

Title:	Intubation (acute paediatric) including Management of Difficult Airway Guideline
Version:	Version 2
Supersedes:	Version 1 ratified 2015 Full review, amendments include: minor changes in format, consideration PPE, addition emphasis of safe apnoea time and Video-laryngoscopy, de-emphasis on suxamethonium and cricoid pressure, removal of tertiary ENT as an option, additional RSI checklist options, addition regional LOCSIPP, additional references and changes in international terminology, inclusion of educational resources.
Application:	The guideline is intended for use by any hospital team caring for infants, children and young people under 16 years age across the Paediatric Critical Care Network in the North West (England) & North Wales region.

Originated /Modified By: Designation:	Originated By: Pete Murphy Designation: NWTS Consultant and Consultant Paediatric Anaesthetist, AHFT Co-Authors version 1: (1) Ralph MacKinnon; (2) Kate Parkins; (3) Rachael Barber; (4) Richard Craig; (5) Adam Donne; (6) Richard McGuire; (7) Amit Dawar; (8) Neil Oakes Designation: (1) NWTS Consultant and Consultant Paediatric Anaesthetist, CMFT; (2) Lead Consultant NWTS and Consultant Paediatric Intensivist, AHFT; (3) NWTS Consultant and Consultant Paediatric Intensivist, CMFT; (4) Consultant Anaesthetist, AHFT; (5) Consultant ENT Surgeon, AHFT; (6) ST Trainee, Northern Deanery;(7) Consultant anaesthetist, Countess of Chester Hospital (8) Consultant anaesthetist, Arrowse Park Hospital Co-Authors version 2: Frances Young, ST7 anaesthetic trainee, RMCH and NWTS Emma Roach Band 6 Paediatric Critical Care nurse, NWTS (LocSIPPS) Sophina Mahmood, Paediatric Pharmacist, RMCH and Paediatric Critical Care ODN NWTS is a regional Paediatric Intensive Care transport service for the North West & North Wales region.
Reviewed by:	North West & North Wales Paediatric Critical Care Network North West & North Wales Paediatric Surgical Network North West & North Wales Children's Major Trauma Network
Ratified by:	1. Paediatric Critical Care and Surgery in Children Operational Delivery Networks, North West (England) 2. RMCH (Host Trust): Paediatric Policies & Guidelines Committee
Date of Ratification:	1. PCC ODN 28.02.24 & SiC ODN 8.12.23 2. RMCH 29.04.24 (PMMC & P&G committees)

EqIA Registration Number (RMCH):	2024-125
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Planned Review Date:	3 years IE April 2027
Responsibility of:	Clinical lead North West & North Wales Paediatric Critical Care Network & NWTS guideline lead consultant

Issue / Circulation Date:	
Circulated by:	
Dissemination and Implementation:	
Date placed on NWTS website:	

1. Detail of Procedural Document

The guideline contains a huge amount of detail and should be read in advance of likely emergencies. It contains a cognitive aid to decision making, associated detailed notes, a combined APA/DAS/RSI airway algorithm and 3 checklists (multiple are in use across the region) one of which is used by NWTS as a combined Checklist/LocSSIP.

As an absolute minimum a checklist (either one of these or locally derived ones) should be used for all acute paediatric intubations and we would encourage the completion of a LocSSIP also.

There is no substitute for simulating this common emergency in-situ (in whichever locations it can occur) in all trusts. This document should be immediately available at all those locations.

2. Equality Impact Assessment

EQIA registration number 2024-125

3. Consultation, Approval and Ratification Process

This guideline was developed with input from:

- NWTS - medical & nursing colleagues
- Representatives from both PICU's (Royal Manchester Children's Hospital and Alder Hey Children's Hospital) - medical, nursing and paediatric intensive care pharmacists.
- Representatives from the North West and North Wales Paediatric Critical Care Operational Delivery Network (PCCODN)- medical, nursing and AHP (paediatrics, anaesthetics, and emergency medicine teams)
- Representatives from ENT
- A survey sent to all of PCCN for pre-revision comments and service evaluation— March 2021.

These guidelines were circulated amongst the PCC and SiC operational delivery networks for comments on 14th November 2023.

All comments received have been reviewed and appropriate amendments incorporated.

For ratification process see appendix 1.

4. Disclaimer

These clinical guidelines represent the views of the North West (England) and North Wales Paediatric Transport Service (NWTS) and the North West and North Wales Paediatric Critical Care Operational Delivery Network (PCCN). They have been produced after careful consideration of available evidence in conjunction with clinical expertise and experience.

It is intended that trusts within the Network will adopt this guideline and educational resource after review and ratification (including equality impact assessment) through their own clinical governance structures.

The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.

Clinical advice is always available from NWTS on a case by case basis.

Please feel free to **contact NWTS (01925 853 550)** regarding these documents if there are any queries

**Guidance for acute paediatric intubation:
DECISION MAKING COGNITIVE AID**

THINK?

Airway assessment?
Most appropriate location that time allows?
Most appropriate personnel that time allows?
Appropriate PPE?
Pre-intubation checklist / LocSSIP (see page 10)

Potential difficult airway?

YES

**Call senior anaesthetist
AND E.N.T. consultant**

Consider moving to theatre
Consider volatile induction
Apnoeic Oxygenation Essential

NO

Risk of cardiovascular instability?

Eg Congenital heart disease or shock or severe asthma

Available: Fluid bolus 10mL/kg

Adrenaline 10 microgram/kg (0.1 mL/kg of 1 in 10,000)

Atropine 20 microgram/kg (min 100 micrograms)

YES

**KETAMINE 1 mg/kg +/-
FENTANYL 1 microgram/kg**

NO

Thiopentone 2-5 mg/kg

Or Propofol 2-4 mg/kg

Aspiration risk?

Most sick patients have gastric stasis

YES

MODIFIED RAPID SEQUENCE INDUCTION
Insert NGT/OGT and aspirate pre-induction
Rocuronium 1 mg/kg
Gentle ventilation pre-intubation
Keep aspirating NGT/OGT whilst BVM

NO

Rocuronium 0.6mg/kg

Or Atracurium 0.5 mg/kg

Airway Success?

Sustained E.T. CO₂ square waveform
and Adequate SpO₂

YES

Secure tube, note length
Place NGT/OGT (if not already done)
CXR: to check ETT & NGT position
Sedation [www.nwts.nhs.uk/
documentation/crashcall](http://www.nwts.nhs.uk/documentation/crashcall)
Complete LocSSIP documentation

NO

Maintain oxygenation

Follow "Unanticipated difficult intubation following RSI in paediatric patient" (page 5)

Guidance for acute paediatric intubation: associated notes

POTENTIAL AIRWAY DIFFICULTIES (PROBLEMS WITH MASK VENTILATION / LARYNGOSCOPY / INTUBATION):

Patient factors (syndromes / deformities etc.) – ensure thorough airway examination

Previous difficult intubation (check grade laryngoscopy in notes / method of intubation used)

Disease factors (infections/trauma/allergy/foreign bodies etc.) affecting the head, neck or airways

WARNING: do not examine airway if patient has stridor—may cause deterioration pre-intubation

RISK OF SIGNIFICANT DETERIORATION ON INDUCTION:

Potential limited cardiac reserve e.g. sepsis, low cardiac output states, congenital heart disease, arrhythmias

Potential limited pulmonary reserve e.g. pulmonary oedema, chronic lung disease, asthma

*** MAKE YOUR “FIRST” ATTEMPT YOUR “OPTIMAL” ATTEMPT:**

Repeated attempts at intubation increases complications and mortality significantly.

If able, a sick child should have the most skilled and practiced airway practitioner and team, in the safest location, with the optimal equipment (e.g. videolaryngoscope / HFNO₂) and a plan for both CVS deterioration and failed airway, all prepared for in advance. Constraints due to patient condition, other duties and available staffing often require senior judgment to be used, deciding when the “optimal” time is. See notes below for practical advice.

PRE-OXYGENATION: Pre-oxygenate with 100% oxygen for at least 3 minutes whilst performing LocSSIP /checklist.

APNOEIC OXYGENATION: This should be used as an adjunct to pre-oxygenation in order to increase safe apnoea time (but should **NOT** replace adequate pre-oxygenation). Use humidified high flow nasal oxygen at 2L/kg/min or if unavailable (in an appropriate timescale) then use simple nasal cannula oxygen at 0.2L/Kg flow (max 10L/min). >50% of NW DGH’s say apnoeic oxygenation strategy is now standard¹.

RAPID SEQUENCE INDUCTION (unless gas induction by senior anaesthetist indicated for a difficult airway)

MODIFIED RSI (infants and most sick children): Give low tidal volume breaths with cricoid pressure on to preclude desaturation before intubation (whilst relaxant works fully) .

CRICOID PRESSURE (by trained practitioner) may prevent aspiration and stomach distention (with face mask ventilation) but can also distort airway anatomy leading to difficulties. Be flexible in its application.

INDUCTION AGENTS: (Intraosseous route is safe for all induction agents and muscle relaxants)

CARDIOVASCULARLY UNSTABLE PATIENTS: consider ketamine +/- fentanyl

Thiopentone reduces intracranial pressure but causes hypotension. Ketamine: no longer contraindicated for those with raised intracranial pressure and is less likely to cause hypotension (preserving CPP).

NEONATES: consider using fentanyl for unstable neonates as a sole induction agent (1-3 microgram/kg)

INHALATIONAL ANAESTHETICS: only by doctors familiar with the anaesthetic machine and technique

MUSCLE RELAXANTS:

Rocuronium - rapid onset at 1mg/kg (approx 1 min and no fasciculations) long duration (>40min).

Can be reversed rapidly (if patient can be woken up!) with sugammadex 16mg/Kg (NB may only be available in theatre and its location should be checked prior to induction). It is **NOT** carried by NWTs.

Suxamethonium has many contra-indications, is very short acting and is more likely to cause anaphylaxis. (only 20% of NW DGH’s now use suxamethonium in this situation)¹

VIDEO-LARYNGOSCOPES (V.L.): There are many paediatric versions now available (3/4 of NW DGH’s have access to a paediatric V.L.)¹. They can greatly improve laryngoscopy view but they cannot just be picked up and used without formal supervised training. Tube manipulation / placement can be challenging (stylet / bougie helps) and they are often bulkier than standard blades. If available consider using for **FIRST** attempt.

INOTROPES: should be immediately available to offset negative effects of induction agents, i.e. drawn up and in the infusion pumps. If evidence of shock consider starting before induction. If given via peripheral line use NWTs sepsis guidelines for inotrope concentration/administration guide, or if using via central line use concentration on:

<https://www.nwts.nhs.uk/documentation/crashcall>

If not enough time, then use 1-2 mL aliquots ‘dilute adrenaline’ to treat hypotension (ie take 0.1 mL/kg 1:10,000 adrenaline solution, then make up to 10 mL total with 0.9% sodium chloride) whilst inotrope infusion(s) prepared.

CUFFED ENDOTRACHEAL TUBES: Microcuff[®] tubes should be used in >3Kg children. There is a strong evidence base for their safe use. Ensure cuff is at minimum pressure possible (max 20 cm H₂O).

ORO/NASOGASTRIC TUBE TO DECOMPRESS STOMACH: do early as an insufflated stomach can have a severe detrimental effect on ventilation. Contra-indications to NGT include basal skull fracture and coagulopathy.

POST INTUBATION CHECKS: Check tube length, Melbourne strapping, CXR for ET/NGT tube position.

Complete local LocSSIP and documentation.

<http://www.nwts.nhs.uk/clinicalguidelines> for guideline on how to tape an ETT & NWTs LocSIPPs

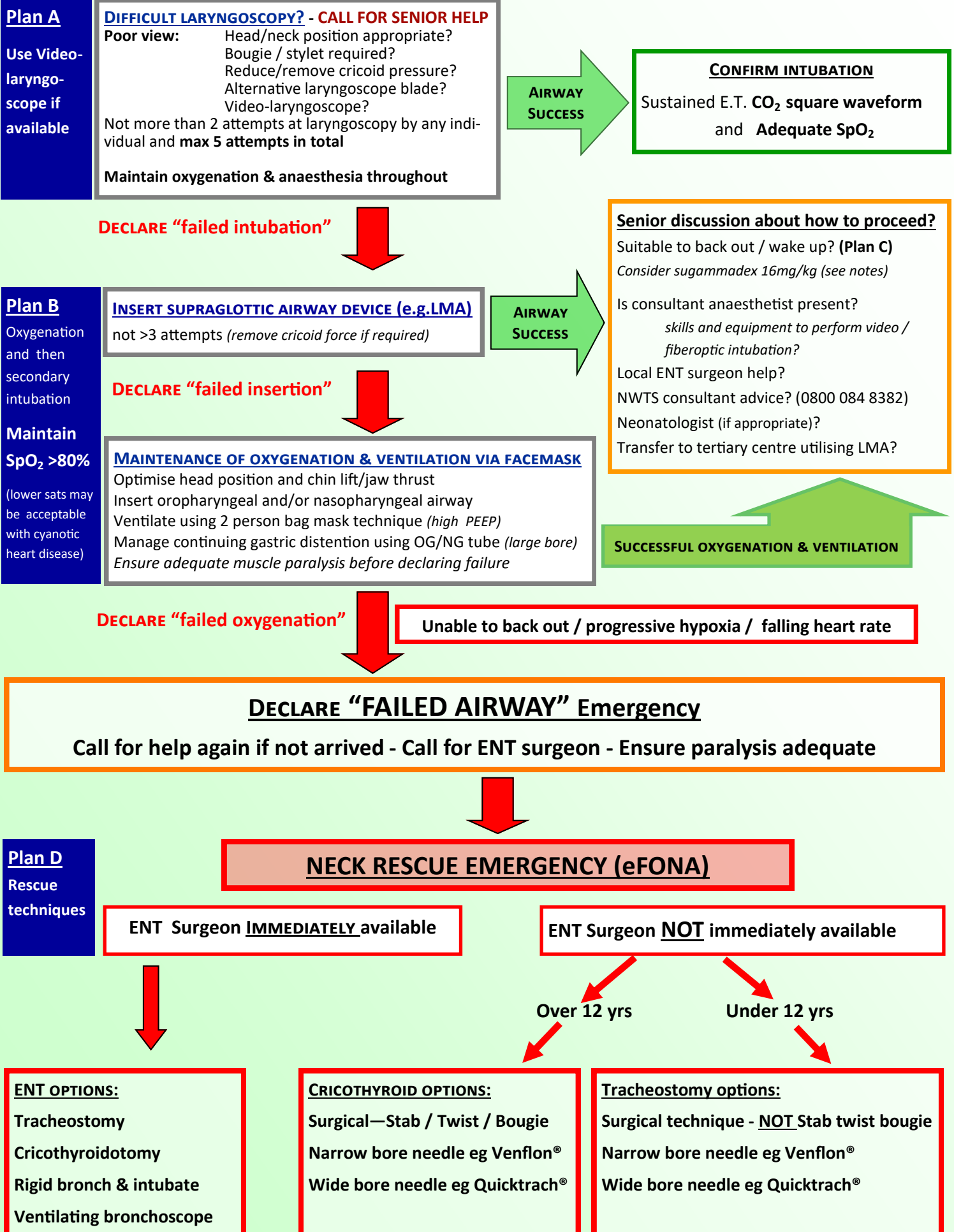
MAINTENANCE OF ANAESTHESIA, SEDATION AND VENTILATION:

Consider morphine and midazolam infusion/boluses as per <https://www.nwts.nhs.uk/documentation/crashcall>

Ideally and if able have post-procedure sedation and paralysis ready to commence prior to induction.

UNANTICIPATED DIFFICULT INTUBATION FOLLOWING RSI IN PAEDIATRIC PATIENT

Assumes pre-oxygenation performed, apnoeic oxygenation and 100%
O₂ used throughout



Guidance for acute paediatric intubation: Notes on Neck Rescue Emergency (eFONA)

There is discordance in national advice in the UK (DAS/APA and APLS) as well as with international experts around the best site (crico-thyroid or trachea) and technique (needle, seldinger or blade) to use in neck rescue emergency in paediatrics. There is also contradictory evidence from published animal studies, and the event is so rare that evidence will never be accumulated in-situ.

These issues are related to the differing sizes and compressibility of the anatomical structures, as well as the size/techniques/compatibilities of equipment used.

“One place– One technique” ie Stab/twist/bougie cricothyroidotomy (as advocated by DAS for UK adult practice) simply does NOT work (sadly), but some attempt at neck rescue **must** be made in a failed airway.

Fundamentally the **cricothyroid** membrane is too small to accept needles until at least 5 years and even the smallest endotracheal tubes until after 8 years (in healthy children). Identification by palpation is unreliable even in older children (38% correct in children aged 9 to 16 years in one study)¹³ thus arbitrary age cut offs are used, however sick children's size is highly variable .

The **trachea** is extremely compressible and will completely collapse with an approaching needle or blade passing through the skin, making tracheal puncture (without direct vision of tracheal wall), challenging and prone to failure/significant complications. Conversely a formal tracheostomy (with direct vision of tracheal wall) is more technically successful (although still high failure rate even in experienced hands in the emergency situation) but takes significantly longer (with likely cardiac arrest ongoing).

The choice between starting with a **needle** or a **blade** is somewhat an individual choice as to personal comfort level on a large patient when accessing the cricothyroid. Anaesthetists and paediatricians are used to the tactile feel and technical aspects of a needle, so may feel more comfortable “crossing the mental line in the sand” by starting with a needle technique. Narrow bore needle techniques require high pressure O₂ which can add to complexity of the task and system errors. A proprietary device (Manujet or Ventrain) to deliver high pressure O₂, needs to be immediately available with the needles. Needle tracheal puncture (if attempted first) should be abandoned after 1 failed attempt and surgical tracheostomy attempted due to increased success rate.

Most adult trained anaesthetists will be more confident with “stab twist bougie” technique for adult cricothyroidotomy—unless the patient is large (>8yrs and more likely post pubertal) this technique is likely to fail due to the small size of the cricothyroid membrane. If this technique is attempted on the trachea directly, it causes catastrophic tearing of the trachea due to circumferential splitting from the horizontal incision. **Do not use it!**

As a minimum, anywhere children are intubated should have front of neck airway equipment immediately available, as well as systems/scenarios simulated (Ideally annually) to offer even the slightest chance of success.

Training (and skill maintenance) for non ENT surgeons in this extremely rare scenario (no matter which technique) is extremely challenging. Rabbits make excellent high fidelity simulators of infant airways to practice techniques (Medical Meat Rochdale, supply Alder Hey with fur-less rabbits for courses).

This guideline is “suggestive” of techniques rather than “prescriptive” recognising every patient / situation / practitioner are different and the lack of definitive evidence. Needle and Surgical techniques do not need to be sequential, it is acceptable to have only one available ie start with tracheostomy.

Failed Airway requiring Neck Rescue Emergency is every practitioner’s nightmare scenario. Being involved (even peripherally) can lead to significant investigations / stress / guilt and the incidence of “secondary” and “moral” injury is very very high. If you have prepared in advance by simulating systems / scenarios / equipment / techniques in situ, then it is likely that some (but nowhere near all) of these stressors can be alleviated.

**Guidance for acute paediatric intubation:
Advice on Front of Neck procedures**

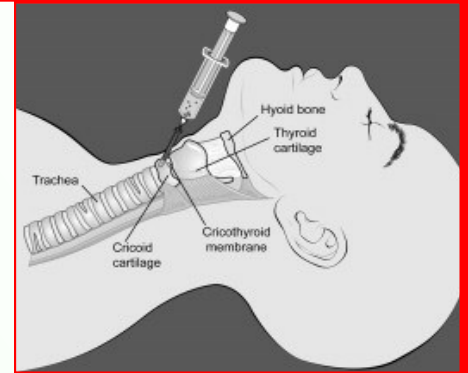
Cricothyroidotomy

Only if anatomy LARGE and CLEARLY Identified (likely >8yrs)

NARROW BORE CANNULA CRICOTHYROIDOTOMY:

Stiffened cannulas (e.g. Ravussin[®]) better than standard cannula (e.g. Venflon[®])
Ravussin 16G Infant / 14G Child / 13G Adult

Stand on patient's Left (for Right handed operator)
Identify cricothyroid membrane: full head and neck extension, shoulder roll/head ring
Insert cannula through cricothyroid membrane (45° caudal angle)
Allow tissues to relax if compressed by needle passage
Confirm tracheal position by air aspiration
Attach insufflation system to cannula using Luer-lock connector
(Need high pressure source e.g. Manujet injector / Ventrain)
Commence cautious inflation (Manujet colour coded / Ventrain (1L/yr of age min 2- max 6)
Continue to increase pressure/ flow until chest rise adequate
Confirm inflation of lungs
Exhalation through upper airway with manujet and via device with Ventrain
Manujet rate 20 (large child) to 40 (neonate) triggers per min (training in technique is essential)
Ventrain (0.5 sec on / 0.5 sec off)— repeat 5 cycles the 5 second pause in "equilibrium" (training in technique is essential)
Keep hold of cannula in the neck as it will easily kink until help arrives
If inflation fails or surgical emphysema develops convert immediately to surgical tracheostomy



LARGE BORE CANNULA CRICOTHYROIDOTOMY:

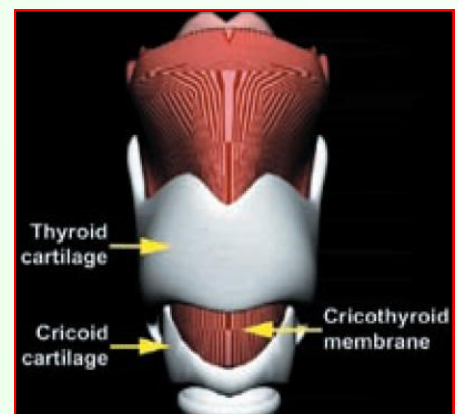
VBM Quicktrach[®] 2mm I.D. Child / 4mm I.D. Adult (both sizes carried by NWTs)

Stand on patient's Left (for Right handed operator)
Identify cricothyroid membrane: Full head and neck extension, shoulder roll/head ring
Hold syringe firmly and puncture skin at 90° angle with needle bevel facing caudally
Once through skin, flatten needle to 60° angle
Advance Quicktrach[®] into trachea up to stopper
Allow tissues to relax if compressed by needle passage
Aspirate - should freely aspirate air (if not reposition)
Remove stopper if freely aspirating air
Slide the plastic cannula over needle until flange is flush with skin
Remove needle and syringe
Secure cannula with tracheostomy tape
Insufflate via anaesthetic circuit or self-inflating bag. Steadily increase pressure if no chest rise.
1 second inflation - 4 second exhalation ie slow ventilation
(Depending on the degree of upper airway obstruction present, it may be necessary to occlude the patient's mouth and nose to adequately inflate the lungs as most of the gas may escape through the upper airway during attempts at inflation). Exhalation must still take place via the upper airway
If inflation fails or surgical emphysema develops convert immediately to surgical tracheostomy



SURGICAL CRICOTHYROIDOTOMY (STAB TWIST BOUGIE) AS PER DAS:

Identify cricothyroid membrane: full head and neck extension, shoulder roll/head ring
Stabilise Cricoid with laryngeal handshake
Single Transverse stab incision through skin and membrane using scalpel (no.10 blade)
Enlarge incision by twisting scalpel caudally 90°
Insert bougie caudally with tip running down scalpel into trachea
Railroad lubricated tracheal tube of appropriate size over bougie
(2 sizes smaller than anticipated tube for intubation is rough guide, ideally cuffed)
Secure tube and ventilate (capnography to confirm ventilation)
Ventilate via anaesthetic circuit or self-inflating bag.
If inflation fails or emphysema develops convert immediately to surgical tracheostomy
Never perform a stab twist bougie directly on the trachea (it causes complete transection)



**These techniques have serious complications - use only in life threatening situations.
Convert to definitive airway as soon as possible
(Ultrasound can be used to assist above techniques if available/trained/no delay)**

**Guidance for acute paediatric intubation:
Advice on Front of Neck procedures**

TRACHEOSTOMY (any age)

Surgical tracheostomy (for right hand dominant practitioner)

1. Hands gloved and need head-light or good overhead light, clean the skin.
2. Stand on the patient's right hand side. Extend the head as much as able to improve access.
3. Identify the larynx and then cricoid with the left hand (stabilise them between thumb and index finger) and mark cricoid with marker pen. (*this can be difficult in small children*)
4. Mark a vertical line below the cricoid (or midline if non palpable) but stop short of the suprasternal notch.
5. Incise the skin and fascia (11 blade on scalpel) along this vertical line.
6. Use blunt but pointed scissors to open the area in a vertical plane.
7. Get an assistant to put cat's paws to hold apart the skin and soft tissue.
8. Use a peanut to "rub down" the soft tissue off the anterior tracheal wall.
9. The thyroid isthmus can be pushed downward for access.
10. Insert a needle and syringe into presumed trachea (10mL syringe with 5mL 0.9% sodium chloride in it with a blue needle) and try to aspirate air.
11. If you can aspirate air do a vertical incision into the trachea (11 blade scalpel).
5mm incision for children < 8 years of age. 8mm incision for children 8 – 16 years of age.
12. Insert a Shiley trachy tube. 3.5 neo for children < 8 years of age
4.5 paed for children 8 – 16 years of age
13. Apply filter, anaesthetic bagging circuit and check for ET CO₂ trace.
14. If no ET CO₂ after 15 secs remove and insert small suction catheter (with the suction attachment cut-off) into the hole in the trachea. Thread the trachy tube over the suction catheter and then remove the suction catheter. Re-attach to bagging circuit and check for ET CO₂ trace.
15. Bipolar diathermy to control bleeding, trachy dressing and ties to secure. (you may just want to apply manual pressure and hold the tube until ENT help arrives)
16. Suture tracheostomy flanges from tube to skin with 3-0 silk.

Needle Tracheostomy

Narrow or large bore cannulas can be used for direct tracheal puncture. The setup/technique is similar to cricothyroid puncture (Page 7), however, there is greater chance of A-P compression (posterior wall damage) or mal-positioning. If inflation fails or surgical emphysema develops convert immediately to surgical tracheostomy.

Size Guide for managing Paediatric Airways

Age	Plain E.T.T. Internal Diameter (#ID, mm)	Length Oral (cm at)	Length Nasal (cm at nose)	Microcuff Size (#ID, mm)	Bougie Size (Ch or FG)	LMA Size	Suction (Ch or FG)	Cricothyroid Needle (G)	Quicktrach (#ID, mm)
Preterm <2kg	2.0,2.5	6-7	7.5-9	-	5 = 1.7mm	1	6	18G =1.27mm	2.0
Preterm 2-4kg	3.0,3.5	7-8.5	9-10.5	3 (if >3kg)	5	1	6,7	18G	2.0
Term -3 months	3.5	8.5-10	10.5-12	3	5	1	7	16G =1.65mm	2.0
3 m- 1year	3.5,4.0	10-11	12-14	3, 3.5	5	1.5	7,8	16G	2.0
1 year	4.0, 4.5	11-12	14-15	3.5	5	1.5, 2	8,10	14G =2.11mm	2.0
2 year	4.5, 5.0	12-13	15-16	4.0	10=3.3mm	2	10	14G	2.0
3 year	5.0	13-14	16-17	4.0	10	2	10	14G	2.0
4-6 years	5.0, 5.5	14-15	17-19	4.5	10	2,2.5	10,12	14G	2.0
6 -8years	6.0, 6.5	15-16	19-21	5.0	15 = 5mm	2.5	12	14G	2.0
>8 years	6.5, 7.0,7.5	16-20	20-23	5.5	15	3	14	14G	2.0 (<35Kg) 4.0 (>35 Kg)

***All sizes / distances are guides and should be confirmed clinically and by CXR**

Microcuff tubes not recommended by manufacturer <3kg — Check compatibilities of your equipment as manufacturers vary

INVASIVE PROCEDURE SAFETY CHECKLIST: PAEDIATRIC INTUBATION

Tick "yes" on transfer form if full compliance. If not, then please ensure you document deviations in patients notes.

TEAM BRIEF / SIGN IN

Preparation	Yes
NWTS intubation guideline — <i>Decision Aid—page 3</i>	Yes
Airway assessment—is difficult airway anticipated?	Yes
Do you need ENT?	Yes
Airway rescue plan in case of unanticipated difficulty?	Yes
See NWTS intubation guideline— <i>page 5</i>	Yes
Team members all introduced themselves	Yes
P.P.E. requirements	Yes
Position optimised e.g. Ramp / C-spine precautions	Yes
Pre-oxygenate: 100% FiO ₂ ideally for 3 minutes	Yes
Apnoeic oxygenation—Nasal cannula / High flow cannula	Yes
NGT / PEG inserted and aspirated	Yes
IV/IO working well	Yes
Team roles: (ideally team leader is not the intubator) - Intubator 1 + 2 - Airway assistant - Drugs/runner (Minimum 3 people required for RS) - NGT/PEG assistant to aspirate often during bagging	Yes
Where is senior help coming from if needed?	Yes
Allergies / Malignant Hyperthermia (MH) risk?	Yes
Plan for cardiovascular decompensation	Yes
Secure IV / IO access checked?	Yes

TEAM BRIEF / SIGN IN

Equipment (use sizing chart - Intubation Guideline—page 9)	Yes
Monitoring attached (SpO ₂ , waveform capnography, stethoscope, ECG, BP on 2 minute cycles)	Yes
Suction working — <i>vankegaur</i> & airway catheter	Yes
Face mask, <i>oro/naso</i> pharyngeal airways and LMA's	Yes
Laryngoscope (preferably 2) checked and working	Yes
Video laryngoscope available? (use as primary device if able)	Yes
Endotracheal tubes - 1/2 size above and below expected size - use <i>microcuff</i> if over 3kg	Yes
Tube tapes / ties ready (ideally with <i>gluggescom</i> and <i>caxilop</i>)	Yes
Bougie / introducer / Magill's forceps	Yes
<i>Anaesthetic</i> bagging circuit and HME	Yes
Bag-valve mask also available in case of O ₂ failure	Yes
Ventilator checked and ready (if time allows)	Yes
Difficult Airway trolley / Defibrillator location known?	Yes

TEAM BRIEF / SIGN IN

Drugs (all labelled)	Yes
<i>Crashcall</i> in hand, check drug doses	Yes
Intubation drugs ready	Yes
Vasopressors ready	Yes
Fluid bolus ready	Yes
Arrest drugs—Adrenaline/atropine ready	Yes
Post intubation sedation available	Yes
<i>Sugammax</i> available	Yes
Anaphylaxis / MH box location known?	Yes

DOCUMENT IN PATIENT NOTES

Indication for intubation
Name of operator
Size and length of tube
Number of attempts — state how / why failed
Laryngoscopy grade and type of Laryngoscope used
CXR reviewed—confirming ETT and NGT/ OGST position
Any adjuncts / specific position or equipment required.
Any complications / adverse events/ issues with equipment/ deviations made/ any other comments.

DEBRIEF / SIGN OUT

ETT position confirmed by ETCO ₂ trace	Yes
Tube depth checked (B/L air entry?)	Yes
ETT secured appropriately	Yes
Cuff pressure checked (if applicable)	Yes
Chest X-ray ordered	Yes
Nasal O2 removed	Yes
Appropriate ventilator settings confirmed	Yes
Analgesia and sedation commenced	Yes
Procedure documented in patients notes	Yes

TIME OUT

Verbal confirmation between team members BEFORE start of the procedure

Airway plan verbalised (plan A,B,C,D)	Yes
Senior help in room or available (Phone / Bleep)	Yes
Is role allocation clear (1 st intubator, 2 nd intubator, drugs, airway assistant / cricoid, runner, team leader, NGT aspirator etc.)	Yes
Triggers for emergency drugs verbalised	Yes
Triggers for failed intubation / oxygenation clear	Yes
Algorithm on display (<i>page 5 intubation guideline</i>)	Yes
Any additional concerns about procedure? <i>If yes, document in notes if / how they were mitigated.</i>	Yes

Guidance for Acute Paediatric Intubation

INTUBATION IN PATIENTS WITH SUSPECTED AEROSOL TRANSMITTED INFECTION

PPE—Appropriately fit tested FFP3 mask, long sleeved gown, gloves (consider double gloving), eye protection (visor or glasses)

Communications is difficult in PPE . Run through plan with team before donning and ensure everyone clear of their roles and plans for failed intubation, failed oxygenation, cardiac arrest.

Minimal number of staff present in room required to be safe.

Prepare drugs and equipment outside room.

Take place in a negative pressure room with greater than 12 air changes per hour where possible.

Consider 2 handed 2 person ventilation technique to improve seal.

2nd generation LMA e.g. iGel for use as rescue

Use cuffed ET tube and inflate cuff prior to ventilating.

Ensure in line suction in place.

Use RSI or modified RSI technique for induction

To minimize attempts the most skilled airway manager to intubate.

Consider using video laryngoscope as first laryngoscope to avoid multiple attempts.

Ensure HME filter fitted between catheter mount and circuit and keep it dry to avoid blockage.

Avoid disconnections. Clamp tube and pause ventilator if disconnection necessary.

Have vasopressors available and ready.

Parents should leave the room prior to AGP being undertaken.

Meticulous doffing post procedure

Clean 20 minutes post last AGP.

Guidance for Acute Paediatric Intubation

REFERENCES AND BIBLIOGRAPHY

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CRASHCALL via: <https://www.nwts.nhs.uk/documentation/crashcall>

GUIDELINES: www.nwts.nhs.uk/clinicalguidelines

Includes regional and relevant national guidelines

EDUCATION: via education website tab on NWTS website

www.nwts.nhs.uk/education-website

Login details for NWTS education site are available from your nursing, AHP and medical paediatric critical care operational delivery network links

OR via email: info@nwts.nhs.uk

RECORDED SESSIONS ON A WIDE VARIETY OF PAEDIATRIC CRITICAL CARE TOPICS WHICH INCLUDES:

Intubation of infants and children

Management of respiratory patients including ventilation top tips

Septic shock, Collapsed neonate etc

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Guideline contact point: peter.murphy@alderhey.nhs.uk

Or via guideline team at NWTS: kate.Parkins@nwts.nhs.uk, Nicola.longden@mft.nhs.uk, or
anna.mcnamara2@mft.nhs.uk

For the most up to date version of this guideline please visit PCC / SiC / LTV ODN

<https://northwestchildrensodnhub.nhs.uk/> or

NWTS website <https://www.nwts.nhs.uk/clinicalguidelines/regionalguidelines-a-z>

RATIFICATION PROCESS

