

Heated Humidified High flow therapy (HHHFT) for children and young people for the management of acute respiratory distress

Indications (not exhaustive)	Contraindications	Cautions
<ul style="list-style-type: none"> High Oxygen requirement Signs of respiratory distress Post extubation if clinically indicated 	<ul style="list-style-type: none"> Nasal obstruction or craniofacial abnormalities Trauma/Surgery to nasopharynx Recurrent apnoea's Respiratory arrest or peri-arrest state Undrained pneumothorax 	<ul style="list-style-type: none"> Drained pneumothorax Upper airway obstruction

Staffing ratios

Staff to patient ratio should be determined based on the assessment of the patient's overall condition. A validated Paediatric early warning score (PEWS) should be used and other critical care interventions considered. Patient ratios should be adjusted accordingly and flexibility required as condition may change rapidly.

Acuity	Low risk/long term use of HHHFT	Medium risk	High risk
Descriptor	Actively weaning HHHFT or established on HHHFT as a long term therapy Mild or no respiratory distress	Acute phase, some stability established but not able to wean FiO2 below 0.40 currently. Moderate respiratory distress.	Acute initiation phase, severe respiratory distress observing for responsiveness to HHHFT. High PEWS
Nurse ratio	1:4 (1:3 < 2yrs)	1:2 or 3	1:1

Isolation for HHHFT is unnecessary unless condition indicates otherwise. Use of NHSE Infection prevention and control guidance recommended.

Commencing treatment

- Select interface and equipment** that achieves the best fit for the patient.
Note: Interface size should not exceed 50% of nares. If flow rate below cannot be achieved on correct interface then use max flow for interface
- On initiation** a competent clinician should observe patient for comfort and compliance. If necessary the flow can be increased to reach recommended range below over a 5 minute period.
- Titrate FiO2** to maintain SpO2 ≥ 92 (or alternative patient range)
- Escalate or wean.** To avoid rapid deterioration or unnecessary continuation on HHHFT review response to HHHFT and follow escalation or weaning criteria below

Suggested flow rates for Optiflow and Vapotherm

<12kg	2 L/kg/min
13-15kg	20-30 l/min
16-30kg	25-35 l/min
31-50kg	30-40 l/min
>50kg	40-50 l/min

Usual flow rate 2L/kg/min. Maximum = 50 L/min
 NB. For Vapotherm flow rates and maximum flow for children on HiFlo study - refer to study protocol

Response to treatment

● Sustained response to HHHFT Nursing ratio 1:4 (1:3<2yrs)	● Response to HHHFT Nursing ratio 1:2 or 3 if cohort is ward level	● Unresponsive to treatment after 1 hour
Wean FiO2 to 0.3-0.4 (depending on patient)	Moderate respiratory distress continues and/or FiO2 > 0.40-0.6	↓
↓ Half the flow rate ↓ If no clinical deterioration is seen after 4 hours HHHFT can be discontinued (or as soon as 1 hour if paediatric consultant confirms)	↓ Re-assess ECC's** and continue on current HHHFT settings until ready to wean ↓ Continue to observe for any deterioration or red flags*	• Re-assess ECC's** Consider discussing with HDU consultant Escalate to NIV (CPAP or BiPAP) • Closely observe for any red flags* ↓ Red flags* on NIV: Follow steps in immediate escalation box
↓ Restart at weaning flow rate if stopping HHHFT not tolerated		

*Red Flags for immediate escalation

- Persistent apnoeic / bradycardic episodes
- Increasing work of breathing
- Clinically tiring
- PEWS indicates immediate escalation
- Increasing FiO2 with poor improvement in oxygen saturations

Immediate escalation

- Increase FiO2 to max
- Discuss with HDU Consultant
- Prepare for intubation
- Liaise with retrieval team and Anaesthetic team (3rd on Anaesthetist)
- Communicate with the family

Monitoring and patient management

Coloured dots refer to corresponding patient acuity

- Continuous oxygen saturations ●●●
- Observation frequency and escalation according to PEWS ●
- Min hourly observations and escalation according to PEWS ●●
- Consider continuous ECG if required ●●
- 2 hrly mouth and nose care including pressure area check ●●●
- Hourly documentation of FiO2, flow rate, and temperature as well as equipment specific checks ●●●

**Essential Care Considerations (ECCs)

- Optimised positioning (e.g. head elevation)
- Consider referral for physiotherapy assessment
- Secretion clearance if indicated and safe to do so
- Consider feeding regime alteration according to risk and underlying disease.
 - High risk should be NBM with IV fluids
 - Med risk should be assessed before feeding and fed with caution
- Psychosocial support, clear communication, play and distraction
- Minimal handling/cluster cares
- Blood gas analysis not essential and acidosis a late sign of failure
- Transcutaneous or end tidal CO2 may be useful if child is moderately to severely unwell

Contact details:

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 Consultant out of hours: via switchboard