



East of England Paediatric Critical Care ODN

(Hosted by Cambridge University Hospitals)



<< BITESIZE >>
NURSING CARE OF THE CHILD ON
HEATED HUMIDIFIED HIGH FLOW OXYGEN
THERAPY



East of England
Paediatric
Critical Care
Operational Delivery Network

Collaborative working to deliver high quality care to our children and their families

<< BITESIZE >>

The bitesize learning packages are intended as a refresher or to support learning in the paediatric setting. It is not the intention to give lengthy explanations or critical analysis of practice, rather to be an aide memoire or refresher for the clinical nurse. Links to further information are given where appropriate so the reader is able to delve deeper should this be required.

The learning packages are based on East of England paediatric clinical guidelines and links to these guidelines are provided

Units will differ in the equipment available. Where equipment is identified the reader should refer to manufacturer guidance to ensure safe use.

This should be used in conjunction with the educational resource booklet, competency document and clinical guideline available on the website.

STARTING HHHFT

Making the decision

A senior paediatric doctor should be involved in making the decision to commence HHHFT and it should be documented in the management plan in the patient's notes. The target saturations should also be documented.

Staff should be familiar with the equipment in use, and have received training on how to use it.

Interface selection

Care must be taken to only fill 50% of the nares with the interface prongs, the gap is required in order to reduce the risk of hyper distention of the airways or gastric system.



Use the guide included with the interface- do not guess.

INTERFACE SELECTION



Consult the manufacturers guide to aid selection of the correct interface.

If the desired flow cannot be achieved, the maximum flow for the correct size interface must be used.

	PRECISION FLOW CANNULA SIZES	FLOW RANGE
	Premature	1-8 L/min
	Neonatal	1-8 L/min
	SOLO (single prong)	1-8 L/min
	Infant	1-8 L/min
	Intermediate Infant	1-8 L/min
	Pediatric Small	1-20 L/min
	Pediatric/Adult Small	5-40 L/min
	Adult	5-40 L/min

F&P OPTIFLOW JUNIOR NASAL CANNULA												
PRODUCT SIZE	ITEM CODE	APPROX WEIGHT (KG)										ACCESSORY
		2	4	6	8	10	12	14	16	18	20	
Premature	OPT312	Max. flow 8 L/min										Wigglepads OPT010
Neonatal	OPT314	Max. flow 8 L/min										Wigglepads OPT012
Infant	OPT316	Max. flow 20 L/min										
Pediatric	OPT318	Max. flow 25 L/min										

Do not exceed the maximum flow rate for the correct size interface

SETTINGS: FLOW, FIO2, TEMPERATURE

Flow

Most guidelines base the flow rates on patient's age or weight. The flow rates from the network guideline are shown here but please refer to your trust guideline.

Patient Weight	Suggested flow rates
< 12 kgs	2L/min/kg
13—15 kgs	20-30 l/min
16—30 kgs	25—35 l/min
31—50 kgs	30 –40 l/min
> 50 kgs	40—50 l/min

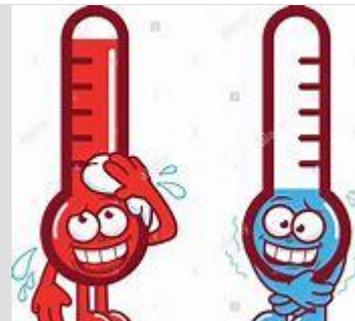


Oxygen

Care should be taken to administer only the Amount of oxygen required to maintain the Saturations at the target level, and reduce the work of breathing.

Temperature

Most devices have pre-configured temperature settings for each mode/size of prong in use; there may an option to alter the target temperature within set parameters. Consider this if a child is struggling with the heat



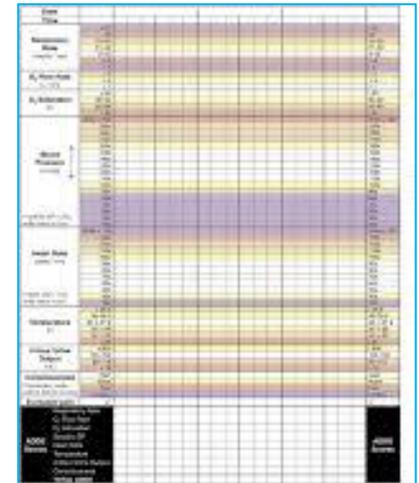
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Observations

All patients should have as a minimum:

- continuous saturation monitoring and at least hourly recording of observations and PEWS score.

Consideration should be given to the need for continuous ECG monitoring but may be dependent on patient condition and cooperation.



Time	Temp	Pulse	Respiratory	PEWS	SpO2	ECG	Other
08:00	37.5	98	20	1	98	Normal	
09:00	37.8	102	22	2	97	Normal	
10:00	38.0	105	24	3	96	Normal	
11:00	38.2	108	26	4	95	Normal	
12:00	38.5	110	28	5	94	Normal	
13:00	38.8	112	30	6	93	Normal	
14:00	39.0	115	32	7	92	Normal	
15:00	39.2	118	34	8	91	Normal	
16:00	39.5	120	36	9	90	Normal	
17:00	39.8	122	38	10	89	Normal	
18:00	40.0	125	40	11	88	Normal	
19:00	40.2	128	42	12	87	Normal	
20:00	40.5	130	44	13	86	Normal	
21:00	40.8	132	46	14	85	Normal	
22:00	41.0	135	48	15	84	Normal	
23:00	41.2	138	50	16	83	Normal	
00:00	41.5	140	52	17	82	Normal	
01:00	41.8	142	54	18	81	Normal	
02:00	42.0	145	56	19	80	Normal	
03:00	42.2	148	58	20	79	Normal	
04:00	42.5	150	60	21	78	Normal	
05:00	42.8	152	62	22	77	Normal	
06:00	43.0	155	64	23	76	Normal	



Documentation

As well as the patient observations and PEWS, the HHHFT settings should be recorded at least hourly and when any changes are made. These include but are not limited to FiO2, flow and temperature plus any device checks that are required.

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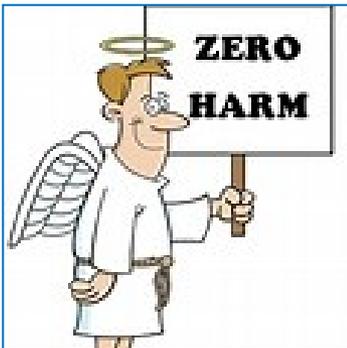
Transfers

Not a 'grab and run' scenario

Are not possible on HHHFT without an additional UPS

Should be well considered and planned

Ensure the correct personnel are aware and accompany



Safety

'primom non nocere'

All staff caring for patients on HHHFT must have received training or being directly supervised. HHHFT is largely a safe therapy,

Emergency equipment including additional oxygen supply.

Caution about entanglement.

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Staffing ratios should be based on the individual patient's condition, the document provides some guidelines however should be used in conjunction with

- Senior nursing staff assessment
- PEWS
- Consideration of other critical care interventions
- Additional requirements due to e.g. isolation or social concerns

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

Remember!

Have the right nurse for the right patient, consider re-allocating to manage your patient load as acuity changes.

ESCALATE

Red flags

A red flag is a sign or symptom that alerts to the possible presence of a serious or life threatening condition, whilst they are not diagnostic on their own, their presence warrants urgent further action. There should be no delay in initiating more invasive management when required.

- ▶ any apnoeas or bradycardic episodes
- ▶ increasing respiratory effort despite initiation of HHHFT
- ▶ PEWS triggering escalation
- ▶ $FiO_2 > 60\%$
- ▶ Respiratory acidosis (pH less than 7.20)



S	Situation a concise statement of the problem
B	Background pertinent and brief information related to the situation
A	Assessment analysis and considerations of options — what you found/think
R	Recommendation action requested/recommended — what you want

Use SBAR to communicate any concerns about a patients condition.

NEBULISERS

Patients receiving HHHFT may also require nebulised medication.



Aerogen ®

Vibrating mesh nebuliser, which is an after market additional purchase and is compatible with HHHFT

In line nebuliser kit (Fisher Paykal system)
Only licensed for use with Optiflow junior circuits



Traditional 'jet' nebuliser, if using this need to reduce or turn off completely the HHHFT in order to ensure patient receives nebulised medication.



TRACHEOSTOMY AND HHHFT



HHHFT is possible via tracheostomy with the correct interface, however be mindful that the benefit of washing out the nasopharyngeal dead space is lost, and the main benefit is of delivering heat and humidification.

Via Airvo 2

Should always be used in adult mode

There may be a minimum flow which will vary between the device.

Temperature should be set at 37 deg

Ensure expiratory valve is always clear of obstruction

Use either nebuliser attachment or separate jet nebuliser with trachy mask

Via Vapotherm

Can be used with a tracheostomy

Need TA 22 universal adapter

Connect vapotherm tubing to TA 22 adapter then to tracheostomy

Use flow rates related to patient weight.

Or attach to tracheostomy mask and place over the tracheostomy

WEANING

Weaning is the gradual reduction in the level of the respiratory support provided by HHHFT to a point that it can be safely discontinued.

After a period of sustained response to therapy, attempt to wean.

Follow Network or local weaning protocol

- FiO₂ is weaned to around 30% – 40%
- Then the flow is halved
- Therapy can be stopped after 4 hours on half flow, sooner if directed by a consultant.
- Stop weaning and escalate if not tolerated – return to pre weaning settings.

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

Wean FiO₂ to 0.3-0.4
(depending on patient)

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)

Restart at weaning
flow rate if stopping
HHHFT not tolerated

SUMMARY

Decision to commence HHHFT

- Patient not critically unwell / deteriorating and /or requires escalation to non invasive / intubation & ventilation
- Where is this patient to be nursed – ward area/staffing

Select appropriate therapy

- Device interface based on nostril size / tracheostomy / flow requirement
- Titrate oxygen requirement to maintain target saturations

Nursing Care

- Staffing ratio
- Monitoring and Observations including PEWS
- Documentation of patient assessment and recording of therapy settings
- Hydration and nutrition requirement,
- Patient comfort
- Patient compliance
- Patient safety
- Observe for red flags

Weaning

- Period of stability
- Tolerated wean of FiO₂ to between 30% - 40%
- Follow weaning protocol