BEST PRACTICE GUIDANCE FOR USING HEATED HUMIDIFIED HIGH FLOW THERAPY (HHHFT) IN CHILDREN & YOUNG PEOPLE: AN EAST OF ENGLAND APPROACH

Introduction:

Over the past few years the use of HHHFT has increased to support children with respiratory distress and those requiring oxygen therapy, particularly infants with bronchiolitis.

This guidance has been adapted from the North and South Thames Paediatric Networks and retrieval services document and reviewed by EoE clinicians. The process collated available guidance documents from the network regions, alongside the latest evidence base to produce and implement a guideline that will standardise practice across the Networks. The East of England Paediatric Critical Care ODN thanks these colleagues for sharing their work.

Please note that this guidance is to be used in all paediatric areas in conjunction with any condition specific guidance and local escalation policy that may be in place e.g. management of bronchiolitis, management of severe asthma.

The contents for the Guideline are as follows:

Main document: Heated Humidified High flow therapy (HHHFT) for children and young people. This is advised to be used in colour for visual triggers.

Appendix 1 HHHFT Equipment QR codes

Appendix 2 References and team credits

Search our website for:

- The EoE HHHFT best practice guidance
- HHHFT educational resource book for nurses
- HHHFT clinical competency for nurses

https://www.networks.nhs.uk/nhs-networks/east-of-england-paediatric-critical-care

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Heated Humidified High flow therapy (HHHFT) for children and young people: An East of England Approach

Indications (not exhaustive)

- High Oxygen requirement
- Signs of respiratory distress
- Post extubation if clinically indicated

Contraindications

- Nasal obstruction or craniofacial abnormalities
- Trauma/Surgery to nasopharynx
- Recurrent apnoeas
- Respiratory arrest or peri-arrest state
- Undrained pneumothorax

Cautions

- Drained pneumothorax
- Upper airway obstruction

Staffing ratios

Staff to patient ratio should be determined based on the patient's overall condition. A validated paediatric early warning score (PEWS), such as the national PEWS should be used, and other critical care interventions considered. Patient ratios should be adjusted accordingly and flexibility is 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 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

1. **Select interface and equipment** based on local availability and patient age and weight
   Note: Interface size should not exceed 50% of nares. If the flow rate cannot be achieved on correct fitting interface then use max flow for interface.
2. **On initiation**, a competent clinician should observe patient for comfort and compliance. If necessary, the flow can be increased to reach the recommended range over a period of 5 minutes.
3. **Titrate FiO2** to maintain SpO2≥92 (or alternative patient range)
4. **Escalate or wean.** To avoid rapid deterioration or unnecessary continuation of HHHFT, review response to HHHFT regularly, at least 1 hour post initiation and then at least 4-6 hrly.

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

Treatment guide

Sustained response to HHHFT Nursing ratio 1:4 (1:3 for < 2 yrs)

Sustained response to HHHFT confirmed.

Commence weaning Wean Fi02: 0.3 – 0.4

If oxygen saturation remains in desired range, halve the flow rate.

If no clinical deterioration is seen after 4 hrs, HHHFT can be discontinued (or as soon as 1 hr if paediatric consultant confirms)

Restart at weaning flow rate if discontinuing HHHFT not tolerated

Response to HHHFT Nursing ratio 1:2

Moderate respiratory distress continues

and/or FiO2 > 0.40-0.6

Reassess ECCs ** continue on current HHHFT settings.

Continue to observe for any deterioration or red flags *

When ready to wean: see weaning guidance in green box.

Unresponsive to treatment Nursing ratio 1:1

In 1st hour **or** any red flags*

Re assess ECCs** Ensure paediatric consultant has reviewed the child.

Discussion with transport service Discussion/review with anaesthetic team Closely observe for any red flags*

Consider NIV if available and appropriate

Any red flags*

Prepare patient and team for intubation

*Red Flags for immediate escalation

- Any apnoeic/bradycardic episodes
- Increasing respiratory distress after HHHFT commenced
- Clinically tiring (raised pC02)
- PEWS indicates immediate escalation to resus team
- Significant concern from parent or carer
- Fi02 > 0.60

Immediate escalation

- Increase FiO2 to max
- Call 2222
- Liaise with retrieval team or on site L3PCC
- Communicate with the family

Monitoring and patient management

Coloured dots refer to corresponding patient acuity

- Continuous oxygen saturations • • •
- 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 & equipment specific checks • • •

**Essential Care Considerations (ECCs)

- Optimised positioning (eg. 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
- Medium 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.

For patient transfer considerations, please go to next page

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Transfer considerations

BCYP requires Heated Humidified High Flow Therapy (HHHFT) AND requires intra-hospital transfer
(eg. Emergency department to ward, or between hospital areas) ***Note: for inter-hospital transfer call transport service for advice***.
This guidance should be used in conjunction with the full HHHFT guideline and STOPP tool and care should be escalated as appropriate.

1 **ASSESS THE RISK** — **Assessment by senior clinician to establish risk of deterioration during transfer**

LOW RISK	MEDIUM RISK	HIGH RISK
Refer to HHHFT Guideline to establish risk and acuity Clinical judgement should always be used and transfer of patient requires adequate risk assessment Appropriate escalation of patients should always occur and the need for intubation of high risk patients should be assessed Clinical condition can rapidly change especially during initiation of treatment, transfer of any patient, regardless of risk, should be treated with caution **HIGH RISK group should only be moved if deemed appropriate by senior clinician with a consideration for intubation.**		

2 **CONSIDER EQUIPMENT AND PERSONNEL** — **Is there reliable transfer equipment and sufficient and appropriately skilled personnel available?**

YES

FOR ALL PATIENTS, COMMENCE THERAPY PRIOR TO TRANSFER, REFER TO GUIDELINE ABOVE.		
Transfer by a Registered Nurse trained in Paediatric Basic Life Support (pBLS)	Should be transferred by a competent health care professional* and a Registered Nurse trained in Paediatric Immediate Life Support (pILS)	Should be transferred by a Paediatric Airway Competent Health Care Professional** and a Registered Nurse trained in Paediatric Immediate Life Support (pILS)

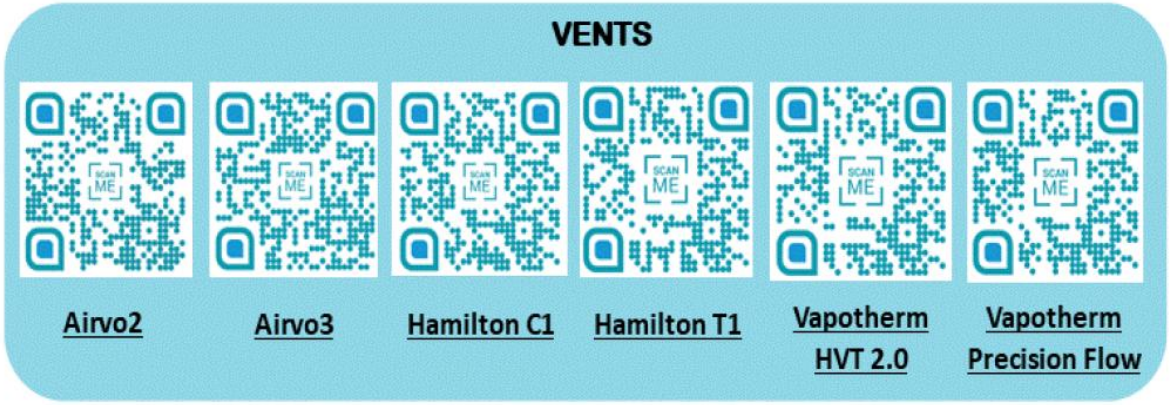
NO

DO NOT commence on HHHFT prior to transfer. Administer oxygen via appropriate device. Ensure therapy can commence immediately on arrival at destination. Do not delay transfer if patient remains LOW RISK.	**If transfer CAN OCCUR WITHIN 30 MINS, DO NOT commence on HHHFT prior to transfer.** Clinical team must assess patient prior to transfer in order to establish RISK OF DETERIORATION. Ensure therapy can commence immediately on arrival at destination. Should be transferred by a competent health care professional* and a Registered Nurse trained in Paediatric Immediate Life Support (pILS) If transfer **CANNOT OCCUR WITHIN 30 MINS** , treat as per HIGH RISK group	Senior clinician MUST ASSESS patient once established on HHHFT to establish RISK OF DETERIORATION without HHHFT. If transfer deemed appropriate, a paediatric airway competent health care professional should transfer patient with a Registered Nurse trained in Paediatric Immediate Life Support (pILS). Consider trial period in situ to establish therapy and assess tolerance and stability. Administer 15L oxygen via a non-rebreathe mask or deliver PEEP via mask and Ayres t-piece if competent to do so. Keep patient NBM, NGT on free drainage Ensure HHHFT can commence immediately on arrival at destination

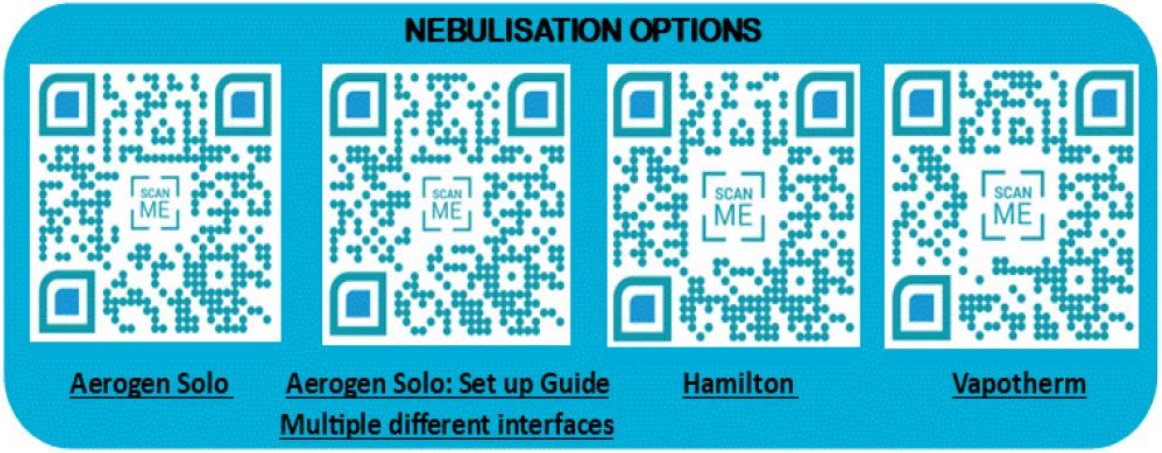
3 **TRANSFER** **Only when safe to do so, and in full consideration of this guideline, transfer the patient.**
Ensure appropriate oxygen delivery, adequate oxygen supply and Bag Valve Mask (BVM) available.
Consider personnel required for safe transfer *able to effectively ventilate using BVM & insert upper airway adjuncts
****competent in advanced airway adjuncts eg.LMA/iGel, can intubate in an emergency.** **Re assess immediately prior to transfer**

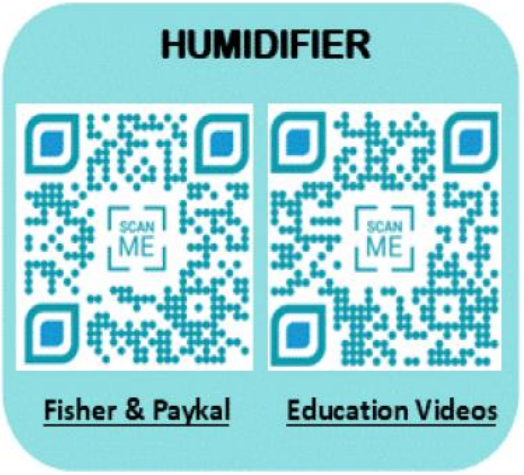
It may be suitable to consider whether the child can be transferred on CPAP if equipment and personnel are available as an alternative to HHHFT.

Appendix 1 Equipment guides









Appendix 2 - Team credits

With special thanks to the North Thames Paediatric Network and the South Thames Paediatric Network and their respective working groups and commissioning bodies for sharing the original guideline from which this East of England approach is derived. This has been shared with the East of England and agreement obtained to adopt it by the ODN for use across the EoE PCC ODN region.

Appendix 3 - Reference list/ Bibliography

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