

Guideline

Management of the Extremely Preterm Infant <27 weeks Prior to Transfer

Key Priorities

Timeframe	Actions
First 10 minutes	<ul style="list-style-type: none"> • Follow NLS approach • Ensure Neohelp suit and radiant heater are in place • Assess breathing and heart rate • Provide respiratory support: inflation breaths, PEEP ± intubation and surfactant • Maintain normothermia ($\geq 36.5^{\circ}\text{C} < 37.5^{\circ}\text{C}$)
First hour	<ul style="list-style-type: none"> • Establish vascular access (PVL / UVC ± UAC) • Commence IV fluids • Give Vitamin K IM and antibiotics • Maintain normothermia • Optimise cardiovascular & ventilation status
Before transfer	<ul style="list-style-type: none"> • Ensure cardiovascular and respiratory stability • Secure ETT and vascular access • Maintain normothermia • Update PaNDR team • Prepare transfer documentation and update parents

1 Scope

This guideline is intended for neonatal doctors, ANNPs, and nurses at Local Neonatal Units (LNUs) and Special Care Units (SCUs) managing extremely preterm infants (<27 weeks) requiring transfer for escalation of care.

2 Purpose

To guide clinicians in stabilising extremely preterm infants after delivery in preparation for safe transfer to Neonatal Intensive Care units (NICUs), with emphasis on maintaining thermal stability, optimising ventilation, and ensuring readiness for transport.

3 Definitions and abbreviations

ANNP	Advanced Neonatal Nurse Practitioner
BAPM	British Association of Perinatal Medicine
BP	Blood Pressure
ECG	Electrocardiogram
ETT	Endotracheal Tube
Hb	Haemoglobin
LNU	Local Neonatal Unit
NGT	Nasogastric Tube
NICE	National Institute for Health and Care Excellence
NICU	Neonatal Intensive Care Unit
PC-AC	Pressure Control – Assist Control
PTV	Patient Triggered Ventilation
NLS	Newborn Life Support
SCU	Special Care Unit
SIPPV	Synchronised intermittent positive pressure ventilation
UAC	Umbilical arterial catheter
UVC	Umbilical venous catheter
US	Ultrasound
VG	Volume Guarantee

4 Introduction

This guideline provides practical recommendations for stabilising extremely preterm infants prior to transfer. It reflects shared learning from NICU teams and PaNDR review meetings and should be used alongside BAPM recommendations and local escalation policies.

5 Guideline

5.1 Delivery of the extremely preterm neonate

Discussions:

Babies <27 weeks' gestation should, wherever possible, be delivered in a delivery unit with a co-located NICU. If time permits, arrange an in-utero transfer via PaNDR. Birth in an LNU or SCU is associated with increased risk of adverse outcome and may influence risk categorisation within the BAPM framework.

Most infants born <23 weeks in a maternity unit without a co-located NICU (LNU/SCU) will fall into an extremely high-risk group. In these circumstances, comfort-focused care will usually be appropriate and postnatal retrieval is not normally indicated.²

Parents should be counselled in line with BAPM guidance on the perinatal management of extremely preterm birth (<27 weeks)². Discussions, agreed plans, and ceilings of care must be clearly documented.

Decisions:

If comfort-focused care is agreed, a PaNDR referral is not required. Follow local palliative and supportive care guidance.

If survival-focused care is planned, prepare both the Delivery Unit and Neonatal Unit for an extremely preterm birth (*see Appendix 1: Delivery Checklist*). Ensure senior neonatal presence where possible.

Referral:

Early notification to PaNDR prior to delivery helps prioritise workload, although deployment is usually post-birth due to timing uncertainty.

Make a formal referral to PaNDR soon after delivery once initial stabilisation is underway.

Delivery and immediate stabilisation:

Preparation:

Pre-warm the resuscitaire and LifeStart (if available).

Prepare equipment for umbilical and/or peripheral venous access in advance to avoid delay on admission to the neonatal unit. Confirm the incubator's function and set the humidity according to local policy.

At delivery:

Do not dry the infant. Place in a Neohelp suit with the head covered, under a radiant heat source. Follow NLS guidance, taking into account gestation, clinical condition and previously agreed parental wishes. Facilitate delayed cord clamping for at least 60 seconds where feasible and clinically appropriate.

Stabilisation:

Follow NLS and provide appropriate respiratory and cardiovascular support. Optimise thermal care; check temperature and intervene if $<36.5^{\circ}\text{C}$ or $>37.5^{\circ}\text{C}$. Where clinically appropriate and aligned with the care plan, support brief skin-to-skin contact before transfer. Refer to PaNDR for transfer to a NICU once stabilisation is underway, with ongoing liaison as required.

Communication with parents:

Where feasible, inform parents of the baby's condition and the immediate plan before procedures. Provide clear updates after significant interventions. Before transfer, explain the reason, likely course, and receiving unit, and invite questions. If urgent care prevents prior discussion, update parents at the earliest opportunity.

5.2 Airway and ventilation

Intubation should be carried out by a senior clinician skilled in neonatal airway management, using an appropriately sized ETT (*see Appendix 2*). A video laryngoscope may be useful if the operator is familiar with it, and cricoid pressure is often needed due to the anterior position of the vocal cords.

- *The ETT size can be estimated using gestation with a decimal point and round up i.e. 24 weeks = 2.4 = 2.5 ETT*
- *The correct insertion depth at the lips can be estimated as 6 cm plus the infant's weight in kilograms i.e. 8 cm for a 2kg baby.*

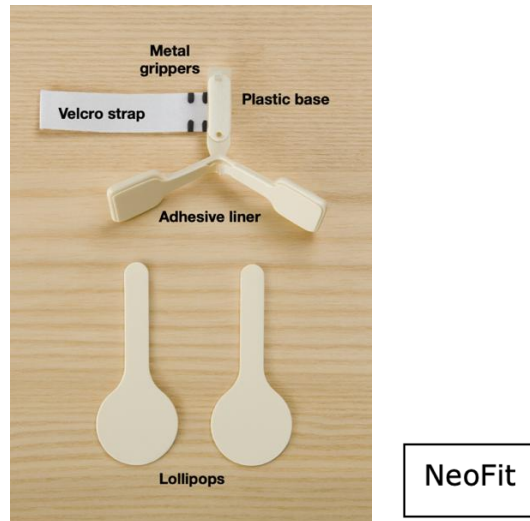
Once correct ETT placement is confirmed clinically—by equal bilateral air entry and a positive colour change on the ETCO₂ detector—administer surfactant immediately at a dose of 200 mg/kg, keeping the infant's head in the midline throughout administration.

Remember:

- Colour change on the ETCO₂ detector may take a few breaths in low-birth-weight babies due to low tidal volume or in babies who have low cardiac output.
- If the chest is not rising with inflation breaths and there is a history consistent with pulmonary hypoplasia (PPROM) you may need to gently increase inflation pressures.
- Follow the difficult airway protocol if required, maximum 2 attempts at intubation and then escalate to a more senior clinician.

Guide on how to secure the ETT in Preterm Infants:

The NeoFit device for neonatal ETT securement is designed to stabilise the ETT while minimising skin trauma and allowing easy adjustment.



Position the ETT centrally in the midline before securing. Maintain continuous manual stabilisation by holding the ETT firmly against the upper gum or palate throughout the securing process to prevent inward or outward displacement and reduce the risk of accidental extubation. Continue until the ETT is fully secured, the position has been re-checked, and the lip marking remains clearly visible.



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Before use, ensure the metal grippers are evenly spaced. Only the middle clip is adjustable; move it closer to the main stem for smaller ETTs, ideally before attaching the NeoFit to the infant.

Although some units tape very small tubes (e.g. 2.0) to improve grip, correct adjustment of the central clip should allow secure fixation without tape. Using the clips alone avoids obscuring depth markings and keeps the lip marking clearly visible.



Apply Cavilon (or a similar barrier cream) under the NeoFit to protect fragile preterm skin. Allow it to dry for 60–90 seconds before applying the NeoFit.



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The round "lollipop" pad is the main anchor and should sit on the cheek, in front of the ear. The thin wing runs forward along the NeoFit, above the tube, and is only for support. The edges may need trimming, as the NeoFit can be too large for some infants' faces.

A common mistake, especially in small babies, is sticking the thin strip down first, which pulls the pad over or behind the ear. Always secure the round pad first without tension, then apply the thin wing, keeping both sides symmetrical and avoiding excessive tension.



Wrap the Velcro strap around the ETT. The ETT can easily dislodge in preterm infants if not properly secured. Always test its stability by gently pushing or twisting it, never by pulling.



To minimise dead space, shorten the ETT by cutting it diagonally and reattaching the connector.



Use the lowest effective inflation pressures needed to achieve target saturations and a satisfactory heart rate. Look for adequate chest rise. Avoid high pressures, particularly after surfactant administration, as lung compliance will increase and lower pressures should be sufficient for effective ventilation.

Switch to a volume-targeted ventilation mode on the unit ventilator as soon as possible. A suggested starting point is SIPPV/PCAC/PTV + VG with tidal volume 5 ml/kg, rate 50 bpm, inspiratory time 0.33-0.36 seconds, PEEP 5 cmH₂O, and Pmax 25 cmH₂O. Ensure Pmax is set at least 5 cmH₂O above the generated PIP.

5.3 Thermoregulation

Keep the infant inside the Neohelp suit or plastic bag throughout stabilisation under a radiant heater in the delivery room or inside a pre-warmed incubator in the neonatal unit. Do not place towels over the bag. The infant should remain inside the bag during procedures such as line insertion, as they are highly susceptible to heat loss. PaNDR transfers all extremely preterm infants in the Neohelp suit to maintain thermal stability, given the absence of humidity in transport incubators.

Attach a temperature probe and monitor continuously. If the infant's temperature remains low, consider using a Transwarmer, ensuring it is not used at the same time as another active heat source, as this can cause burns.

Extremely preterm infants require humidity in the incubator. When opening the incubator, use only the portholes and activate 'Air Boost' to minimise loss of heat and humidity—this also applies during line insertion. Consider deferring the non-essential procedures until the infant is normothermic, and temperature should be monitored throughout.

If the infant becomes hypothermic during a procedure, consider pausing briefly and rewarming before continuing.

5.4 Cardiovascular and Haemodynamics

On admission, carry out a full examination, noting the infant's colour, perfusion, and heart rate. Monitor blood pressure regularly (recommended every 30 minutes) using a cuff until invasive monitoring is in place. Use gestational age as a guide for acceptable mean arterial pressure.

If the blood pressure is low with signs of poor end-organ perfusion (e.g. prolonged capillary refill, tachycardia, raised lactate, or reduced urine output), give a cautious fluid bolus of 10 ml/kg over 30 minutes.

In very preterm infants, avoid repeated fluid boluses unless there is clear evidence of hypovolaemia, as excess fluid is associated with an increased risk of IVH and may impair ductal constriction. If blood pressure remains low after a single bolus, consider starting inotropic support early rather than giving further fluid. Choice of inotropes can be advised by the PaNDR consultant.

When flushing lines, use 0.45% saline where possible to reduce the risk of hypernatraemia, and flush slowly at about 1 ml/min to prevent rapid cerebral blood flow changes that could increase the risk of intraventricular haemorrhage.

Monitor pH, lactate, and haemoglobin on blood gases. Consider a transfusion if haemoglobin falls below 120 g/L. If the infant shows significant bruising, send a clotting screen and consider repeating vitamin K or administering clotting factors based on the results.

5.5 Access and bloods

Once access is secured, perform a septic screen and send admission bloods promptly: group and save, blood spot, FBC, electrolytes, CRP and blood culture.

In infants <24 weeks, consider early UVC rather than a peripheral cannula. A double-lumen UVC is preferred, and a UAC is recommended for continuous BP monitoring and sampling where feasible. If a cannula is used, place gauze under the hub to reduce pressure injury.

Secure lines carefully. Run 0.5 ml/hour saline to maintain patency until X-ray confirms position. If necessary, clear fluids can be administered before confirmation.

An example of how to secure umbilical lines.

Whichever securing method is used, the key principles are to avoid taping directly onto the baby's skin and ensure the line is firmly secured. Skin preparation and securing of lines should follow the guidance outlined in *section 4.7 (Skin)* to minimise the risk of skin injury.

Step 1: Using a suture, take a bite through the Wharton's jelly, avoiding the umbilical vessels. Tie two knots. Cut off the needle and dispose of it safely.

Step 2: Take the two ends of the suture, wrap them once around the catheter, and tie two knots in opposite directions. Check that the catheter is secure. Repeat this step if the catheter remains mobile.

Step 3: Confirm line position on X-ray. Ensure the catheter is secure before obtaining the X-ray.

Step 4: Wrap the suture around the catheter again and tie two further knots for additional security. This can be repeated 2–3 more times, moving up the catheter.

Step 5: Use tape or Steri-Strips to secure the catheter and the suture ends together. Trim any excess thread and recheck line security.



5.6 Fluids, feeding and medication

Take great care when inserting NG tubes in infants of <24 weeks' gestation. Stop immediately if resistance is felt, as the risk of oesophageal perforation is high (*see Appendix 3: NGT size for preterm*). Secure the NGT to the NeoFit, not to the infant's skin.

All extremely preterm infants should commence parenteral nutrition as soon as possible, ideally within 8 hours of birth, in line with NICE guidance. However, if the infant is being prepared for transfer, parenteral nutrition does not need to be started locally, as this is typically initiated or recommenced by the receiving Neonatal Intensive Care Unit.

Due to significant insensible losses, extremely preterm infants require higher fluid volumes, with a starting total of around 90 ml/kg/day. Monitor blood glucose closely, as hypoglycaemia is common and will need prompt treatment.

Monitor urine output and overall fluid balance carefully. Record all sampling volumes, flushes, and administered drugs in the fluid chart, and hand over the total blood volume taken to the transport team for their log.

Encourage mothers to begin expressing breast milk within the first two hours after delivery; if available, it can be used for oral care.

Where possible, involve the most experienced available nursing staff to support the timely preparation and drawing up of medications, including those that may be required during transfer. All preterm babies should receive vitamin K and a loading dose of caffeine before transfer.¹

5.7 Skin

Preterm infants are highly vulnerable to skin injury. For those born <34 weeks' gestation and <7 days old, use an alcohol-free 0.5% aqueous chlorhexidine gluconate solution for skin preparation before umbilical line insertion. After application, gently dab the area with sterile water-soaked gauze to reduce the risk of chemical burns. Avoid pooling of the solution on the skin or within any surface in contact with it, such as inside the Neohelp suit.

ECG leads are generally avoided in extremely preterm infants <24 weeks, unless there are specific concerns about arrhythmia, as there is a high risk of them causing skin damage.

Take care with saturation probes to prevent bruising or skin breakdown. Ensure the wrap is not too tight and that no adhesive part is in direct contact with the skin. Keep nappies loose or unfastened to avoid pressure and friction.

5.8 Infection

Antibiotics should be administered within the first hour after birth, following the local protocol. If benzylpenicillin is used, start at a dose of 50 mg/kg.

5.9 Neurology and general handling

The risk of intraventricular haemorrhage is greatest within the first 72 hours of life. A cranial ultrasound should be performed after delivery, when possible, but it is not a priority and should not delay transfer.

Handle extremely preterm infants with great care and minimise handling. Where feasible, coordinate examinations and procedures with routine nursing cares every 6–8 hours.

Keep the head in the midline and elevated by 15–20 degrees.

Morphine is often used during neonatal transfer for analgesia and sedation in ventilated or distressed infants, after optimising non-pharmacological measures. This can often be stopped at the receiving unit. Monitor pain and comfort throughout. Use lower doses in preterm or unstable infants. Use cautiously in hypotension, extreme prematurity and hypovolaemia with continuous monitoring.

6 Monitoring compliance with and the effectiveness of this document

Audit standards:

The compliance and effectiveness of the document will be monitored by review of any reported incidents by the lead consultant and nurse for risk. Case reviews between PANDR and referring units will be encouraged following complex transfers.

Equality and diversity statement

This document complies with the Cambridge University Hospitals NHS Foundation Trust service equality and diversity statement.

Disclaimer

It is the responsibility of all staff to ensure they are using the latest version of a document.

References

1. First Hour of Care Guideline (FHOC). <https://eoneonatalpccsiconetwork.nhs.uk/neonatal/downloads/first-hour-of-care-fhoc/>
2. Perinatal Management of Extreme Preterm Birth Before 27 Weeks of Gestation. (Feb 2026). <https://www.bapm.org/resources/perinatal-management-of-extreme-preterm-birth-before-27-weeks-of-gestation>

Document management

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Appendix 1:
Extremely Preterm Delivery Preparation Checklist (Survival-focused Care)

Maternal Preparation

- Gestation confirmed, counselling complete, decision for active care
- Antenatal steroids completed / ongoing
- Magnesium sulphate for neuroprotection given
- Antibiotics administered if indicated
- Delayed cord clamping planned/discussed with team
- NICU informed of planned delivery

Team & Environment

- Room temperature $\geq 26^{\circ}\text{C}$, doors closed, no drafts
- Adequate lighting and space around the resuscitaire
- Consultant aware – Roles allocated: team lead, airway, procedures, scribe
- SBAR briefing completed with the obstetric team
- Communication established with the neonatal unit

Equipment Preparation

- Resuscitaire / LifeStart pre-warmed, heater functioning
- Gas supply and blender checked, T-piece (Neopuff) pressures tested
- Flow rate 8–10 L/min, PIP and PEEP set as per NLS guideline
- Pulse oximeter ready (neonatal SpO₂ probe)
- Suction checked
- Masks (sizes 00, 0, 1); Direct laryngoscope blades & video laryngoscope (if available) (sizes 00–0); ETTs (2.0, 2.5, 3.0 mm) with stylet; CO₂ detector; ETT fixation; and oral airways
- Self-inflating bag and circuit checked

At Delivery

- Polyethene wrap/bag (do not dry baby before use)
- Thermal hat / double-layer cap
- Gel mattress / Transwarmer activated (for LifeStart use)
- Temperature probe ready
- Surfactant drawn up (if indicated)
- Visible clock, record sheet, ID labels prepared
- Neonatal resuscitation equipment/trolley available, including umbilical lines and resuscitation drugs

Neonatal Unit Preparation

- Incubator pre-warmed, humidity set as per guidelines
- Ventilator / CPAP / HFNC ready and checked
- UVC / UAC trolley with sterile packs with appropriate cleaning solution
- Monitoring setup: (ECG if >24 weeks), saturation probe, temperature probe
- Drugs ready: fluids, surfactant, vitamin K, antibiotics, caffeine
- Admission, prescription, and observation charts available

Appendix 2: Endotracheal Tube Size and Length Guide

Tube Size (Internal Diameter - mm)	Weight (g)	Corrected Gestational Age (Weeks)	Corresponding Suction* Catheter (Fr) for ETT
2.5	<1000	<27	5
3.0	1000 - 2000	27 - 34	6
3.5	2000 - 3000	35 - 38	7
3.5 – 4.0	>3000	>38	8

Length by Table: *Suction pressure should be set no greater than 8 – 10 kPa

ETT Length at Lips (cm)	Weight (g)	Corrected Gestational Age (Weeks)
5.5	500 - 600	23 - 24
6.0	700 - 800	25 - 26
6.5	900 - 1000	27 - 29
7.0	1100 - 1400	30 - 32
7.5	1500 - 1800	33 - 34
8.0	1900 - 2400	35 - 37
8.5	2500 - 3100	38 - 40
9.0	3200 - 4200	41 - 43

Length by Formula: Oral Intubation (cm to lips) = 6 + weight (kg)
 Nasal Intubation (cm to nares) = 6 + [weight (kg) x 1.5]

From EoE First hour or care guideline (1)

Key Points:

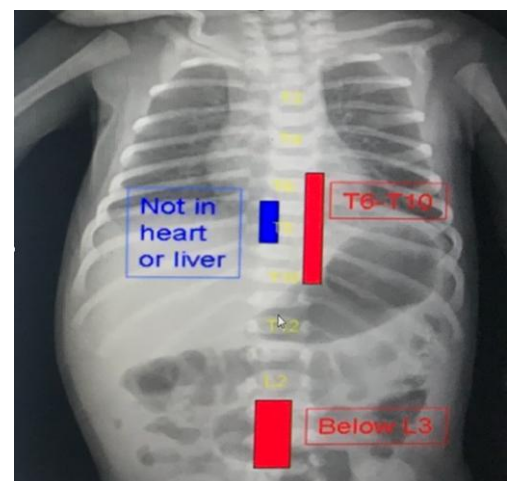
- Confirm tube position by chest rise, auscultation, and CO₂ detection.
- Use colorimetric CO₂ detector: Gold is good.
- For surfactant via ETT, keep the head in the midline.

Appendix 3: Umbilical Catheter Size and Length Guide

Catheter Type	Baby Weight	Size (Fr)
Umbilical Venous Catheter (UVC)	<1 kg	3.5
	1–3.5 kg	5
	>3.5 kg	5–8
Umbilical Arterial Catheter (UAC)	<1.5 kg	3.5
	≥1.5 kg	5

Insertion Length Guide:

- **UVC:** (Weight × 1.5) + 5.5 cm + stump → **Tip at T8–T9** (outside the cardiac silhouette, IVC–RA junction)
- **UAC:** (Weight × 3) + 9 cm + stump → **Tip at T6–T10**.
 Low position → Tip below L3 (L3–L5) (below renal arteries, above aortic bifurcation)



Key Points:

- Confirm tip position with X-ray or US before use.
- Clear fluids should be started (0.9% saline at 0.5ml/hr) before X-ray to keep line patent.
- Avoid mid-position placement for UAC lines.
- Maintain strict aseptic technique, using appropriate cleaning.
- solutions and avoiding pooling to prevent chemical burns.
- Secure the line firmly once the position is confirmed.