



Extubation Guideline - Broome Hospital

1. Guiding Principles

The aim of this document is to provide guidance and structure for selecting and assessing patients appropriate for extubation at Broome Hospital.

Acutely/critically unwell patients presenting to Broome Hospital may at times require intubation for non-surgical indications, such as:

- altered/depressed conscious state
- behavioural control
- intoxication and overdose
- acute psychiatric illness
- respiratory failure
- threatened airway.

Such non-surgical intubated patients are usually transferred to Royal Perth Hospital or Sir Charles Gairdner Hospital Intensive Care Units (ICUs) for on-going management. This is in contrast to the majority of surgical patients who may be intubated and undergo general anaesthesia at Broome Hospital to facilitate an elective or emergency surgical procedure and are usually extubated at Broome Hospital following surgery.

The majority of patients who undergo intubation for non-surgical reasons are usually not safe for extubation at Broome Hospital due to the on-going condition which necessitated intubation, however for selected patients it may be reasonable to consider extubation at Broome Hospital if the condition necessitating intubation has resolved or been treated.

Given the remoteness of Broome Hospital from Perth tertiary hospitals, delays for retrieval by Royal Flying Doctor Service (RFDS) may be lengthy due to logistical constraints, and in such cases the treating doctor may consider (or be requested by RFDS to consider) extubating the patient at Broome Hospital.

2. Guideline

2.1 Patient suitability for extubation

Careful attention should be given to the patient's disposition and the underlying condition necessitating intubation. Ensure the following factors are satisfied:

- the underlying condition has resolved or has been treated adequately so that the patient will likely tolerate extubation and is unlikely to require re-intubation
- the clinical disposition and any required definitive management is appropriate for on-going management at Broome Hospital
- objective markers (e.g. blood alcohol level for alcohol intoxication, CT scan) have been assessed to determine resolution of the patient's underlying condition
- the multi-disciplinary team has considered the patient's suitability for extubation at Broome Hospital, including:

- Intensive Care Consultant
- GP-Anaesthetic District Medical Officer
- Senior Medical Officer Broome Hospital
- Nurse Unit Manager (or if after-hours the After Hours Nurse Manager) to discuss appropriate nurse skill-mix and staffing and Emergency Department patient flow
- Other relevant consultant specialists e.g. Toxicologist/Psychiatrist/Duty Anaesthetist if relevant: please document name and title in the patient healthcare record.

Advice **must** be sought from the ICU consultant at the hospital to which the patient would be otherwise transferred.

Royal Perth Hospital (RPH)

Please contact the ICU 'Consultant C' at RPH via switchboard on 08 9224 2244, if unavailable then contact the on-call ICU consultant. Telehealth can be organised at the discretion of the ICU consultant.

Sir Charles Gairdner Hospital (SCGH)

Please contact the on-call ICU consultant at SCGH via switchboard on 08 6457 3333. Telehealth can be organised at the discretion of the ICU consultant.

The names and roles of clinicians involved in the decision to extubate at Broome Hospital must be documented in the patient's healthcare record:

1. Treating Doctor
2. ICU / High Dependency Unit (HDU) Consultant
3. Nurse Manager
4. Senior Medical Officer

2.2 Structured Assessment of readiness for extubation using the 'VOICE' acronym

Turn sedation off

- In preparation, strongly consider switching **early** from morphine and midazolam to propofol and fentanyl sedation, to allow faster de-sedation when ready for assessment.
- Alternatively, a dexmedetomidine infusion may be considered if medical and nursing staff are suitably trained and experienced.

Reverse muscle relaxants

Document time this has been assessed as reversed.

- Consider assessing Train of Four with a nerve stimulator prior to reversal, or be very confident of negligible muscle relaxant effects, e.g. greater than 12 hours since last muscle relaxant dose. Note that patients with renal failure may experience prolonged paralysis.
- Administer 200mg dose of sugammadex if there is any concern over residual neuromuscular paralysis if aminosteroid agents have been used (vecuronium or rocuronium). Improvement in strength should be seen within 5 minutes of administration.

Criteria for extubation

The patient must be able to fully satisfy **all** the following criteria:

Ventilate

- Can the patient take a normal tidal volume, with a normal respiratory rate and have a normal PaCO₂ on blood gas?
- Set the ventilator to pressure support ventilation (PSV) with positive end expiratory pressure (PEEP) 5 cm H₂O and Pressure Support less than 10 cm H₂O.
- Assess the patient's **tidal volume, respiratory rate and check PaCO₂** on Arterial blood gas (ABG) / venous blood gas (VBG) (if available). Target parameters TV 7-10mL/Kg IBW, RR 10-20, PaCO₂ 35-45 mmHg.
- **Ensure pressure support is less than 10 cm H₂O otherwise hypoventilation may be masked.**

Oxygenate

- Set PSV with PEEP 5 cm H₂O and Pressure support less than 10 cm H₂O.
- Set FiO₂ less than 40%.
- Ensure **saturations greater than 95%** on pulse oximetry.
- Corroborate ABG (if available) with SaO₂.
- Check chest X-ray and examine their chest for any worrying lung disease.
- **Ensure you don't have any additional PEEP otherwise shunt may be masked.**

Invariate

- The underlying condition necessitating intubation has likely **resolved or been treated adequately** to not require re-intubation e.g. sufficient time for detoxication with blood alcohol level of zero.
- The patient is otherwise stable and does not need any investigations, procedures, operations, transfers that require them to remain intubated for the time being.
- The clinical course is improving and expected to continue improving on my current treatments.
- Assess that metabolic state is normal (fever, Na⁺, BSL, metabolic acidosis etc.).

Cooperate

- Ensure adequate **alertness, cooperation and conscious state.**
- Does the patient obey commands? E.g. "Stick out your tongue, squeeze my hands, wriggle your toes". Should be consistent and reproducible.
- Ask the patient "Do you want me to take that tube out of your mouth?"
If they say no or shake their head don't do it!!

Expectorate

- Can the patient give a strong cough, enough to bring secretions up to their mouth and clear them? This is actually a test of strength.
- Ask them to cough or suction the endotracheal tube (ETT) and elicit a cough.
- Lift arms in air and hold for 3 seconds, lift head off pillow and hold for 3 seconds. This also tests for residual neuromuscular paralysis at the same time.
- Assess the quantity and consistency of respiratory secretions: aspiration or pneumonia may have a large secretion load that warrants continued ventilation, antibiotics and chest physiotherapy rather than extubation.

Consider cuff leak check:

- In patients with airway swelling (e.g. post-anaphylaxis, neck surgery, epiglottitis) or those intubated for a long time (greater than 5 days), always check for a cuff leak prior to extubation.
- On PSV 10/5 deflate the cuff and listen for air leak. Should be an obvious sound in the back of their mouth.
- No Cuff Leak = No extubation, as high risk of stridor post-extubation
- Give dexamethasone 8mg BD and promote diuresis if indicated.

2.3 Procedure for Extubation:

After multi-disciplinary involvement for careful consideration of suitability for extubation, and undertaking a structured assessment of readiness for extubation as above:

Preparation

- Ensure adequate staffing including GP-anaesthetic doctor ready to undertake re-intubation.
- Allocate roles and discuss airway plan in case of re-intubation.
- Be aware of grade of laryngoscopy at original intubation
- Prepare appropriate airway trolley equipment and emergency medications ready to undertake re-intubation.
- Suction available.
- Ensure patient has fasted for 4 hours. Aspirate naso/orogastric tube if present.
- Ensure Hudson mask with non-rebreather available and connected to oxygen at 15L/min. Ambu bag connected to oxygen at 15L/min.
- Explain the procedure to the patient.
- Pre-oxygenate with FiO₂ 100%.
- Consider connecting the patient to the Ambu bag with 100% oxygen for a trial of spontaneous breathing prior to extubation. Observe work of breathing, oxygen saturation, chest movement and respiratory rate.
- Suction ETT as needed, suction posterior pharynx.

Extubation

- Remove tapes or cut ties.
- Ask the patient to take a deep breath in (as one person applies positive pressure with the Ambu bag), open mouth fully and cough (as the other person deflates the cuff and removes ETT as soon as the cuff is deflated).
- Suction the mouth and back of throat immediately post-extubation.
- Apply supplemental oxygen to the patient. This can usually be commenced with a Hudson mask at 10 L/min. Alternately, humidified nasal oxygen can be used but this needs to be set up prior to extubation.
- Record extubation time on patient chart and perform and record full respiratory assessment, monitoring closely for signs of respiratory distress or airway obstruction.
- Encourage the patient to deep breath, cough, speak and mobilise as able.
- Reduce O₂ flow as tolerated to oxygen saturation target and apply humidification via saline nebs if required.
- Monitor ability to swallow. Withhold fluid/diet until evident that the need for re-intubation is unlikely.
- Consider HDU for monitoring and on-going care following successful extubation.

3. Roles and Responsibilities

Extubation must be undertaken by suitably trained Medical Staff who are competent and credentialed for anaesthetics practice, in collaboration with Registered and Enrolled Nurses.

All Staff are required to work within policies and guidelines to make sure that WACHS is a safe, equitable and positive place to be.

4. Compliance

Guidelines are designed to provide staff with evidence-based recommendations to support appropriate actions in specific settings and circumstances. As such, WACHS guidelines should be followed in the first instance. In the clinical context, where a patient's management should vary from an endorsed WACHS guideline, this variation and the clinical opinion as to reasons for variation must be documented in accordance with the [Documentation Clinical Practice Standard](#).

WACHS staff are reminded that compliance with all policies is mandatory.

5. Records Management

All WACHS clinical records must be managed in accordance with [Health Record Management Policy](#).

6. Evaluation

Monitoring of compliance with this document is to be carried out by Broome Hospital Emergency Department annually using the following means or tools:

- Emergency Department Nurse Unit Manager to keep a record of all elective extubations undertaken in the Emergency Department to report to morbidity and mortality audit committee
- Morbidity and mortality audit to capture all elective extubations performed in the Emergency Department.

The District Medical Officer Anaesthetics team to undertake a review of this guideline every 3 years or sooner if required.

7. Standards

National Safety and Quality Health Service Standards

Clinical Governance Standard: 1.27

Comprehensive Care Standard: 2.07

Communicating for Safety Standard: 6.03, 6.09

Recognising and Responding to Acute Deterioration Standard: 8.03, 8.04, 8.06 – 8.10

8. Legislation

Health Practitioner Regulation National Law (WA) Act 2010

Medicines and Poisons Act 2014 (WA)

Medicines and Poisons Regulations 2016 (WA)

Privacy Act 1988

9. References

- Department of Health - WA Country Health Service [HealthPoint] Adult Airway Management – Clinical Practice Standard. Perth: WACHS; 2019 [Accessed 21 September 2022]
- Difficult Airway Society Extubation Guidelines: Extubation Algorithms 2012 <http://das.uk.com/guidelines/das-extubation-guidelines1>. Reproduced from Popat M, Mitchell V, Dravid R, Patel A, Swampillai C, Higgs A. Difficult Airway Society Guidelines for the management of tracheal extubation. *Anaesthesia* 2012; 67: 318–340, with permission from the Association of Anaesthetists of Great Britain & Ireland/Blackwell Publishing Ltd [Accessed 21 September 2022]
- Royal Perth Hospital [HealthPoint] Intubated Patient Management in the Intensive Care Unit (ICU) and Emergency Department (ED) Nursing Practice Standard [Accessed 21 September 2022]
- Expert opinion and structured approach to assess readiness for extubation: Professor Luke Torre, Head of Department Intensive Care Unit, Sir Charles Gairdner Hospital, Perth, WA.

10. Related Forms

MR140A WACHS Adult Observation and Response Chart (A-ORC)

11. Related Policy Documents

WACHS Adult Airway Management Clinical Practice Standard

Printed or saved electronic copies of this policy document are considered uncontrolled.
Always source the current version from [WACHS HealthPoint Policies](#).

WACHS [Airway Suctioning Clinical Practice Standard](#)
WACHS [Aseptic Technique Policy](#)
WACHS [Hand Hygiene Policy](#)
WACHS [Oxygen Therapy and Respiratory Devices – Adults Clinical Practice Standard](#)
WACHS [Patient Identification Policy](#)
WACHS [Recognising and Responding to Acute Deterioration \(RRAD\) Policy](#)
WACHS [Recognising and Responding to Acute Deterioration \(RRAD\) Procedure](#)

12. Related WA Health System Mandatory Policies

[Clinical Handover Policy](#) – MP0095
[WA Health Consent to Treatment Policy](#)

13. Policy Frameworks

[Clinical Governance, Safety and Quality Policy Framework](#)

**This document can be made available in alternative formats
on request for a person with a disability**

Contact:	District Medical Officer/Procedural – Anaesthetics		
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