APPENDIX A

INDICATIONS FOR NEONATAL TRANSFUSION

Transfusion triggers for neonates will vary depending on the clinical context including the gestational age at birth. Neonatal transfusion guidelines have generally been developed as a result of neonatal studies predominantly of very low birth weight (VLBW; <1.5 kg) babies. In neonatal intensive care units (NICUs) most transfusions are given to preterm neonates (mostly < 32 weeks gestational age; National Comparative Audit, 2010), some of whom will require transfusion beyond 28 days of life. In general, babies of all gestational and postnatal ages on NICUs will tend to be transfused using the same guidelines although there is little evidence specifically related to term babies.

A.1 RED CELLS

The majority of red cell transfusions to neonates are top-up transfusions of small volumes given to replace phlebotomy losses in the context of anaemia of prematurity, particularly for preterm very low birth weight neonates. There is very limited evidence to define optimal volumes for neonatal red cell transfusions, in particular relating to long term outcomes. Volumes greater than 20 mL/kg may increase the risk of volume overload in non-bleeding patients. Therefore, in the context of data supporting restrictive transfusion thresholds from patients of all age groups including neonates, the use of top-up transfusion volumes of 15 mL/kg is recommended for non-bleeding neonates in most cases.

- There is currently no strong evidence to suggest that stopping feeds during transfusion can reduce the risk of transfusion associated Necrotizing Enterocolitis (NEC).
- Based on current evidence the routine use of furosemide during transfusion is not recommended.

A.1.1 Indications Neonates

- Small-volume “top-up” transfusions, to maintain the Hb above a particular threshold.
- Presence of surrogate markers of anaemia such as:
    - Poor growth
    - Lethargy
    - Episodes of apnoea and bradycardia

RBC transfusion may be considered at higher thresholds than demonstrated in Table A1.2 for neonates with:

- Acute haemorrhage
- Hypovolaemia (unresponsive to crystalloid infusion)
- Septic Shock
- Necrotising enterocolitis

Sometimes it may be appropriate to request a reticulocyte count to inform decisions in older babies who are anaemic.

A clinical decision should be reached during a ward round as to whether transfusion is needed, rather than using absolute levels to determine decision-making.

Table A.1.2 **Suggested Transfusion Thresholds & Targets for Preterm Neonates**

Postnatal age	Suggested Transfusion Threshold Hb (g/L)			Volume	Rate
	Ventilated	On Oxygen/ NIV †	Off Oxygen	10-20mL/Kg	3-5mL/Kg/Hr
1st 24 hours	< 120	< 120	< 100	Typically 15mL/Kg in non-bleeding patients	Max rate 150mL/hr (Max 4 hours out of fridge)
≥ Week 1 (day 1-7)	< 120	< 100	< 100		
Week 2 (day 8-14)	< 100	< 95	< 75		
≤ Week 3 (from day 15)	< 100	< 85	< 75		

- Standard definition of preterm is <37 weeks gestational age at birth but table applies to very preterm neonates (< 32 weeks).
- It is accepted that clinicians may use higher thresholds depending on clinical situation
- † NIV: non-invasive ventilation

A.1.3 **Large Volume Transfusions**

Large volume transfusion is defined as at least equivalent to a single circulating blood volume (approximately 80 mL/kg for neonate) over 24 hours or 50% of the circulating volume within 3 hours. Rapidly infused large volume transfusions increase the risk of hyperkalaemia, the risk is further increased by rapid infusion via a central line, and to reduce the risk red cells issued for large volume transfusion should be less than 5 days old. To avoid hypothermia all large volume transfusions should be administered via a blood warmer and core temperature should be monitored.

A.1.4 **Recommendations for reducing transfusion (BCSH 2016)**

- Current evidence supports restrictive transfusion thresholds and suggested Hb thresholds for top-up transfusions are given in Table A.1.2.
- The routine use of erythropoietin or darbepoeitin alfa is not recommended in preterm infants to reduce transfusion.
- Where the term neonate or preterm neonate does not require resuscitation, consider delayed cord clamping. Results should be interpreted with caution if there are sampling difficulties.
- Phlebotomy should be minimised where possible. Refer to local policy for the frequency and types of regular blood tests required, collecting small samples, and using small-volume laboratory analysers and near-patient testing.