

Pathway for TCAA transfers:

Does the patient transfer meet a potential indication for helicopter air transfer?
(see page 3)

Note - all potential air transfers to be discussed with William Tremlett, Mark Russell, Alex Philpott or Lou Kelly/Harriet Mawby before referral to the air desk for tasking.



If decision is Yes for potential air transfer - have you considered?

a) patient suitability, b) team factors, c) parent travel

Note - TCAA now use a trained member of flight crew for all journeys so there is no mandatory requirement for an AETC trained KIDSNTS staff member to travel.



If decision is Yes for referral to TCAA then tasking call needs to be made to the air desk on 02476 639552.

- Helicopter request form needs to be prepared prior to making a tasking call. (see page 4). A user guide for completion of this form can be found if you click on appendix 1 below.

- Request form requires preparation of team, equipment and parent weights.
- Oxygen consumption calculation as per page 7 of this SOP.
- Checking the colour scheme for the TCAA infection control protocols for both a) category of PPE required for patient - click below for appendix 2, and b) recommended decontamination of both flight crew and aircraft - click below for appendix 3.

[appendix 1](#)

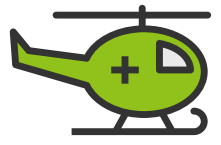
[appendix 2](#)

[appendix 3](#)



If TCAA helicopter is available and mission accepted:

- Prepare TCAA flight bag as per checklist on page 9-10.
- There is a bespoke nature to some of these transfers so equipment will need to be double checked before departing.
- Print off and take TCAA flight checklist as per page 8.



Index item	Page
Background and TCAA info	2
Indications for TCAA transfers	3
TCAA tasking and referral form	4
Landing Sites	5
Altitude physiology and medical considerations	5-6
Oxygen calculation	7
TCAA pre-departure checklist	8
TCAA flight bag and equipment	9-10
Insurance	11

Background:

KIDS NTS have been going through the process of “onboarding” with The Children’s Air Ambulance (TCAA) and have now been accepted to be a clinical partner team (CPT). KIDS NTS will become the 11th CPT for TCAA, joining the majority of other paediatric retrieval teams around England.

TCAA provide use of a helicopter, with one based in both Oxford and Gamston, for their CPTs.

Aeromedical transport should not be regarded as simply ‘road transport by air’. Specific knowledge is required to optimise safely. Whilst other countries undertake air retrieval frequently, UK geography lends itself to land retrieval.

- TCAA:**
- Airdesk tasking line: **02476 639552**
 - Operating hours: Currently 08:00-20:00
 - Bases: Oxford and Gamston bases (2 aircraft available)
 - Usual flying height: 1000-3000 ft
 - Crew: a) Two pilots from TCAA and b) Team: KIDS NTS - up to a maximum of 3 if no parents travelling. 4 seats available including one for the trained member of TCAA staff.



Indications for TCAA helicopter retrieval:

Note – all potential air transfers to be discussed with Mark Russell, Will Tremlett or Lou Kelly/Harriet Mawby before referral to the air desk for tasking.

Potential Indications for TCAA Transfer:

- To significantly reduce transfer times (especially patient journey section) where a prolonged duration of road travel is expected (i.e > 90mins for acutely unwell child or >120mins for planned transfers).

- Long distance planned elective transfers is likely to be our main use for TCAA at present whilst we become more experienced with air transfers, and due to our geography in the West Midlands.

Note – the total transfer time may not always be significantly reduce, but the patient journey section may be significantly reduced and this may have clinical significance.

Important factors to consider are:

- a) Patient factors. Is the child fit to fly? Are there any contraindications?
- b) Safety, especially in adverse weather – this will be addressed by TCAA.
- c) Logistics of arranging flights, including limited availability of night flights.
- d) Suitable landing sites.
- e) Availability of a suitably experienced team.

TCAA request form for referrals: (please see the following page for the form)

All of the information in parts 1-4 will need to be given to the air desk co-ordinators when making a tasking referral to TCAA.

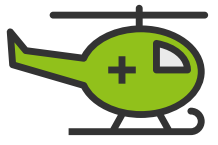
Please ensure that this information is prepared before making a referral.

Accurate weights are needed for all staff members, parents and equipment.

For the infection control section - please use the TCAA infection control colour coded matrix to give the correct response to the TCAA call handlers. (links on page 1 of this guideline)

Please perform the oxygen consumption calculation prior to any request.

SOP for TCAA transfers



Click here to download pdf copy

Children's Air Ambulance Helicopter Request Form - AW169

V11.2

Airdesk Tasking Line: 02476 639552

TCAA Task Number	
Airdesk Coordinators	

PART 1 - REQUEST

Request Date & Time	
Clinical Partner Team (CPT)	
CPT Case Ref Number	
POC / Person Completing Form - Name/No	
PPE Colour	
Aircraft Cleaning Colour	
Continuous or frequent AGP?	
Any Other Flight Restrictions?	

PART 2 - TASK ROUTING

CPT Pick-up Date & Ready to Move Time	
CPT Pick-up Point	
Referring Hospital HLS	
Referring Hospital (if different)	
Receiving Hospital HLS	
Receiving Hospital (if different)	
CPT Drop-Off Point	

PART 3a - TCAA & EQUIPMENT

TCAA	
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PART 3b - CPT

Mob Tel					
CPT 1		Helmet		Weight	0 kg
CPT 2		Helmet		Weight	0 kg
CPT 3		Helmet		Weight	
CPT 4		Helmet		Weight	
Cabin Bag				Weight	0 kg
Ventilator	None			Weights of these items are <u>not</u> included elsewhere.	
Specialist	None				
Babypod	No				
Monitors	None				
Infusion Devices	0				
Other Equipment in Cabin				0 pcs	0 kg
Other Equipment in Cargo Bay (CPT taking own Clipdeck?)				0 pcs	0 kg

PART 4 - PATIENT & PARENT

Patient		0 kg
Parent		
Additional Equipment in Cabin		0 pcs 0 kg
Additional Equipment in Cargo Bay		0 pcs 0 kg

Gases

Med Air Required (Max 1280 litres)		Call End Time	
Oxygen Required (Max 2400 litres)			

Notes:



▪ Take off/Landing sites:

- Pick Up Points (PUP's)

- **Primary PUP = Nechells Wellbeing Centre (Birmingham) - Day only. Gates will be opened for ambulance access by Wellbeing Centre staff. (4 min drive from BCH)**

- Other potential PUP's:

- a) Coventry Base - Day only (night approval in progress).
- b) Birmingham Airport - 24Hrs.
- c) Birmingham QE Hospital - Helipad, Day only. At present Hospital do not commit staff to manning the Helipad after sunset.
- d) Birmingham QE Hospital - Secondary site is Metchley park, day only.

- No other suitable alternative for BCH.

Altitude physiology and medical considerations:

Altitude Physiology basics:

The fall in atmospheric pressure & hence partial pressure of oxygen with increasing altitude may result in hypoxia. At 18,000 ft the partial pressure of O₂ in inspired air is approximately half that at sea-level. Fortunately for Helicopter retrieval, low altitudes of 1000-3000ft are generally used which means that the effects of altitude physiology are minimal.

For healthy individuals, hypoxia may become apparent above 10,000 ft, where arterial oxygen saturations of 98% at sea level decline to ~90%.

Patients hypoxic at sea level, due to ventilation-perfusion mismatch, will be at increased risk of severe hypoxia at altitude. A fall in oxygen saturation should be anticipated. This may be ameliorated by increasing inspired oxygen concentration &/or ventilatory pressures. The team should be aware of altitude so problems can be anticipated.

At altitude, it remains important to consider & treat other causes of hypoxia.

Clinical Implications:

1) Patient considerations:

- Gas in closed/semi closed compartments expands at altitude – pneumothoraces enlarge and should ALWAYS be drained pre-transfer; abdominal distension may worsen – consider risks in bowel obstruction/NEC etc; intra-cranial or intra-ocular gas expands and therefore children with open head injury or recent neurosurgery should not be transferred by air; middle ear infections/sinusitis are relative contra-indications due to gas expansion.
- Ensure anticipated interventions undertaken pre-departure.
- Airway suction prior to moving.
- Always de-compress stomach with NGT.



2) Equipment considerations:

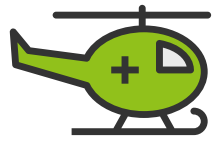
- ETT cuffs should be deflated or the air replaced with saline.
- Urinary catheter balloons should be filled with saline.
- Be extra vigilant for air in infusion lines.
- NIBP cuffs may be affected, resulting in inaccuracies. Remove between readings.
- Pressure bags will also be affected – ideally invasive arterial monitoring, attached to syringe pumps.
- Air filled devices such as vacuums need decompressing and then re-inflating at altitude.
- All equipment to have adequate battery power independent of the aircraft (store spare batteries separately to avoid leakage, take screw driver/equipment needed to change battery).
- All equipment taken must be approved by the airline/aircraft for use (some electronics affect the airplane avionics).
- All equipment must be securely strapped down during the flight including oxygen cylinders.
- Lithium based batteries present a spontaneous fire hazard that is of concern within restricted spaces. Lithium batteries are to be retained in the device battery bay for which the battery was designed or if carried as a spare, they shall be retained in an air-tight container.
- Spare lithium batteries are not to be placed in the baggage bay of the aircraft; they are to be carried in the cabin of the aircraft.

3) Vibration & Noise:

- Helicopters are very noisy & vibrational. The main sources of vibration in fixed-wing aircraft are the engines and atmospheric turbulence, with contribution from the rotors & gearbox in helicopters. Flying above 3000-5000ft may avoid turbulence.
- Team members will wear headsets to assist in communication.
- Auscultation is very difficult and therefore ETCO₂ mandatory for diagnosis of dislodged ETT etc.
- Difficulty hearing alarms; ensure monitor displays visible & observed.
- Ear protection should be worn by patients & team in helicopters.
- Interference with monitoring eg. NIBP, oximetry. Arterial access advisable.

4) General Safety:

- When loading/unloading aircraft ensure patient can be adequately monitored at all times. Ideally with one person on aircraft & one outside.
- Check location of oxygen, suction, power outlets (if applicable).
- Only use equipment approved by airline/provider.
- Secure all equipment & luggage.
- Ensure easy access to emergency equipment, drugs, fluids that may be required.
- Ensure patient secured appropriately.
- Seatbelts MUST be fastened securely for take-off & landing.
- A safety briefing should be provided to the team & passengers by the crew. Follow flight crew instructions at ALL times.
- Inform pilot if defibrillator being used.
- All equipment must be entirely self-sufficient on own battery source for the entire duration of the flight
- Air filled equipment: Volume 30% greater at 8000ft. 100% greater at 18000ft. Deflate and remove/open BP cuff after use. Vacuum mattresses will lose their vacuum at altitude. Useful as an air-filled mattress in flight or re-vacuum.



Below is a list of all equipment carried on the TCAA aircraft:

CABIN

ZOLL Defibrillator (Check Fully Charged daily) 4 green charge lights visible	1	Cabin Rear Bulkhead
Aircraft Syringe Bracket	1	Cabin Rear Bulkhead
Paediatric Ear Protection	1	Cabinet Aft Wall
Infant Ear Protection	1	Cabinet Aft Wall
Adult Pocket Mask	1	Cabinet Aft Wall
Torch (Check Battery)	1	Cabinet Aft Wall
Spare Suction Canisters	2	Cabinet Aft Wall
Yankeur (1x Large, 1x Small)	2	Cabinet Aft Wall
Pack of Surface Wipes	1	Cabinet Aft Wall
Cabin Thermometer	1	Behind D aft seat
BOC ZD Oxygen Cylinders 4 x 600 Litres. Not to depart with less than 1800 litres	4	Oxygen Rack
BOC E-Size Medical Air Cylinders 2 x 640 Litres. Not to depart with less than 640 litres.	2	Med Air Rack
Oxygen Masks (In the event of onboard Nitric Oxide leak)	4	Med Air Rack
Medical Air Therapy Heads. One attached to the top of each cylinder.	2	Med Air Rack
Sharps Bin	1	Behind Med Air
Passenger Briefing Cards	4	For each passenger
Aircraft LSCU Suction Unit + Angle Piece +Tubing (check fully charged daily)	1	Front of MTM
Sick Bags	6	Inside MTM Base
Adult Life Jackets (AK28)	5	Inside MTM Base
Infant Life Jacket (AK28)	1	Inside MTM Base
Survival Baby Cot	1	Inside MTM Base
Nitric Oxide Environmental Monitoring Equipment (Check function daily)	1	Cabin
ZOLL Defibrillator Kit Bag - Containing:		
ECG Electrodes	1	Behind Aft A Seat
Paediatric Defib Pads	2	Behind Aft A Seat
Adult Defib Pads	1	Behind Aft A Seat
Printer Paper Roll	1	Behind Aft A Seat
Leads - Aircraft Suction Unit Charging Lead (Not auth'd for use yet) ECG cable, Defibrillator, SPO2.	4	Behind Aft A Seat
Crew to ensure the following Aircraft and personal kit is taken		
Aircraft Drop Leads x 6	Battery Bank and Lead	VFR & IFR Pubs Bag
TCAA Mobile Phone	Glims (aid departure from unlit HLS)	Map Bag
iPads x 2	Pilots License	Tech Log Folder

Inhaled Nitric Oxide: Can be used on TCAA - SOP available. KIDSNTS currently awaiting a nitric module for the stretcher system so we cannot perform nitric transfer yet.

Oxygen calculations:

To calculate the estimated oxygen consumption for your Hamilton Medical ventilator, you need to take these parameters into account:

- Fraction of inspired oxygen (%Oxygen)
- Expiratory minute volume (ExpMinVol) (x2 for patients < 8 kg) in l/min
- Base flow = 3l/min for the Hamilton T1 ventilator
- In the case of leaks: leak flow (Mvleak)

$$\text{Oxygen consumption (l/min)} = (\text{ExpMinVol} + \text{Base flow} + \text{Mvleak}) * ((\% \text{Oxygen} - 21) / 79)$$

$$\text{O2 requirement litres} = \text{Oxygen consumption (l/min)} * \text{Estimated journey time (mins)}$$

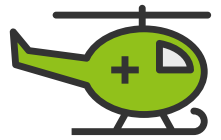
ALWAYS TAKE DOUBLE THE CALCULATED VOLUME OF OXYGEN REQUIRED



TCAA flight checklist:

The below checklist is to be used in addition to the KIDS NTS pre-departure checklist, and will be attached to the TCAA flight bag.

Pre departure	Tick
All stretcher equipment	
Clip deck and Straps	
TCAA Flight Bag checklist	
On Board	
Check gases - correct positioning, hoses connected, contents	
Check communications working	
Patient stability - check monitoring, pumps, ventilator	
Patient secure	
Patient comfortable - ear protection	
Suction unit working	
Cabin bag	
Stretcher locked in position	
All team members secure	
Team brief prior to departure	



TCAA cabin bag checklist: (click here for a pdf of the cabin bag checklist)

Please note - to travel with TCAA there is limited space within the cabin for equipment. Therefore you can take a "cabin bag" for any equipment that would be needed for immediate use whilst in the air. Further equipment can be carried in the hold of the aircraft and this will need to be determined on a case by case basis.

TCAA Cabin Bag			
Main bag			
Airway / Breathing			
Scissors		1	D36
Elastoplast		1	D33
10ml Syringe		1	C30
Laryngoscope handle	Small	1	A9
Laryngoscope handle	Large	1	A9
Aqua gel sachet		2	
Yankeur	Small		
Yankeur	Large		
Ventilator circuit	Patient specific	1	
Facemask for oxygen delivery	Patient specific	1	
Ambu bag	Patient specific	1	
Bagging circuit	Patient specific	1	
Non-rebreathe mask	Patient specific	1	
Laryngoscope blade	Patient specific	1	A6
ET tubes	Patient specific		A4
LMA or Igel	Patient specific	1	A11
Magill forceps	Infant or Child	1	A5
Facemask for bagging circuit	Patient specific		B7
Guedel Airway	Patient specific		A14
HMEF's	Patient specific		B22
Neo-breath-easy	If pt < 3 kg		B21
Inline Suction or Suction Catheter	Patient specific	2	B3
Needle Decompression pouch			
Cannula - Jelco	Blue	1	
	Pink	1	
	Green	1	
Venflon	Orange	1	
	Grey	1	
3 Way taps		2	C17
20ml Syringe		2	C33
10ml Syringe		2	C33
Chloraprep		1	C21
Clear dressing		2	D34
Guaze		2	
Tape roll		1	
Flutter valves		2	
sterile gloves		6.5	1
		7.5	1
Clamps		2	
Circulation			
0.9% saline bag	500ml	1	D25



[TCAA cabin bag checklist: \(click here for a pdf of the cabin bag checklist\)](#)

- Page 2 of cabin checklist -

Dispensing pins		1	C20	
Syringes	50ml	2	C23	
	20ml	2	C33	
	10ml	2		
	5ml	2		
	2ml	2		
	1ml	2		
3 way tap		2		
Needles	Green	2		
	Red	2		
White bungs		4		
Alcohol wipes		3		
Gauze		2		
Tegaderm		2		
<u>IO pouch</u>				
EZ IO driver		1		
Stabiliser dressings		2	C29	
15mm/15G needle		2	C28	
25mm/15G needle		2	C28	
3 way taps		2	C17	
10cm lines		2	C28	
<u>Monitoring pouch</u>				
Pentorch		1		
Skin temp probes		2		
Thermometer		1		
Stethoscope		1		
Neonatal NBP lead		1		
Invasive leads		1		
Tempus Defib pads	Paediatric	1	D14	
	Adult	1	D14	
End tidal	Patient specific	1	D10	
BP cuff	Patient specific	1	D1-5	
ECG dots	Patient specific	1		
Sats probes	Patient specific		D13	
Temperature probes	Patient specific	1	D7&8	
<u>Miscellaneous</u>				
Hamilton Spare battery		1		
Bile bag		1		
Enteral syringes	10ml	1		
	20ml	1		
<u>Items to add:</u>				
<u>* EPOC and consumable box</u>				
<u>*KIDS drug bag</u>				



Insurance summary:

General Aviation Liability:

The Aviation Provider (TCAA) holds liability for claims and damages.

Clinical Liability:

The provision of adequate clinical insurance (including medical malpractice insurance) for each task is the responsibility of the Clinical Partner Team that requests the task. **KIDS NTS insurance includes performing 20 helicopter and 10 fixed wing retrievals within the UK per annum.**