SESLHD PROCEDURE COVER SHEET

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SUMMARY	The procedure outlines the minimum requirements for the prescribing restrictions, safe handling, storage, and administration of neuromuscular blocking agents. It does not contain guidance on therapeutic use of neuromuscular blocking agents.

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Neuromuscular Blocking Agents: Prescribing, Handling, Administration and Storage

SESLHDPR/763

1. POLICY STATEMENT

This procedure provides information on the following:

1. the specific prescribing restrictions for available neuromuscular blocking agents,
2. the specific storage requirements for neuromuscular blocking agents, and
3. the monitoring and additional equipment requirements for administration of neuromuscular blocking agents.

2. BACKGROUND

Neuromuscular blocking medicines (often referred to as neuromuscular blocking agents) produce skeletal (including respiratory) muscle relaxation. They are used to facilitate endotracheal intubation and control of the airway, to allow mechanical ventilation and to prevent reflex muscle contraction.

Neuromuscular blocking agents are considered high-risk medicines because inadvertent use in patients without the availability of medical staff skilled in airway support can lead to respiratory arrest, permanent harm, or death. They must not be used without adequate sedation. Facilities for maintenance of airway and a reversal agent must be readily available.

Serious incidents have involved the inadvertent administration of a neuromuscular blocking agent to patients instead of a sedative. Identified contributing factors to incidents involving neuromuscular blocking agents include:

- look-alike packaging and labelling
- sound-alike medicine names
- drug administration after extubation
- use of pre-prepared, unlabelled syringes
- unsafe storage, particularly small quantities in refrigerators
- use in clinical areas where clinical staff may be unfamiliar with the drugs and their action.

Neuromuscular blocking (NMB) medicines are divided into depolarising and non-depolarising agents according to their effect at the neuromuscular junction.

SESLHD Medicines Formulary prescribing restrictions:

- For use by anaesthetic, critical care, or hyperbaric services only
  - Suxamethonium
  - Rocuronium
  - Vecuronium
- For use by anaesthetic or critical care services only
  - Cisatracurium
- For use by anaesthetic services only
  - Atracurium
- For use in cardiothoracic surgery
  - Pancuronium
- Mivacurium - not available in SESLHD

3. RESPONSIBILITIES

3.1 Medical staff (or other authorised prescribers) will:

- Understand and implement the principles of safe prescribing of neuromuscular blocking agents.
- Adhere to the prescribing restrictions outlined in the SESLHD Medicines Formulary.
- Ensure, at least, minimum monitoring requirements are in place prior to use.

3.2 Registered Nursing / Midwifery staff will:

- Understand and implement the safe practice of and restriction on administration of neuromuscular blocking agents.
- Escalate any adverse events relating to neuromuscular blocking agents and their reversal agents.
- Unless in a critical care area, administer neuromuscular blocking agents **only under the direct supervision of a medical officer**.

3.3 Enrolled nursing staff will:

- Check neuromuscular blocking agents for administration with a Registered Nurse / Midwife.

3.4 Pharmacy staff will:

- Understand and implement the safe practice of and restriction on administration of neuromuscular blocking agents.
- Assist with appropriate staff and patient education.
- Assist in the routine auditing processes.
- Understand and ensure availability of reversal agents in relation to the safe handling of neuromuscular blocking agents.

3.5 Nursing / Midwifery Unit Managers will:

- Ensure the procedure is available to all staff.
- Undertake routine audit to ensure staff compliance.
- Understand and implement the safe practice of and restriction on administration of neuromuscular blocking agents.

4. PROCEDURE

4.1 Monitoring Requirements

Ventilator support must be present during administration of neuromuscular blocking agents and for the duration of their effect. Adequate and skilled staff to assist with ventilator support (and if required cardiopulmonary resuscitation) must be present.

Minimum monitoring requirements:

- Continuous pulse oximetry monitoring (the equipment must alarm when appropriate limits are transgressed)

- Regular monitoring of pulse rate, oxygen saturation and blood pressure
- ECG and capnography monitoring should be available for use according to the clinical status of the patient.

For intubated patients: Prior to extubation, patients must have full reversal of muscle relaxation, adequate oxygenation/ventilation, be haemodynamically stable, neurologically intact and normothermic.

4.2 Equipment Requirements

4.2.1 Neuromuscular blocking reversal agents

Neuromuscular blocking reversal agents must be available in clinical areas where these agents are used and stored. Clinical areas must regularly assess the range and quantity of reversal agents required to be held.

Suggested minimum reversal agent quantities to be held in clinical areas where these neuromuscular agents are used and stored.:

Reversal Agent	Suggested Minimum Quantity
Neostigmine 2.5mg/mL Injection	2 ampoules
Atropine 1.2mg/mL Injection	2 ampoules

Sugammadex should be available **in close proximity to** any clinical area that holds rocuronium. Clinical areas that have minimal use of sugammadex are advised to coordinate access within their unit to minimise wastage. This may include rotating stock prior to expiry with high use areas (such as operating theatres) or by coordinating storage between clinical areas that are in close proximity (e.g., medical imaging units).

Reversal Agent	Suggested Minimum Quantity
Sugammadex 200mg/2mL Injection	8 ampoules

4.2.2 Red plunger syringes

Red plunger syringes must be available and should be used where appropriate.

4.3 Availability and Supply

The availability of neuromuscular blocking agents in general ward areas has been identified as a common root cause of errors associated with inadvertent administration of NBA. Such errors have the potential to cause serious or catastrophic harm to patients.

Neuromuscular blocking agents must be limited to only those critical care areas where there is a clinical use and patients are ventilated and monitored. For information on the clinical areas approved to stock neuromuscular blocking agents see **Appendix A**.

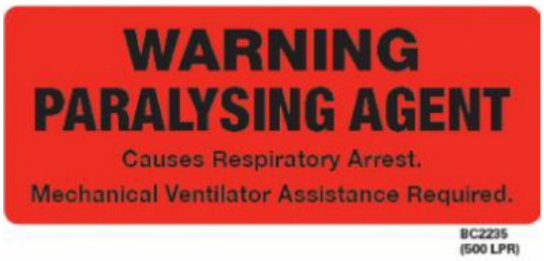
The Clinical Emergency Response team must bring neuromuscular blocking agents to general ward areas if emergency intubation is required.

The range of neuromuscular blocking agents kept in approved clinical areas will depend on the clinical use within the unit. The number of different neuromuscular blocking agents should be regularly reviewed and kept to a minimum.

4.4 Storage

Neuromuscular blocking agents should be segregated from other medicines and stored in their original packaging where possible. Where only a small number of doses are kept, storage must be in a labelled container. Where multiple types of neuromuscular blocking agents are held, labelled storage should clearly differentiate between agents to reduce the risk of selection error.

Warning labels must be applied to storage containers / shelving stating *Warning Paralysing Agent – Causes Respiratory Arrest. Mechanical Ventilator Assistance Required.*



NBAs are to be stored in their original packaging, or printed NBA storage bags if not used after removal from fridge.

4.4.1 Neuromuscular blocking agents removed from refrigeration

When neuromuscular blocking agents have been removed from the refrigerator for use, but not then used, the medicine must be clearly labelled with the new room temperature ‘use-by’ date. Do not return stock to the refrigerator. Staff should place the product into a printed NBA Storage Bag (which includes a warning label) and record the use-by date as advised on the Neuromuscular blocker storage chart, available here.

PLEASE NOTE: advice for amended expiry and storage conditions may change frequently as different brands and suppliers become available.

NOTE: the effective dates on the Neuromuscular blocker storage chart. Download an updated version each quarter (March, June, September, and December).

4.5 Administration

Once prepared, labelling must comply with the appropriate standards for anaesthesia and the National Standard for User-applied Labelling of Injectable Medicines, Fluids and Lines.

A second person check should be used prior to administration of NBAs, except where preparation and administration is completed by a medical officer (refer to recognised practice guidelines e.g., Australian and New Zealand College of Anaesthetists Guidelines for safe medication use).

Red coloured barrel/plunger syringes are to be used when drawing up neuromuscular blocking agents.

4.6 Medication Safety (Procurement)

Look-alike packaging, labelling and sound-alike medicine names have been identified as contributing factors to incidents involving NBAs. Selection of an NBA for formulary should be based on a practice of 'purchasing for safety', and not on cost alone.

A review of packaging and labelling should occur prior to any new additions to the formulary or brand changes. Manufacturers that provide NBAs with labelling that includes clear warning labels and/or that are significantly different from other NBA presentations should be preferred (to reduce look-alike packaging).

5. AUDIT

An audit of the compliance with the requirements of this procedure on wards/ clinical areas at SESLHD facilities will be conducted on an annual basis using the QARS audit tool. Results to be tabled at the facility Medication Safety Committee.

Medication incidents involving NBAs will be reviewed in the anaesthetic incident reporting system and IIMS+ and reviewed by the facility Medication Safety Committee.

6. REFERENCES

1. NSW Ministry of Health Policy Directive PD2022_032 - Medication Handling
2. NSW Ministry of Health Policy Directive PD2024_006 - High-Risk Medicines Management
3. Australian and New Zealand College of Anaesthetists (ANZCA). Guidelines on Sedation and/or Analgesia for Diagnostic and Interventional Medical, Dental or Surgical Procedures. 2014
4. Australian Injectable Drugs Handbook. The Society of Hospital Pharmacists of Australia 9th Edition. Accessed October 2023.
5. Australian and New Zealand College of Anaesthetists (ANZCA). Guidelines for the Safe Management and Use of Medications in Anaesthesia. 2021.
6. Australian Commission on Safety and Quality in Health Care. National standard for user-applied labelling of injectable medicines, fluids and lines. 2015.

7. VERSION AND APPROVAL HISTORY

Date	Version	Version and approval notes
1 May 2024	1.0	Replaces SSEH CLIN065, POWH CLIN114 & SGH CLIN586. Approved at SESLHD Drug and Therapeutics Committee and SESLHD Clinical and Quality Council.

Appendix A: Clinical areas approved to keep neuromuscular blocking agents

Prince of Wales Hospital	• All Operating Theatres (Randwick Campus Operating Suite and Recovery, Urology, Cardiothoracic and Endoscopy Suite) • Intensive Care Unit • Cardiothoracic Intensive Care Unit • Emergency Department • Medical Imaging Department (All areas) • Radiotherapy • Hyperbaric Unit • Coronary Care Unit (Suxamethonium only) • Nuclear Medicine • Echo Lab
St George Hospital	• Operating Theatres • Intensive Care Unit • Cardiac Catheter Lab • Emergency Department • SCN/1E (Emergency Trolley)
Sydney / Sydney Eye Hospital	• Operating Theatres • Emergency Department
The Sutherland Hospital	• Anaesthetics • Delivery Suite • Critical Care Medicine Unit (ICU) • Emergency Dept • Special Care Nursery
Royal Hospital for Women	• Newborn Care Centre • Operating Theatres • Close Observation Unit (in Emergency Resus Tray)

Neuromuscular Blocking Agents will also be available for rapid response e.g., 'Code Blue Drug Pack' used in emergencies.