Paediatric Invasive Ventilation Guideline

(This is a guideline only and is not intended to replace patient-specific decision making by the senior Anaesthesiologist/Intensivist in attendance)

Common indications for intubation in the acute setting

It is often prudent to pre-emptively intubate a deteriorating child in advance of collapse – contact the PICU referral line for advice – 1800 222378

- **Airway protection/patency**
- **Respiratory Failure** – Progressive hypoxaemia/hypercarbia or respiratory muscle failure
- **Cardiovascular Support** - congenital heart disease/myocarditis (*discuss with PICU prior to intubation – can be ++Risk)* or impending cardiovascular collapse i.e. Severe Sepsis
- **Neuroprotection** – to facilitate scanning/optimise pC02 and reduce cerebral metabolic O2 demands
- **Facilitate a procedure** i.e. Central Venous Access / Chest drain insertion

Pre-Intubation Considerations

1. **Location –** Aim to move child as little as possible as this can cause significant delays - bring equipment/staff to the child where possible i.e. Resus/HDU bay
2. **Equipment Selection –** Use intubation/airway guide @ http://www.nasccrs.ie/IPATS/Guidelines/Respiratory/Intubation-and-Airway-guide-1- .pdf as an aide memoire if required
3. **Induction agents –** Ketamine 2mg/kg + Rocuronium 1mg/kg IV is a cardio-stable and reliable induction combination for most children. For older haemodynamically stable children, propofol + muscle relaxation is generally well tolerated. Atropine can be a useful adjunct in the ill neonate at risk of vagal stimulation and bradycardia.
4. **Pre intubation checklist / team huddle** – We recommend printing & using the 'pre intubation checklist' to ensure all monitoring/ equipment and team dynamics have been discussed prior to intubation. http://www.nasccrs.ie/IPATS/Guidelines/Respiratory/intube.pdf

Post Intubation Checklist

ETT Confirmation: Auscultation □ + ETC02 waveform Capnography □ + **CXR** □ **(Chest X Ray is mandatory before transfer). Naso/Oro gastric tube placement is required in all ventilated children – on free drainage for transfer**

Ongoing sedation: Young/unstable children – Morphine 20mcg/kg/hr (10-40mcg/kg/hr) + Midazolam 2mcg/kg/min (1-5mcg/kg/min). Older stable children can be sedated with Propofol infusion. We recommend intermittent muscle relaxation in all ventilated patients for transfer. Urinary catheterisation of all paralysed patients is recommended.

Blood Gas: Any blood source (cap/ven/art) is acceptable in paediatrics. Perform **at least one gas** on transport ventilator prior to departure - ideally after approx. 10min of stable ventilator settings. Correlate with ETC02 for ambulance journey.

Suggested *Starting* Ventilator Settings

Patient	Peak Pressures Start at lowest pressure to achieve chest rise	Tidal Vol	PEEP	Rate	I Time	I:E ratio	Target Sats
Infant	15-25	5-7ml/kg/min is a safe tidal volume target for most infants and children. Peak pressures should be weaned to target this volume to limit barotrauma whenever possible	5	35	0.5	1:2	>94%
Young child	15-30		5	25-30	0.7	1:2	>94%
Adolescent			5	15-20	1	1:2	>94%
+Asthma	To move chest		0-5	12-20	1	1:2-1:4	>90%
+ARDS	To move chest		5-15	15-20	1	1:1.5 -1:2	>88%

Troubleshooting Ventilation

D isplaced ETT	Ensure ETC02 reading, auscultate chest, check ETT depth at lips
O bstructed ETT	Suction ETT with largest possible catheter, **saline lavage can be very helpful** (1ml/kg up to 10ml per lavage)
P neumothorax	Check trachea is midline/look + auscultate, CXR if unsure / trans illuminate if neonate
E quipment	Check ventilator settings and circuit. Higher pressure may be required to ventilate children on T/port vents
S tomach	Ensure NG/OG is open and aspirate to ensure diaphragm splinting is not occurring

Deadspace – This can be difficult to manage in small infants on transport ventilators. If Pc02 is difficult to clear - ensure rate is optimised & breath stacking is not occurring; consider cutting ETT (leave 4cm); Ensure appropriate sized circuit is in use. Contact PICU 180022237 for further advice if these measures are ineffective. **Do NOT remove the HME filter or ETC02**