Neonatal and Pediatric Respiratory Care

Newborn lung disorders, NICU oxygen targets, CPAP and surfactant, oscillation, oxygenation index, tube and suction sizes

ICU Basics
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NEWBORN LUNG DISORDERS

Early-onset sepsis or pneumonia mimics RDS: think of it with prolonged rupture of membranes or maternal fever.

DISORDER	CLUES	RESPIRATORY CARE
RDS	Preterm; ground glass, air bronchograms	CPAP 6–8; surfactant if FiO_2 ≥0.30
Transient tachypnea	Cesarean without labor; fluid in fissures	O_2 or CPAP; clears in 1–3 days
Meconium aspiration	Term; patchy, hyperinflated; air leak	Gentle ventilation, surfactant; PPHN
Apnea of prematurity	Pause ≥20 s, or shorter with bradycardia	Caffeine; CPAP or nasal ventilation
Bronchopulmonary dysplasia	O_2 still needed at 36 weeks PMA	Least ventilation; home O_2 plan

- Lung maturity: lecithin/sphingomyelin ratio 2:1 or more with phosphatidylglycerol present.
- Caffeine citrate: 20 mg/kg load, then 5–10 mg/kg daily.

OXYGEN TARGETS AND MONITORING

- Preterm on O_2: SpO_2 90–95% (AAP); Europe 2025: 90–94% under 28 weeks, alarms 89 and 95%. Wean when SpO_2 sits at 99–100%.
- Preductal (right hand) higher than postductal (foot): right-to-left ductal shunt, as in PPHN.
- PaO_2 that stays low on 100% O_2 (failed hyperoxia test): suspect cyanotic heart disease; prostaglandin E1.
- Transcutaneous sensor heated to 42–44 °C: move the site often (every 2–4 h, sooner in preterm skin) and confirm with a gas.

EXAM TIP Oxygenation index = MAP × FiO_2 × 100 ÷ PaO_2. About 25: inhaled NO 20 ppm (over 34 weeks) or oscillation. 40 or more: ECMO referral.

CPAP, SURFACTANT AND VENTILATION

- CPAP 6–8 cm H_2O by short binasal prongs or mask; escalate to nasal ventilation before intubating.
- Surfactant (thin catheter preferred) improves compliance within minutes: wean pressure and FiO_2 at once to avoid air leak.
- Ventilate with volume targeting: about 5 mL/kg (usually 4–7), PIP limit 25–30, backup rate about 30.
- Accept $PaCO_2$ of about 38–53 mm Hg (5–7 kPa); extubate to CPAP or nasal ventilation once MAP is about 7–8 cm H_2O.

HIGH-FREQUENCY OSCILLATION

Preterm 10–15 Hz, term 7–8 Hz; inspiratory time 33% (I:E 1:2).

SETTING	CONTROLS	CHANGE
Mean airway pressure	Lung volume, oxygenation	Usually 10–14; film 8–9 posterior ribs
Amplitude (ΔP)	CO_2	Raise to lower $PaCO_2$; watch chest wiggle
Frequency (Hz)	CO_2, inversely	Lower Hz = bigger breaths, lower $PaCO_2$
FiO_2	Oxygenation	Over 0.6: raise MAP to recruit

SAFETY Sudden loss of wiggle, rising CO_2 or desaturation: displaced or blocked tube, secretions or pneumothorax. Transilluminate, and needle the chest at once for tension.

TUBES AND SUCTION

Newborn depth: NRP table to the upper gum, or nasal–tragus length + 1 cm. Child depth: 3 × tube size (cm).

PATIENT	ETT (MM ID)	SUCTION CATHETER
Under 1.2 kg, under 28 wk	2.5	5–6 Fr
1.2–2.2 kg, 29–34 wk	3.0	6–8 Fr
Over 2.2 kg, over 34 wk	3.5	8 Fr
Child	Cuffed: age ÷ 4 + 3.5	ETT × 3 ÷ 2

- Suction neonates at −60 to −100 mm Hg (AARC 2022: below −120), 15 s or less, closed system.
- Home ventilation: two trained caregivers, backup power and ventilator or bag, spare tubes in the same size and one smaller.

PEDIATRIC AIRWAY EMERGENCIES

- Croup: dexamethasone for all; stridor at rest adds racemic epinephrine 2.25%, 0.5 mL in 3 mL saline; watch 2–4 h for rebound; heliox for partial responders.
- Epiglottitis: keep calm and upright; no throat exam, no nasotracheal suction; intubate in the OR with a smaller tube.
- Bronchiolitis: nasal suction, O_2 if SpO_2 under 90%, high-flow up to 2 L/kg/min; no routine albuterol, steroids or chest physiotherapy.
- Foreign body: one-sided wheeze or hyperinflation after choking needs rigid bronchoscopy.

Sources (16) are listed with links at icubasics.com/sheets/rt-neo-peds.html. For education and exam preparation only. Not medical advice; follow current guidelines and your institution's protocols. ICU Basics is an independent study aid not affiliated with any certifying body.