Irish Paediatric Acute Transport Service

Clinical Guideline

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Related Documents:	

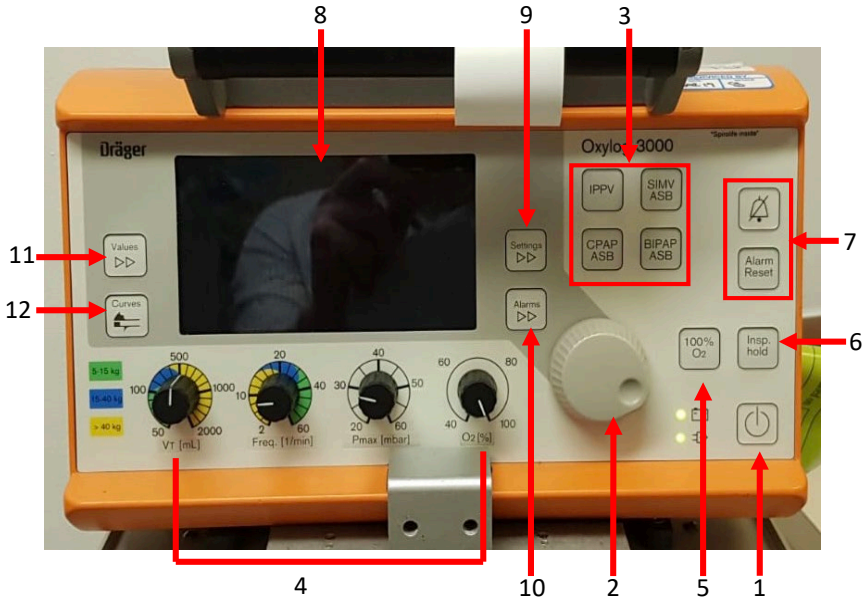
The Irish Paediatric Acute Transport Service (IPATS) has produced this clinical guideline. It has been designed for nurses, doctors and ambulance staff to refer to in the emergency care of critically ill children.

This guideline represents the views of IPATS and was produced after careful consideration of available evidence in conjunction with clinical expertise and experience. The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.

Oxylog 3000/3000plus Paediatric Invasive Ventilation Guideline

(This is not intended to replace the manufacturers guideline and is an aide-memoir only)

- Time cycled volume/Pressure controlled paediatric & adult ventilator
- Designed for patients with a tidal volume requirement of 50ml or greater. Not suitable for *lung protective ventilation* in infants < 7Kg

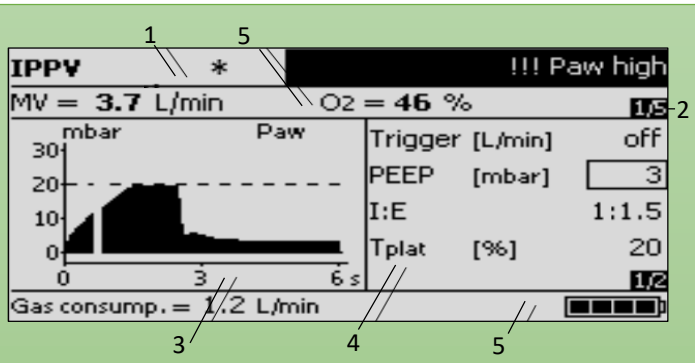


"Knobology"

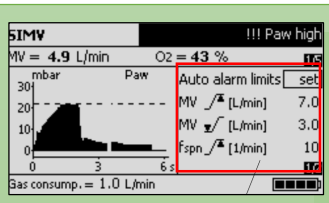
1. **On/Off –** 5sec self test will start
2. **Rotary knob –** Used to select and activate parameters
3. **Ventilator mode selection** – press for 3sec or press briefly & confirm with rotary knob
4. **Parameter Adjustment –** Tidal volume, Rate, Pmax and Fi02 dials
5. **100% O2 breath**
6. **Inspiratory hold button –** Used to assess plateau pressure in IPPV mode or deliver a manual breath
7. **Alarm silence & alarm reset/acknowledgment buttons.** Alarm silence will function for 2minutes

Screen Operating controls

8. **Main screen**
9. **Settings > >** To change screen pages in the pages in the setting window in order to set other ventilator parameters – press repeatedly to scroll through pages
10. **Alarms > >** To superimpose or change screen pages in the alarm window in order to set and display alarm limits – press repeatedly to scroll through pages
11. **Values > >** To change screen values in order to display the measured values
12. **Curves > >** To select the main page to display the pressure or flow curve

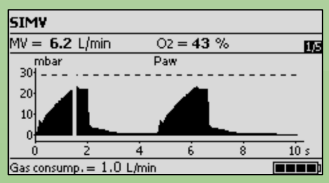


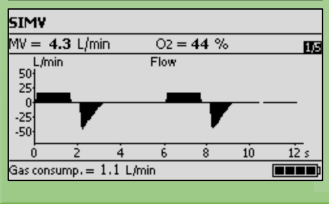
1. Status and alarm messages window Line displaying all measured values in current vent mode *=Spont breaths
2. 1st page of 5 measured values. Scroll using 'values > > key'
3. Curves & measured values window
4. Settings & alarm window –NB allows selection of essential additional settings in each ventilation mode
5. Information window – gas consumption/battery reserve



'Alarms' Screen window

- Allows scrolling and selecting of appropriate alarm limits
- Press alarm > > to access and scroll through





Pressure & Flow Curves

- Press 'curves' key (**12**)
- Click through to change views
- To return to main screen select Settings/Alarms or values buttons as required

Recommended Modes of paediatric ventilation with Oxylog 3000/3000plus

- **IPPV/VC-CMV** This is the default setting of the ventilator for patients not spontaneously breathing. Analogous to PRVC, it is a time cycled volume controlled mode of ventilation. On the display, PEEP & I:E can be set. Turning the trigger on will allow for spontaneous breaths to be supported (small value=high sensitivity). The mode will then display IPPV$_{assist}$ or VC-AC depending on the model.
- **BIPAP-ASB / PC-BiPAP** This is a pressure controlled mode of ventilation which is more open to error that IPPV. Pinsp, PEEP & I:E ratio are set on the main screen; frequency and Pmax are set on the front dials. Any patient triggered breaths can be supported by setting the 'Pressure support – support above PEEP' denoted as either ΔASB or ΔP_{supp} depending on model.

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**