CLINICAL PRACTICE STANDARD — Aeromedical Operations
AO.CLI.02 – Pre-hospital Emergency Anaesthesia

Document No.	WI2023-029
File No.	D13480/23 (E22/125-05)
Date issued	05 June 2023
Contents	**Work Instruction** AO.CLI.02 – Pre-hospital Emergency Anaesthesia
	Attachments RSI Algorithm
Associated Policy Directive/s and/or Operating Procedures	This procedure should be read in conjunction with the: • Greater Sydney Area AO Pre-hospital Emergency Anaesthesia Manual. • Emergency Anaesthesia Pre-Intubation Checklist.
Directorate	Aeromedical Operations (AO)
Author Branch	Aeromedical Operations (AO)
Branch Contact	Executive Assistant to Executive Director – AO, Phone: 02 9553 2212
Summary	The purpose of this procedure is to provide guidance to Greater Sydney Area AO physician/paramedic teams conducting pre-hospital emergency general anaesthesia; define the indications for pre-hospital emergency anaesthesia; and describe the essential elements for safe pre-hospital emergency anaesthesia.
Applies to	NSW Ambulance aeromedical paramedics and doctors.
Review Date	April 2025
Previous Reference	WI2019-040
Status	Active
Approved by	Executive Director, Aeromedical Operations
Related Documents	Nil
Related Legislation	Nil

CLINICAL PRACTICE STANDARD – Aeromedical Services
AO.CLI.02 – Pre-hospital Emergency Anaesthesia

1. Purpose

The purpose of this procedure is to provide guidance to Greater Sydney Area Aeromedical Operation physician/paramedic teams conducting pre-hospital emergency general anaesthesia PHEA (also known as Rapid Sequence Intubation RSI); define the indications for pre-hospital emergency anaesthesia; and describe the essential elements for safe pre-hospital emergency anaesthesia.

This procedure should be read in conjunction with the Aeromedical Operations Pre-hospital Emergency Anaesthesia Manual.

2. Procedure

2.1 Indications for Pre-hospital Anaesthesia

- Failure of airway patency.
- Failure of airway protection.
- Failure of ventilation or oxygenation.
- Anticipated clinical course.
- Humanitarian reasons.
- Safe helicopter transport

2.2 Preparation for RSI

- The medical crew must assess scene safety issues prior to considering emergency anaesthesia.
- A risk versus benefit analysis considering the relevant medical, environmental and personnel factors must be undertaken prior to every anaesthetic.
- Establish adequate access to the patient. Where possible, 360 degrees of access and a good intubating height, should be obtained. This may require repositioning of the patient prior to induction. Do not attempt intubation in confined or cramped conditions unless there is no alternative.
- Monitoring is to be established including a minimum of pulse oximetry, continuous waveform (or quantitative) capnography, ECG and BP prior to commencing induction. These must be documented on the mission case sheet and in the clinical database for all patients.
- Standard pre-oxygenation utilises the adult or paediatric BVM with PEEP valve set to 5cm H_2O tightly applied to the patient's face together with nasal prongs running at 10L/min to provide apnoeic oxygenation. Resource (Oxygen) poor settings should target patient saturation either side of a defined preoxygenation period.

- When desaturation during apnoea is deemed likely (due to patient physiology and/or injuries, and especially from inadequate ventilation/oxygenation during preoxygenation), then assisted ventilation should be provided by optimised BVM technique (2 person, airway adjuncts, low pressure) before laryngoscopy.
- If C-spine precautions are necessary, as in the case of traumatically injured patients, then the patient should have cervical in-line immobilisation in-place with the cervical collar open during laryngoscopy.
- A small folded towel or SAM splint placed under the occiput should be used to correct any hyperextension of the cervical spine in the supine patient.
- If C-spine precautions are not indicated then the patient should be positioned in the "ear-to-sternal notch position" with the external auditory meatus in the same horizontal plane as the sternal notch and the patient's face parallel to the ground

2.3 Pre-Anaesthetic Sedation

- In agitated patients, sedation may be necessary to facilitate pre-oxygenation.
- In trauma patients with severe pain, analgesia may be required while setting up for induction.
- Doses should be carefully titrated to effect, particularly in patients who are obviously hypovolaemic or hypotensive.
- Ketamine in titrated boluses of 10-20mg provides excellent analgesia and sedation whilst maintaining respirations and airway tone.

2.4 Performing Emergency Anaesthesia

- **The first attempt at intubation must be optimised.**
- The tracheal bougie should be used routinely to facilitate successful first attempt at intubation. Only railroad ETT over bougie after confirmed tracheal placement (visual or tactile hold up). Visual confirmation may be direct and/or video view.
- The retrieval physician and paramedic should discuss which of them will perform laryngoscopy taking into account expected difficulty, physiology (time to desaturate), clinical priorities and personal ability/confidence at performing the proposed intubation.
- *If there are indicators of either a difficult airway or difficult oxygenation (Sa02 <98%) then, in most cases, the physician should perform laryngoscopy.*
- The doctor and paramedic must brief the procedure with all participating personnel prior to commencing induction. They must assign specific roles to those assisting and check understanding of procedures and drugs. Ensure all personnel are ready prior to commencing.
- **The Emergency Anaesthesia Pre-Intubation Checklist should be used for all emergency anaesthetics immediately prior to induction.**
- Standard drug choice is Ketamine (1.5mg/kg) for induction of pre-hospital anaesthesia in conjunction with rocuronium (2.0 mg/kg) for muscle relaxation (using estimated weight) expecting laryngoscopy 60s later. A dose reduction of ketamine should be made for

significant hypovolaemia and old age. Alternatives are adding Fentanyl (>2mcg/kg) and/or substituting Thiopentone (5 mg/kg) for hypertensive patients. This is more likely in medical cases.

- Intubation of the trachea should be confirmed by a combination of vision of the ETT with inflated cuff below cords by direct/video laryngoscopy AND continuous capnography (mandatory). Rise and fall of chest and auscultation help identify an endobronchial ETT.
- Mechanical ventilation should be instituted as soon as possible post intubation.
- Where glottic visualisation is sub-optimal, declare the problem ("nothing seen, epiglottis only, arytenoids only) then proceed as a team to 30 second drills to improve view. Video screen view can be vocalised by assistant, or ideally shared by operator.

  Thirty second drills - consider:

  Arytenoids or Epiglottis only:
  - Review Video screen for video laryngoscopy options
  - Bimanual laryngoscopy (one/two person ELM)
  - Head elevation
  - Lift epiglottis directly with blade
  - Direct bougie's coude tip (or Stylet ETT) deep & anterior behind epiglottis to achieve bougie hold up
  - Change to stylet to lift epiglottis

  No identifiable structures:
  - Suction secretions or blood blocking the view
  - Insert the laryngoscope deeply in the midline and slowly withdrawn until identifiable anatomy (epiglottis or uvula) is seen
  - Change laryngoscopist's eye level/position
  - Change of blade size or type/ change laryngoscope
  - Change of operator.

2.5 Failed Intubation

The algorithm for failed intubation must be understood and frequently rehearsed. Return to BVM and consider insertion of LMA or surgical airway. For patients requiring ventilation and transport, a surgical airway must be primarily considered. In controlled situations a CMAC D blade can be considered when immediately available.

The surgical airway kit must be readily available whenever performing pre-hospital emergency anaesthesia.

3. Currency

All staff must maintain clinical currency in Intubation and Emergency Anaesthesia procedure consisting of a regular practical session with the Duty Retrieval Consultant or Training Department delegate.

4. Responsible Personnel

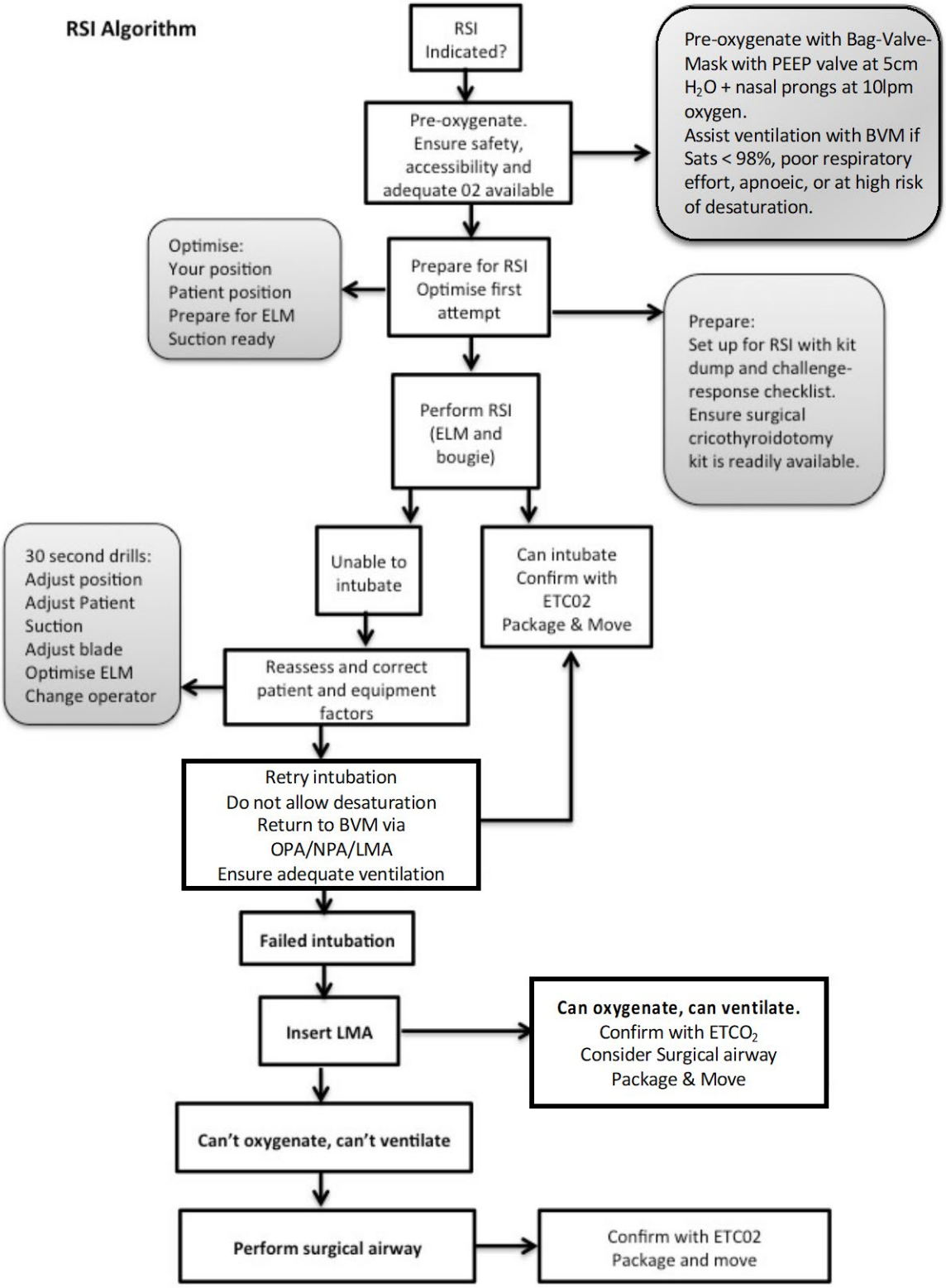
Duty Retrieval Consultants, Supervisor of Training, Medical Manager, Paramedic educators.

APPENDICES

1. RSI Algorithm

REVISION HISTORY

Version (Document #)	Amendment notes
Version 5.0	• RSI Algorithm updated
Version 4.0 Issued	• Emphasis on use of BVM ventilation where risk of desaturation • 30 sec drills split by view • VL specifics changed Approved by Executive Director, Aeromedical Operations
Version 3.0 Issued 16 September 2016	• Inclusion of diffuse apnoeic oxygenation. • De-emphasis of suxamethonium (in favour of rocuronium) • Reference to Senior Retrieval Consultant changed to Duty Retrieval Consultant. • Transition to new format. Approved by Executive Director, Health Emergency & Aeromedical Services.
Version 2.0 Issued 30 January 2015	Approved by Executive Director, Health Emergency & Aeromedical Services.
Version 1.0 Issued May 2013	Approved by Executive Director, Health Emergency & Aeromedical Services.


RSI Algorithm
RSI Indicated?
Pre-oxygenate. Ensure safety, accessibility and adequate 02 available
Pre-oxygenate with Bag-Valve-Mask with PEEP valve at 5cm H_2O + nasal prongs at 10lpm oxygen.
Assist ventilation with BVM if Sats < 98%, poor respiratory effort, apnoeic, or at high risk of desaturation.
Optimise:
Your position
Patient position
Prepare for ELM
Suction ready
Prepare for RSI
Optimise first attempt
Prepare:
Set up for RSI with kit dump and challenge-response checklist.
Ensure surgical cricothyroidotomy kit is readily available.
Perform RSI (ELM and bougie)
30 second drills:
Adjust position
Adjust Patient
Suction
Adjust blade
Optimise ELM
Change operator
Unable to intubate
Can intubate
Confirm with ETC02
Package & Move
Reassess and correct patient and equipment factors
Retry intubation
Do not allow desaturation
Return to BVM via OPA/NPA/LMA
Ensure adequate ventilation
Failed intubation
Insert LMA
Can oxygenate, can ventilate.
Confirm with $ETCO_2$
Consider Surgical airway
Package & Move
Can't oxygenate, can't ventilate
Perform surgical airway
Confirm with ETC02
Package and move