THAMES VALLEY & WESSEX NEONATAL OPERATIONAL DELIVERY NETWORK

THAMES VALLEY INITIAL RESUSCITATION & STABILISATION OF THE PRETERM INFANT (<32WKS) GUIDELINE FOR NEONATAL UNITS	
Presented for approval to/on	**Thames Valley & Wessex Neonatal ODN Governance Group** **September 2020**
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Distribution	**Thames Valley Neonatal Clinical Forums** **Thames Valley and Wessex Neonatal Network website** **Thames Valley and Wessex Neonatal Network e-bulletin**
Related documents	**References** 1. Resuscitation Council (UK) Guidelines 2015. Newborn Life Support 2. Wyllie JW et al. Resuscitation. 2015; 95: 249-63 3. Sweet DG, Carnielli V, Greisen G, et al. European consensus guidelines on the management of neonatal respiratory distress syndrome in preterm infants--2013 update. Neonatology. 2013; 103: 353-68. 4. Rojas-Reyes MX, Morley CJ, Soll R. Prophylactic versus selective use of surfactant in preventing morbidity and mortality in preterm infants. Cochrane Database Syst Rev. 2012 Mar 14; 3: CD000510.
Implications of race, equality & other diversity duties for this document	**This guideline must be implemented fairly and without prejudice whether on the grounds of race, gender, sexual orientation or religion.**

1.0 Aim of Guideline

This guideline aims to provide a consistent approach to the use of exogenous surfactant in neonates across Thames Valley.

Please see guidance on “Initial Resuscitation and Stabilisation of Preterm Infants” for the general approach to delivery suite management in preterm infants.

2.0 Scope of Guideline Framework

The guideline applies to all Neonatal Units covered by Thames Valley Neonatal ODN. This includes the following hospitals:

Thames Valley	
Buckinghamshire Healthcare NHS Trust	- Stoke Mandeville Hospital, Aylesbury
Frimley Health NHS Foundation Trust	- Wexham Park Hospital, Slough
Milton Keynes University Hospital NHS Foundation Trust	- Milton Keynes General Hospital
Oxford University Hospitals NHS Foundation Trust	- John Radcliffe Hospital, Oxford
Oxford University Hospitals NHS Foundation Trust	- Horton General Hospital, Banbury
Royal Berkshire NHS Foundation Trust	- Reading

3.0 Initial Resuscitation & Stabilisation of the Preterm Infant (<32 weeks)

Background

Infants born prematurely more frequently need support to achieve stabilisation rather than resuscitation during fetal to neonatal transition. This guidance reflects the latest evidence and updates to resuscitation guidance, both nationally and internationally.

Key points:

- Delay cord clamping for **60s** in stable preterm infants.
- Careful attention to thermal care to aim to maintain temperature **36.5-37.5oC**.
- Support spontaneously ventilating infants with **CPAP** whilst monitoring HR and saturation (SpO2). *There is no gestation at which you should routinely intubate*.
- Start with an inspiratory fraction of oxygen (FiO2) of **0.30** and titrate according to oxygen and HR nomogramms.
- Surfactant should be used selectively.

Delayed Cord Clamping

Delaying cord clamping (DCC) in preterm infants improves stability in the immediate postnatal period, reduces the need for blood transfusion, and may reduce the incidence of IVH, PVL & late onset sepsis.
Practical Considerations (appendix 1)
Only stable preterm infants should undergo DCC for 60s.

- Start the clock on the resuscitaire as the baby is born. Most resuscitaires alarm at 1 minute, which will indicate when to clamp the cord.
- Assess stability visually – tone and colour. You may feel for cord pulsation. If the infant is pale and floppy and/or there is no cord pulsation (the cord or placenta may be detached), you should clamp the cord without delay and commence resuscitation.
- **Thermal Care** management during DCC
    - Delivery room temperature increased to ≥26oC
    - Avoid draughts and air conditioning
    - Pre-warm resuscitaire and surrounds by having resuscitaire heater on 100%
    - For vaginal deliveries

        - do not dry, place in a neoHELP bag which includes plastic head cover, OR
        - place in a standard plastic bag “jumper style” with the baby’s head coming through a precut hole in the closed end of the bag. Dry and cover the head with a hat.
    - For C-Section
        - For all infants, do not dry; place in a neoHELP bag which includes plastic head cover,
- Attach the SpO2 probe to the right wrist (preductal saturations) but don’t attach to SpO2 monitor until baby is on resuscitaire.
- Continue to assess until the 1minute alarm, then clamp the cord and move the baby to the resuscitaire.

Initial Assessment on Resuscitaire

- If the infant is floppy or pale with no respiratory effort: Move to standard NLS algorithm *(appendix 2).*
- Otherwise, place head in neutral position and apply mask CPAP of 5cmH2O via T- piece (Neopuff) using FiO2 0.3 (no inflation breaths yet!) and, without taking away the mask, assess breathing and check chest rise.
- Attach SpO2 cable to the monitor to obtain heart rate and peripheral oxygen saturation (SpO2).
- Titrate oxygen according to Oxygen saturation and HR nomogram *(appendix 3)*.
- Assess condition at 1-2 minutes of life and follow algorithm *(appendix 1).*

On-going Thermal Care Management

- One member of the resuscitation team should be allocated responsibility for temperature maintenance and thermal care
- Attach temperature probe on the upper back (around scapula region) and monitor continuously
- Aim to keep the baby’s temperature 36.5-37.5oC.
- Consider adding a transwarmer if the temperature is <36.0 at 10 minutes. Note: RISK OF BURNS. To minimise risk
    - Ensuring the transwarmer is activated at room temperature (no higher)
    - Place transwarmer clear side down with a sheet between the baby and transwarmer
    - Remove the transwarmer as soon as the temperature reaches 36.50Cnormal range
- Check baby’s skin integrity every 5-10 minutes
- Retain transwarmer in case it is required whilst procedures are performed in the neonatal unit (the same precautions should re-commence).

Rationale for using CPAP as primary mode of respiratory support

- Several trials (COIN, SUPPORT, VON, etc.) have shown that using CPAP in favour of intubation improves respiratory outcomes in VLBWI.

On-going Respiratory Management

- Babies who are still breathing irregularly following 2 minutes of mask CPAP should receive 5x3s inflation breaths using PIP 20-25cmH2O ensuring adequate chest wall rise and should then be reassessed to determine whether on-going manual ventilation is required.

- Use HR and Oxygen saturation nomogramms to continually assess and adjust FiO2 and ventilator support accordingly (NB maintain & check airway patency regularly).

- In babies who establish regular respiration, but have increased work of breathing or who require FiO2 >0.6 consider increasing CPAP pressure up to 8cmH2O.
- Intubate and ventilate if by 10 minutes of age:
    - HR still 60-100
    - Respiration not established
    - FiO2 >0.60

- Ensure correct tube placement using correct tube length for gestation (see network resuscitation cards), visual check for chest rise, auscultation and end-tidal capnography (Neo-StatCO2 or Pedi-Cap).
- Give surfactant in delivery suite to intubated babies <28 weeks, once tube is correctly positioned and secured. Lung compliance will change rapidly, therefore reduce peak inspiratory pressure (PIP) whilst ensuring adequate chest wall movement and titrate FiO2 against nomogram over the next 5-10 minutes.

Preparation for Transfer to Neonatal Unit

- Check core temperature prior to transfer.
- Ensure sufficient gas supply and gas cylinders are turned on.
- Cover infant in towels and space blanket just before disconnecting resuscitaire from power supply.
- Lower the resuscitaire to low position before disconnecting from power supply on DS.
- Breathing infants should be transferred to NICU/ HDU on mask CPAP.
- Monitor airway positioning and mask seal carefully during transfer.
- Ventilated infants should have tube position checked and secured before transfer.

On arrival in NICU

- Infants should be transferred to a warmed humidified incubator appropriate to their gestation and kept in their plastic bag until temperature stabilizes.
- The baby should be weighed and temperature measured.
- Once established in incubator and on NIV, assess respiratory status and need for surfactant within two hours of life:
- Give surfactant (Curosurf) 150-200mg/kg if FiO2 >0.6 (see surfactant guideline for details).
- Where appropriate, surfactant can be given by LISA or INSURE technique (see surfactant guideline).

Appendix 1

Delivery Suite Management < 32 weeks gestation

0 – 2 min

DELAY CORD CLAMPING FOR 60s IF STABLE
Whilst on cord:
Strict temperature control measures.
Place in polythene bag, attach SpO_2 probe to right wrist, assess for baby's tone, respiration and colour.
Move to resuscitaire early if pale, floppy, or no cord pulsation.

Breathing
Mask CPAP 5 cmH_2O,
Starting FiO_2 0.3
Watch SpO_2 monitor
Determine FiO_2 according to SpO_2 – nomogram (Appendix 3)

Not breathing, HR < 60/min

Follow NLS algorithm. (Appendix 2)

Consider parental views around resuscitation at limits of viability

***Do not give**: chest compressions or adrenaline to infants <26wks

*Consultant decision only.

2 – 8 min

Regular Breathing
HR >100
Continue CPAP
Determine FiO_2 according to SpO_2 - nomogram

If FiO_2 >0.6,
Consider ↑ PEEP 6-8 cm H_2O
Keep warm

Breathing irregular,
HR 60-100/min
Commence mask ventilation
5 x 3s inflation breaths
PiP 20-25 (-30) / 5cm H_2O
Consider ↑ PEEP 6-8 cm H_2O
Increase FiO_2: 0.3 - 0.6 - 1.0 according to SpO_2 - nomogram and HR.
Keep warm

At all times, ask yourself: Do I need help?

8 – 10 min

Breathing regularly
$FiO_2 \leq 0.6$
Keep warm
Transfer to ward on mask CPAP

Breathing regularly, but
$FiO_2 > 0.6$

If, at 10 min, on-going ventilation, $FiO_2 > 0.6$, HR < 100:
INTUBATE - ensure correct ET-tube position (capnography/ tube length for gestational age & auscultation) and secure ET-tube.
If < 28 weeks give surfactant (1 vial) in DS.
Keep warm
Transfer to ward intubated & manually ventilated.
Beware of changing lung compliance & high PIPs following surfactant

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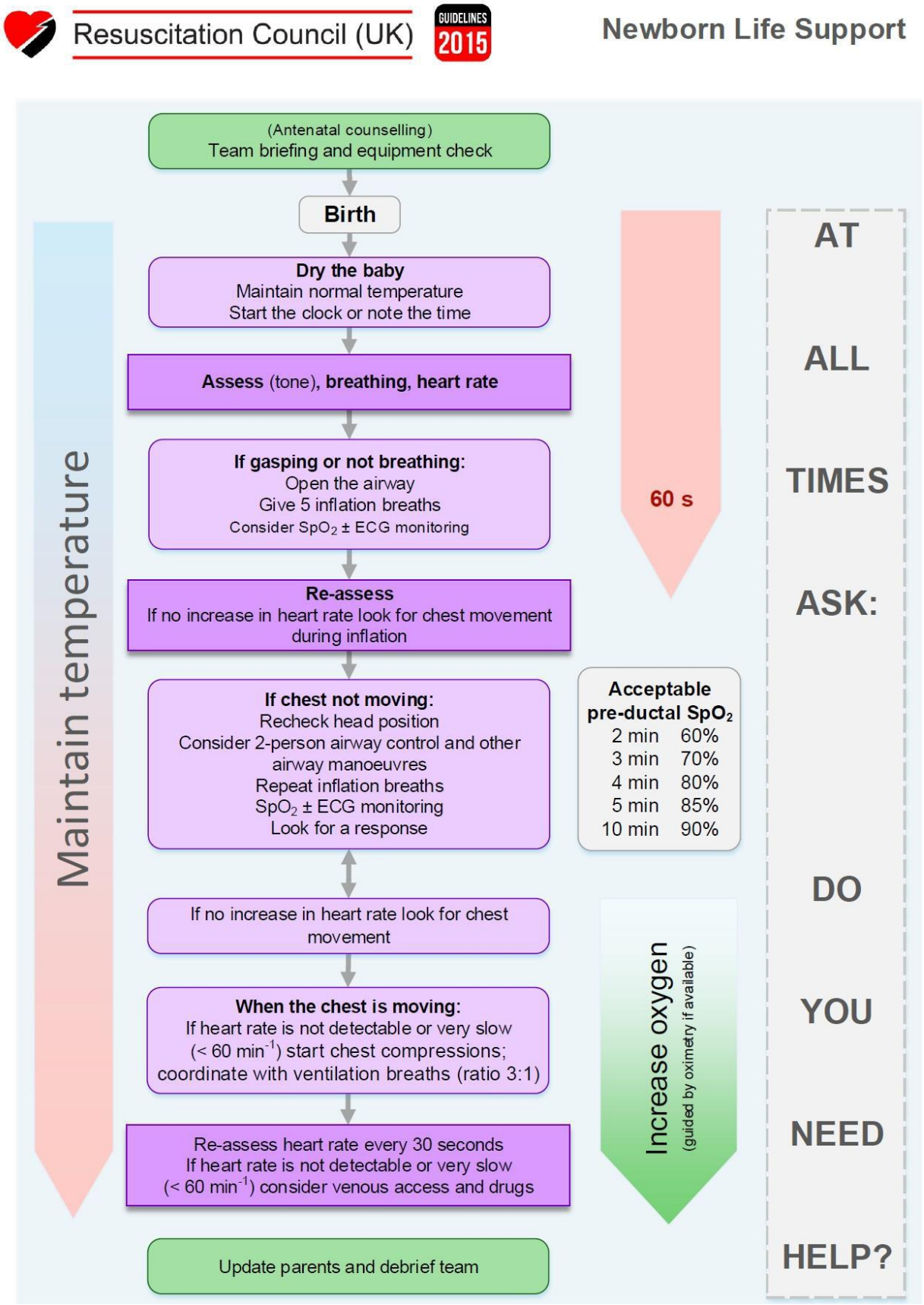
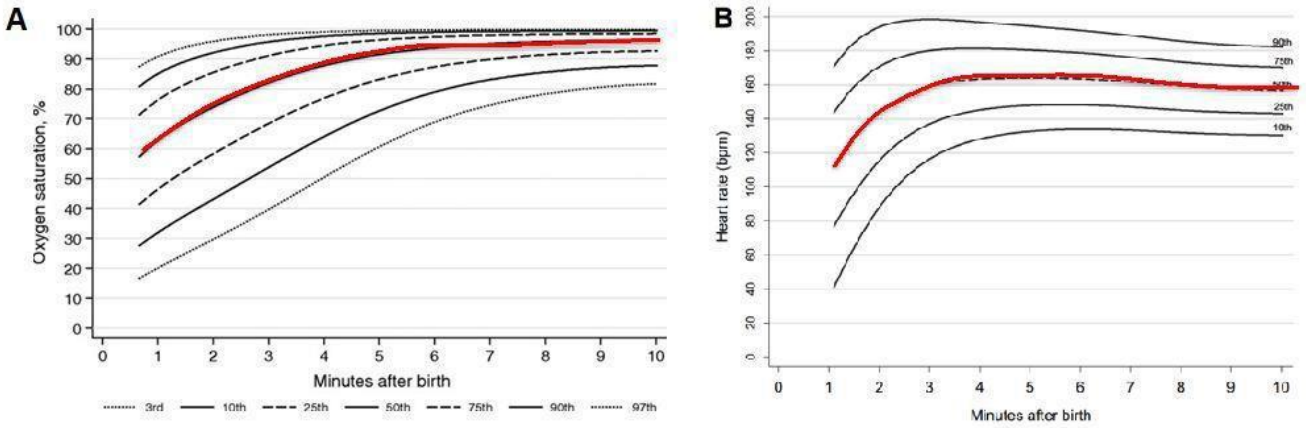
Appendix 2


Resuscitation Council (UK)
GUIDELINES 2015
Newborn Life Support
(Antenatal counselling)
Team briefing and equipment check
Birth
Dry the baby
Maintain normal temperature
Start the clock or note the time
Assess (tone), breathing, heart rate
If gasping or not breathing:
Open the airway
Give 5 inflation breaths
Consider SpO2 ± ECG monitoring
Re-assess
If no increase in heart rate look for chest movement during inflation
If chest not moving:
Recheck head position
Consider 2-person airway control and other airway manoeuvres
Repeat inflation breaths
SpO2 ± ECG monitoring
Look for a response
If no increase in heart rate look for chest movement
When the chest is moving:
If heart rate is not detectable or very slow (< 60 min-1) start chest compressions; coordinate with ventilation breaths (ratio 3:1)
Re-assess heart rate every 30 seconds
If heart rate is not detectable or very slow (< 60 min-1) consider venous access and drugs
Update parents and debrief team
Maintain temperature
60 s
Acceptable pre-ductal SpO2
2 min 60%
3 min 70%
4 min 80%
5 min 85%
10 min 90%
Increase oxygen
(guided by oximetry if available)
AT
ALL
TIMES
ASK:
DO
YOU
NEED
HELP?

Appendix 3

Peripheral O_2-saturation (A) and heart rate (B) centiles for healthy newborn infants



Red lines = 50th centiles

Dawson JA et al., *Pediatrics* 2010

Dawson JA et al. J. Pediatrics 2010: Defining the reference range for oxygen saturation for infants after birth.

Version Control:

Version	Date	Details	Author(s)	Comments
3	May 16	New Guideline, modified from OUH guideline Feb 2016 2017 LISA and reference update	Dr E Adams Dr C Roehr	Ratified *Note versions 1&2 OUH Guidelines*
4	Jan '17	Updated. Naloxone and Luer lock	Dr E Adams Dr C Roehr	Minor updates agreed and completed.
5	Sept 2020	Updated. Non-pharmacological sedation for LISA	Dr E Adams Dr C Roehr Dr K Ives	Ratified at Governance Sept 2020
Review Date:	**September 2023**			