 4 yearly NLS course run by the Resuscitation council UK.

10.3 Maternity and neonatal staff are expected to be involved with the unannounced skills drills that are run by the education team on the wards. Involvement of staff members will be logged by the PD lead midwife as part of the training records

12.0 References

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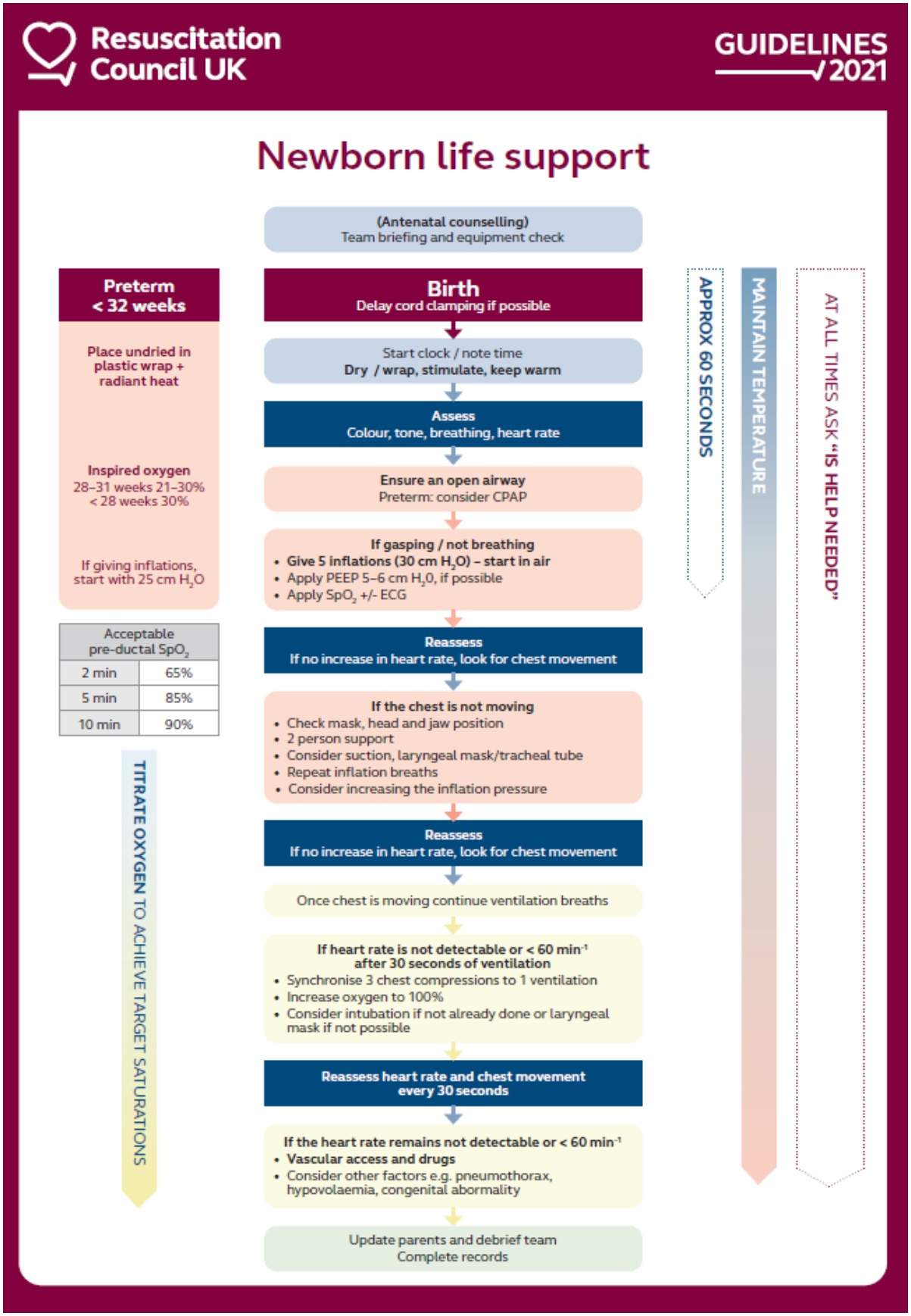
Royal College of Paediatrics and Child Health, Royal College of Obstetricians and Gynaecologists, Royal College of Midwives. (2006) Joint Statement on Training and Maintenance of Skills for Professionals Responsible for Resuscitation of Babies at Birth

SANDS (2013). Guide for Consent Takers: Seeking consent/authorisation for the post mortem examination of a baby**.**
https://www.hta.gov.uk/sites/default/files/5._Sands__Guide_for_consent_takers_Jan_2013.pdf

Neonatal Resuscitation Flow Chart

https://www.resus.org.uk/sites/default/files/2021-05/Newborn%20Life%20Support%20Algorithm%202021.pdf


Resuscitation Council UK
GUIDELINES 2021
Newborn life support
(Antenatal counselling)
Team briefing and equipment check
Preterm < 32 weeks
Place undried in plastic wrap + radiant heat
Inspired oxygen
28–31 weeks 21–30%
< 28 weeks 30%
If giving inflations, start with 25 cm H2O
Acceptable pre-ductal SpO2
2 min 65%
5 min 85%
10 min 90%
TITRATE OXYGEN TO ACHIEVE TARGET SATURATIONS
Birth
Delay cord clamping if possible
Start clock / note time
Dry / wrap, stimulate, keep warm
Assess
Colour, tone, breathing, heart rate
Ensure an open airway
Preterm: consider CPAP
If gasping / not breathing
Give 5 inflations (30 cm H2O) – start in air
Apply PEEP 5–6 cm H2O, if possible
Apply SpO2 +/- ECG
Reassess
If no increase in heart rate, look for chest movement
If the chest is not moving
Check mask, head and jaw position
2 person support
Consider suction, laryngeal mask/tracheal tube
Repeat inflation breaths
Consider increasing the inflation pressure
Reassess
If no increase in heart rate, look for chest movement
Once chest is moving continue ventilation breaths
If heart rate is not detectable or < 60 min-1 after 30 seconds of ventilation
Synchronise 3 chest compressions to 1 ventilation
Increase oxygen to 100%
Consider intubation if not already done or laryngeal mask if not possible
Reassess heart rate and chest movement every 30 seconds
If the heart rate remains not detectable or < 60 min-1
Vascular access and drugs
Consider other factors e.g. pneumothorax, hypovolaemia, congenital abormality
Update parents and debrief team
Complete records
APPROX 60 SECONDS
MAINTAIN TEMPERATURE
AT ALL TIMES ASK "IS HELP NEEDED"