

NON-INVASIVE RESPIRATORY SUPPORT

< 1.2 kg Current Weight		≥ 1.2 kg Current Weight	
Irrespective of gestational age			
Set-up	<ul style="list-style-type: none"> Bubble Mask NCPAP at 8 cmH₂O and 8 l/min for any weight 	<ul style="list-style-type: none"> High Flow Therapy at 8 l/min (up to 10 l/min in term babies > 4 kg) 	
Stabilisation	Aim for: <ul style="list-style-type: none"> < 28 days of life: FiO₂ ≤ 0.4, pH ≥ 7.2 and pCO₂ ≤ 8.5 kPa ≥ 28 days of life: FiO₂ ≤ 0.4 pH ≥ 7.2 and pCO₂ ≤ 10 kPa 		
	<ul style="list-style-type: none"> If FiO₂ persistently > 0.4, consider intubation and mechanical ventilation If FiO₂ acceptable, but pCO₂ high, start SiPAP at rate 30 BPM and I-time 0.5 s Set NIV Leak compensation at “Low” for both modes 	<ul style="list-style-type: none"> If FiO₂ persistently > 0.4, start Infant Flow NCPAP at 8 cmH₂O If FiO₂ acceptable, but pCO₂ high, start SiPAP at rate 30 BPM and I-time 0.5 s Set NIV Leak compensation at “Low” for both modes 	
	If FiO ₂ persistently > 0.4 or recurrent/severe apnoeas despite measures above, consider intubation and mechanical ventilation at any time		
Weaning and Ongoing Management	Wean Bubble NCPAP by: <ul style="list-style-type: none"> 1 cmH₂O every 6 hours if in air 1 cmH₂O every 12 hours if FiO₂ ≤ 0.3 1 cmH₂O every 24 hours if FiO₂ ≤ 0.4 do not wean if FiO₂ > 0.4 alternate mask and prongs regularly (see below for details) 	Wean High Flow Therapy by: <ul style="list-style-type: none"> 1 l/min every 6 hours if in air 1 l/min every 12 hours if FiO₂ ≤ 0.3 1 l/min every 24 hours if FiO₂ ≤ 0.4 do not wean if FiO₂ > 0.4 	
	Wean Infant Flow NCPAP by: <ul style="list-style-type: none"> 1 cmH₂O every 6 hours if in air 1 cmH₂O every 12 hours if FiO₂ ≤ 0.3 1 cmH₂O every 24 hours if FiO₂ ≤ 0.4 do not wean if FiO₂ > 0.4 alternate mask and prongs regularly (see below for details) 		
	Change to High Flow Therapy once stable for at least 6 hours on NCPAP at 4 - 5 cmH ₂ O (either Bubble or Infant Flow)		
	Start at 8 l/min (up to 10 l/min in term babies > 4 kg) and wean High Flow Therapy by: <ul style="list-style-type: none"> 1 l/min every 6 hours if in air 1 l/min every 12 hours if FiO₂ ≤ 0.3 1 l/min every 24 hours if FiO₂ ≤ 0.4 do not wean if FiO₂ > 0.4 		
Stop High Flow Therapy, if: <ul style="list-style-type: none"> 5 l/min in air and ≥ 4 kg weight 4 l/min in air and ≥ 3 kg weight 3 l/min in air and ≥ 2 kg weight 2 l/min in air and ≥ 1.2 kg weight 1 l/min in air and < 1.2 kg weight consider weaning down further before stopping, if FiO₂ ≤ 0.4 do not stop High Flow Therapy if FiO₂ > 0.4 			
Consider Low Flow Therapy if FiO ₂ ≤ 0.4 after day 28 of life for ongoing oxygen requirement using the oxygen chart overleaf			
Go back to previous settings or support mode at any time if FiO₂ > 0.4 persistently			

**Low Flow Nasal Cannula
Estimated Inspired Oxygen Concentration**

Flow	Weight						
	1.0 kg	1.25 kg	1.5 kg	2 kg	2.5 kg	3 kg	3.5 kg
< 0.06							
0.06							
0.125							
0.15							
0.25							
0.5							
0.75							
1.0							
Go back to High Flow Therapy/NCPAP if oxygen concentration requirement persistently in the Red Zone							

Oxygen Concentration	≤ 25 %	≤ 30 %	≤ 40 %	≤ 50 %	> 50 %
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Practice Points for NCPAP/High Flow to Prevent Failure and/or Midface Injuries

Bonnet sizing and fitting

- Ensure the bonnet/head gear is a snug fit covering the infant's ears fully with the front edge sitting just above the eyebrows and the back at the nape of the neck. Change bonnet if it becomes stretched.
- Do not tie the bonnet ties as this may cause the hat to migrate upward pulling the prongs/mask deeper into the nose.
- Do not pull the cheek straps tightly as they are for lateral support only. Tight cheek straps will increase the risk of pressure marks along the ears, cheeks, nasal bridge and nasal septum.
- Do not place gauze under the cheek straps as this will affect seal of NCPAP. It may be better to go up a size on prongs if you have an inadequate seal.

Skin protection

- Apply Duoderm to the septum and nasal bridge **before** starting NCPAP and change at least 12 hrly. Change more frequently in babies < 1.2 kg or with skin damage, e.g. 8 hrly. Remove any adherent Duoderm with Appeel liquid (or other safe adhesive remover) to minimise skin trauma. Facial NCPAP via Neopuff may be used during Duoderm changes to provide pressure relief and to enable full inspection of the skin. This is a two person procedure.

Mask and prong fitting

- Check prongs/nasal cannula are correct size as per manufacturer instructions and recheck prong sizing daily as the nares will stretch with NCPAP/High Flow Therapy use:
 - For NCPAP select prongs that are snug – they should fill the nares without causing blanching on the outside of the nares. Larger rather than smaller prongs prevent the full length of the prongs from fully entering the nose. Equally prongs that are too small will move, particularly with the bubbling motion, and cause trauma from friction. Leave a gap between the base of the prongs and the septum to reduce skin trauma.
 - For High Flow Therapy select cannula that fills at more than 50% but less than 90% of the nostril, ideally without touching the inside of the wall of the nostrils. Both should not be pressed hard against the nose.
- Check the mask is sized correctly and not flattened when in use. The mask should not touch the tip of the nose.

- Use preferably mask in babies < 1.2 kg. Switch to prongs every 4 hours but use prongs for no more than 2 hours. Switch between mask and prongs 4 hrly in babies \geq 1.2 kg. For babies who do not tolerate prongs well, even 30 minutes of use may provide essential pressure relief.
- Change between mask and prongs might need to occur more frequently in babies who have any skin damage. The skin around the nose, nares, septum and surrounding area must be inspected for signs of redness, bleeding, crusting, excoriation and any narrowing of the passages during changes to mask or prongs and if possible during ward rounds by the examining doctor.
- All checks must be documented. A wound care plan must be completed for any infant with skin damage.

Positioning and care on NCPAP or High Flow Therapy

- Prone positioning of infants on NCPAP may increase the likelihood of success with non-invasive respiratory support.
- Infants with umbilical lines, including UACs, may be carefully positioned so that their chest is prone, providing the pelvis is rotated so that the umbilicus entry site can still be easily viewed. It is useful to tilt the bedding or nest laterally by placing a muslin underneath as this will make it easier to view the umbilicus. The infant should be nursed on a plain white sheet or muslin so that any blood loss is more easily seen. Nappies must be left open to allow the buttocks and umbilicus to be seen.
- To prevent abdominal distension in newborns < 1.2 kg site a 5 French oro-gastric tube, keep it closed and aspirate air 2 hourly. In newborns \geq 1.2 kg aim for a 6 French oro-gastric tube, keep it closed and aspirate air 2 – 3 hourly. Monitor level of abdominal distension and the tube position regularly as oral secretions may cause the oro-gastric tube to migrate. In case of refractory marked abdominal distension consider upsizing the gastric tube and/or leaving the gastric tube open for a defined period of time after discussion with and instruction by a Consultant.

Equipment checks

- Ensure desired NCPAP pressure is being delivered through continuous assessment of pressure display (Infant Flow NCPAP) and bubbling (Bubble NCPAP).
- Check equipment at regular intervals, ensure good humidity and water level at all times, particularly if secretions are thick. Excess water from tubing will need to be emptied.

Troubleshooting

- Check prongs have not become displaced or mask collapsed inwardly.
- Check prongs are not blocked through excess secretions.
- Check seal - a chin strap should be considered to improve pressure delivery, if there is evidence of respiratory deterioration and/or pressure level/bubbling cannot be maintained on NCPAP. Take care not to apply the strap too tightly as it can occlude the airway. The chin strap should be positioned so that it encircles the head from the tip of the chin toward the crown. One Velcro strip should be connected in front of the crown and one behind.
- Check for rainout in the tubing and ensure that the tubing passes downward from the baby's head. Any water within the inspiratory tubing may reach the baby causing apnoea or desaturation.
- Check for accidental disconnections.
- Consider suction of nasopharynx, aspirating excess gastric air, offering a pacifier, containment, minimal handling, low dose analgesia.
- Consider other causes for respiratory deterioration, e.g. pneumothorax, consolidation, effusions.