health
Department:
Health
REPUBLIC OF SOUTH AFRICA

SOUTH AFRICAN ADULT HOSPITAL LEVEL ESSENTIAL MEDICINES LIST
CHAPTER 12: ANAESTHESIOLOGY AND INTENSIVE CARE
NEMLC RECOMMENDATIONS FOR MEDICINE AMENDMENTS (2017 -2019)

Medicine amendment recommendations, with supporting evidence and rationale are listed below. Kindly review the medicine amendments in the context of the chapter for anaesthesiology and intensive care.

SECTION	MEDICINE/MANAGEMENT	ADDED/DELETED/AMENDED
12.1 Premedication	Midazolam, IV	Dose amended
12.2.1 Intravenous induction (and/or maintenance) agents	Thiopental, IV	Contraindication added
12.2.2.1 Induction (inhalation agents)	Halothane, inhalation	Directions for use amended
	Sevoflurane, inhalation	Directions for use not amended
12.2.2.3 Maintenance (inhalation agents)	Isoflurane, inhalation	Retained
	Sevoflurane, inhalation	Not added
	Desflurane, inhalation	Not added
12.3.1 Depolarising muscle relaxants	Suxamethonium, IV	Directions for use amended
12.3.2 Non-depolarising muscle relaxants (NDMR)		
	Intermediate-acting neuromuscular-blocking agents	Added as a therapeutic class
	Cisatracurium	Retained as an example of class
	Vecuronium	Retained as an example of class
	Rocuronium	Added as a therapeutic alternative; Intubation dose amended from "0.6-.01 mg/kg" to "0.6-1.2 mg/kg"
	Atracarium	Added as a therapeutic alternative; Intubation dose amended from "01-0.2 mg/kg" to "0.3-0.6mg/kg"
12.3.4 Medicines to reverse muscle relaxation	Suggamadex, IV	Not added
12.4.1.2 Intravenous analgesics	Morphine, IV	Directions for use amended
	Ketamine, IV	Dose amended
	Paracetamol, IV	Not added
12.4.2 Postoperative pain in the recovery room	Fentanyl, IV	Retained
	Sufentanil, IV	Not added
	Diclofenac, IM	Directions for use amended
	Parecoxib, IV	Not added
	Lornoxicam, IV	Not added
12.4.3.1 Examples of ward prescriptions for postoperative analgesia according to anticipated pain severity	NSAIDs	Caution box added
	Diclofenac, IM	Directions for use amended
12.5.1 Crystalloids	Balanced solutions, IV	Added as a therapeutic class
	Ringer Lactate, IV	Listed as example of therapeutic class in STG
	Balsol, IV	Listed as an example of therapeutic class in therapeutic interchange database
	Plasmalyte B, IV	Listed as an example of therapeutic class in therapeutic interchange database
12.6.1 Malignant hyperthermia	Dantrolene, IV	Dose and directions for use amended
12.6.3 Anaesthetic-related	Ephedrine, IV	Directions for use amended

acute hypotension		
12.6.5.1 Prevention of PONV	Combination therapy	not added
	Droperidol, IM/IV	not added
	Ondansetron, IV/IM	Dose and directions for use amended
12.6.5.2 Treatment of PONV	Droperidol, IV	Not added
	Ondansetron, IV	Not added
- *If an anticholinergic agent or promethazine is not available:*	Diazepam, IV	Dose amended from "10 mg" to "5-10 mg".
12.7.1 Anticoagulants and spinal or epidural blocks	Table on timing of anticoagulants for neuraxial anaesthesia	Not amended
12.8 Epidural anaesthesia	Lidocaine 2% (preservative-free)	Deleted
12.9 Peripheral nerve block or wound infiltration	Ropivacaine, IV	Not added
12.13.1 Nutritional support	Multi-chamber bags	Guidance for short-term use at secondary level of care clarified

Note:

- Limited capacity and limited support from external stakeholders received for the review of this chapter during the 2017-2019 review cycle. Furthermore, a number of comments were received to consider medicines for inclusion on the EML, without submission of supporting motivations or evidence.
- Therefore, extensive medicine reviews are required to be developed for this chapter in the next review cycle – possibly in collaboration with external stakeholders.
- STGs relating to chronic pain management have been moved to the pain chapter.
- External comment received from a dietitian has been noted and a cross-reference to the NEMLC reviewed NDoH Parenteral Nutrition for Adults, 2017 Guidelines will be included in the text of the STG (the NDoH guideline provides guidance for secondary, tertiary and quaternary levels of care).

12.1 PREMEDICATION

Midazolam, IV: *dose amended*

Aligned with SAMF, 2016[1] and RCTs (low quality) in Cochrane review[2] that showed no difference in time to discharge from hospital, assessed by clinical criteria, in patients who received anxiolytic premedication versus placebo for day case surgery with significantly deeper sedation (pre-operatively and postoperatively) shown for midazolam vs. placebo. Doses ranged from 0.05 to 0.2 mg/kg IV, PO, IM or SL.

Level of Evidence: II Systematic review of RCTs of low quality, Guidelines

12.2.1 INTRAVENOUS INDUCTION (AND/OR MAINTENANCE) AGENTS

Thiopental, IV: *contraindication added*

Agent contraindicated in porphyria.

Level of Evidence: III Guidelines[3]

12.2.2.1 INDUCTION (INHALATION AGENTS)

Halothane, inhalation: *directions for use amended*

Sevoflurane, inhalation: *directions for use amended*

South African Society of Anaesthesiologists commented that dosing recommended are maximum vapouriser settings (4% and 8% for halothane and sevoflurane, respectively); and that agents should

[1] SAMF, 2016

[2] Walker, K.J. and A.F. Smith, *Premedication for anxiety in adult day surgery.* Cochrane Database Syst Rev, 2009(4): p. CD002192

[3] SAMF, 2016

preferably be titrated to effect, using end-tidal concentrations (if available) which reflect agent uptake to the brain.
Level of Evidence: III Expert opinion

12.2.2.3 MAINTENENACE (INHALATION AGENTS)

Isoflurane, inhalation: *retained*
Sevoflurane, inhalation: *not added*
Desflurane, inhalation: *not added*
South African Society of Anaesthesiologists commented that sevoflurane and desflurane be included in the secondary level EML for maintenance of anaesthesia. However, NEMLC had previously considered sevoflurane cost-prohibitive for the local secondary level setting[4] [5]. Desoflurane is also cost-prohibitive but may possibly be considered for teaching purposes. Desoflurane and sevoflurane has been shown to have a quicker recover time compared to isoflurane and sevoflurane is comparable to desflurane in day surgery discharge time[6], though desflurane is the most expensive[7].
Recommendation: Evidence review and costing analysis to determine affordability would be required to inform decision-making for consideration of using desflurane at academic institutions.
Level of Evidence: Expert opinion

12.3.1 DEPOLARISING MUSCLE RELAXANTS

Suxamethonium, IV: *directions for use amended*
Text of the STG was updated as follows for clarity purposes:

- Suxamethonium, IV, 1–1.5 mg/kg.
  - Onset 30–60 seconds.
  - Duration 5 minutes.
  - Repeated doses associated with bradycardia and prolonged neuromuscular block.
  - Contraindicated in patients at risk for developing suxamethonium-induced hyperkalaemia, e.g. upper or lower motor neuron defect, prolonged chemical denervation (ICU > 3 days), direct muscle trauma, tumour or inflammation, ~~thermal trauma~~ burns, disuse atrophy, severe infection, pre-existing hyperkalaemia.

Level of Evidence: III Standard of care

12.3.2 NON-DEPOLARISING MUSCLE RELAXANTS (NDMR)

Intermediate-acting neuromuscular-blocking agents: *added as a therapeutic class*
Cisatracurium: *retained as an example of class*
Vecuronium: *retained as an example of class*
Rocuronium: *added as a therapeutic alternative*
Atracurium: *added as a therapeutic alternative*

Availability of NMDRs are inconsistent due to supply shortages. However, the choice of NDMRs is largely dependent on the following parameters: **onset, duration of action, adverse reactions, metabolism and elimination and price[8].**

[4] National Department of Health, Essential Drugs Programme. Medicine review: Sevoflurane, 5 March 2015. http://health.gov.za/
[5] National Department of Health, Essential Drugs Programme. Cost analysis report for halothane versus sevoflurane for induction of anaesthesia in adults at hospital level, 10 September 2015. http://health.gov.za/
[6] Jindal R, Kumra VP, Narani KK, Sood J. Comparison of maintenance and emergence characteristics after desflurane or sevoflurane in outpatient anaesthesia. Indian J Anaesth. 2011 Jan;55(1):36-42. https://www.ncbi.nlm.nih.gov/pubmed/21431051
[7] SEP price of desflurane 250ml = R1980. 63 [Internet] [Accessed 1 December 2019] https://mpr.code4sa.org/
Contract price (RT300-2017): Sevoflurane 250ml= R792.48; Isoflurane 100ml= R162.47; 250ml= R234.60
[8] SAMF, 2016

A circular was previously disseminated, when there were supply challenges with cisatracurium and atracurium. The circular advised of the rational use of NMDRs; and where there is no clinical indication for the use of cisatracurium or atracurium, (e.g.: no renal or liver impairment) rocuronium or vecuronium (if available) is preferred[9].

The recommended therapeutic alternative for cisatracurium is atracurium. Atracurium is eliminated by Hoffman degradation and ester hydrolysis[10] and can therefore be safely used in renal or liver impairment; but significant histamine release is associated with cardiovascular effects. Cisatracurium provides greater cardiovascular stability as it lacks histamine-releasing effects. Although, the increased adverse events with atracurium was noted to be not clinically significant ($p < 0.05$) with significant lower cost per patient total dose ($p<0.01$)[11]. Atracurium and vecuronium are listed on the WHO EML list, 2017 edition.

Comparison of the intermediate-acting NDMRs[12]:

Medicine	Intubation dose (mg/kg)	Time to intubation (onset)	Elimination	Duration	Price
Atracurium	0.3–0.6 *(70kg:42mg)#*	3-5 min	Eliminated by Hoffman degradation; can be used in renal or liver impairment.	15-35 mins	25mg/2.5ml: R57.84** *(70kg:2 amps = R115.68)#*
Cisatracurium	0.1–0.15 *(70kg:10.5mg)#*	4-6 min	Eliminated by Hoffman degradation; can be used in renal or liver impairment.	45-55 mins	5mg/2.5ml: R33.51** *(70kg:R167.55)#*
Vecuronium	0.08–0.1 (70kg:7mg)#	3-4 min	Eliminated by liver and kidney; avoid in renal and liver impairment.	20-30 mins	4mg/2ml: R802.93** *(70kg:R1605.86)#*
Rocuronium	0.6-1.2 *(70kg:84mg)#*	1-2 min	Eliminated by liver and kidney; avoid in renal and liver impairment.	45-60 mins	50/5ml: R52.93*; R182.15** *(70kg: 2 amps = R105.86*; R364.30**)#*

* Contract circular: Hp06-2017SVP; ** SEP database, 12 December 2018; # Estimated dose and price for a 70 kg adult

Recommendation: The Adult Hospital Level Committee recommends that atracurium, cistracurium, vecuronium and rocuronium be included in the therapeutic class of intermediate-acting non-depolarising muscle relaxants.
Rationale: Availability of intermediate-acting NMDRs are inconsistent due to continuous supply shortages.
Level or Evidence: III Guidelines

12.3.4 MEDICINES TO REVERSE MUSCLE RELAXATION

Suggamadex, IV: *not added*
South African Society of Anaesthesiologists commented that suggamadex should be considered for addition (no evidence or motivation submitted).
Suggamadex is anticipated for consideration in unanticipated difficult airway as provides immediate reversal and prolonged repeated doses with post tetanic count prolonged.
Recommendation: Medicine review is required for suggamadex to be used at the respective level of care to inform decision-making for consideration for inclusion on the EML.

[9] NDoH: Affordable Medicines Directorate. Circular: Non-depolarising muscle relaxants, December 2016.
[10] Craig RG, Hunter JM. Neuromuscular blocking drugs and their antagonists in patients with organ disease. Anaesthesia 2009;64 Supp 1:55.
[11] Movafegh, A.et al. Cost analysis and safety comparison of Cisatracurium and Atracurium in patients undergoing general anesthesia .Eur Rev Med Pharmacol Sci .2013;17(N. 4):447-450
[12] SAMF, 2016; BNF, 2019

12.4.1.2 INTRAVENOUS ANALGESICS

Sufentanil, IV: *not added*
Fentanyl, IV: *retained*
The recommendation from the previous review cycle of the Adult Hospital Level STGS and EML was upheld - See below, the extract from the minutes of the Adult Hospital Level Committee meeting of 29 October 2015:

Sufentanil: The option of sufentanil was discussed. However, this agent has a longer duration of action than fentanyl, and most anaesthesiologists are more comfortable with the shorter acting agent. Sufentanil is also more expensive than fentanyl[13].

Morphine, IV: *directions for use amended*
Guidance provided to administer bolus doses of morphine at intervals of 5-10 minutes, aligned with SAMF 2016[14].
Level of Evidence: III Guidelines

Ketamine, IV: *dose amended*
Dosing was aligned with RCTs reviewed in two systematic reviews[15] [16], where dosing is dependent on surgery procedure. Cochrane review provides review provides evidence of efficacy of perioperative ketamine in providing effective analgesia, but does not conclude on optimal dosing.
Level of Evidence: III

Paracetamol, IV: *not added*
The South African Society of Anaesthesiology commented that IV paracetamol should be considered as it is the safest analgesic and avoids first pass metabolism, thus attaining far higher blood levels than oral (no evidence submitted).
In the previous review cycle, NEMLC considered the price of paracetamol, IV to be cost prohibitive (willingness to pay price was provided as R5.00). The IV formulation was considered to be comparable to oral paracetamol in terms of safety and efficacy.
Current medicine prices of paracetamol, IV and tablets are listed below (note that the price of the administration set has not been included):

Medicine	Contract circular price	SEP[17]
Paracetamol 500 mg tablets, 20's	R 2.863[18]	
Paracetamol, IV 1g (Fresenius Kabi)	R 10.83[19]	R163.19
Cetafuse, IV 1g®		R17.90
INtramol, IV 1g®		R23.25
Perfalgan, IV 1g®		R321.66
Paracetamol Biotech, IV 1g®		R17.82
Paraspen, IV 1g®		R163.19

Recommendation: Paracetmol, IV not be added to the hospital EML.
Review indicator: Price

[13] Prices from Contract circular HP06-2017SVP
- Fentanyl, 10 mcg (0.2ml) IV: R0.30 (using weighted average price for 0.05mg/ml 2ml amp = R2.982
- Sufentanil, 0.5 mcg (IV): R4.60 (0.5 mcg/2ml amp = R9.20)
[14] SAMF, 2016
[15] Brinck EC, Tiippana E, Heesen M, Bell RF, Straube S, Moore RA, Kontinen V. Perioperative intravenous ketamine for acute postoperative pain in adults. Cochrane Database Syst Rev. 2018 Dec 20;12:CD012033. https://www.ncbi.nlm.nih.gov/pubmed/30570761
[16] McNicol ED, Schumann R, Haroutounian S. A systematic review and meta-analysis of ketamine for the prevention of persistent post-surgical pain. Acta Anaesthesiol Scand. 2014 Nov;58(10):1199-213. http://www.ncbi.nlm.nih.gov/pubmed/25060512
[17] SEP Price [Internet] [Accessed 2 December 2019] https://mpr.code4sa.org/
[18] Contract circular RT289-2019
[19] Contract circular RT297-2019

12.4.2 POSTOPERATIVE PAIN IN THE RECOVERY ROOM

Diclofenac, IM: *directions for use amended*

External comment advising of Nicolau's syndrome associated with IM diclofenac. However, this is rare; but commentator's motivation for providing guidance to counsel patients of the potential for scarring, as amended, was considered and the following STG text was updated:

- Diclofenac, **deep IM**, 75 mg 12 hourly.
  - Administer for a maximum of 2 days.
  - Avoid the same injection site.
  - Counsel patient prior to injection of adverse events (scarring) at inject site, if applicable.

Level of Evidence: III Observational study[20]

NEMLC MEETING OF 5 DECEMBER 2019:

NEMLC recommended that the general description of the site of IM injection, in the "*upper outer quadrant of the buttocks*" not be included as random IM injection into the buttock risks damaging the sciatic nerve which may result in medicolegal implications. Thus, safe injection practice for IM injection to the upper outer quadrant of the buttock is required, appropriately identifying the safer injection site in the deltoid muscle for each patient (ventrogluteal or dorsogluteal sites) which is not in the scope of the STGs and EML.

Parecoxib, IV: *not added*

External comment received to consider parecoxib IV as an alternative to diclofenac IM as it has greater efficacy (no evidence submitted).

Lornoxicam, IV: *not added*

External comment received to consider lornoxicam, IV rather than parecoxib, IV as the latter contains sulphur, is more expensive and cannot be administered IM.

Recommendation: HTA be done/commissioned for parenteral NSAIDs for postoperative pain in the recovery room.

12.4.3.1 EXAMPLES OF WARD PRESCRIPTIONS FOR POSTOPERATIVE ANALGESIA ACCORDING TO ANTICIPATED PAIN SEVERITY

NSAIDs: *caution box added*

Aligned with chapter 13: Musculoskeletal conditions.

Diclofenac, IM: *directions for use amended*

Aligned with section 12.4.2 Postoperative pain in the recovery room.

12.5.1 CRYSTALLOIDS

Balanced solutions, IV: *added as a therapeutic class*
Ringer Lactate, IV: *listed as example of therapeutic class in STG*
Balsol, IV: *listed as an example of therapeutic class in therapeutic interchange database*
Plasmalyte B, IV: *listed as an example of therapeutic class in therapeutic interchange database*

Aligned to chapter 20: Emergencies and injuries[21], informed by the updated Ringer lactate review, September 2019[22].

[20] Tarloff D, Lamacraft G, Joubert G. The prevalence of skin scars in patients previously given intramuscular diclofenac injections attending the Pain Clinic at Universitas Academic Hospital, Bloemfontein, South Africa. S Afr Med J. 2017 Jan 30;107(2):101-105. https://www.ncbi.nlm.nih.gov/pubmed/28220730

[21] Minutes of the NEMLC meeting of 26 September 2019.

[22] National Department of Health: Affordable Medicines, EDP-Adult Hospital level. Medicine Review: Ringer Lactate for resuscitation in adults, updated review, August 2019. http://www.health.gov.za/

And, STG text updated to:

Balanced solutions may be appropriate in some patients (i.e. presentation with hyponatraemia, previous renal placement therapy):

- Balanced solution, e.g.:
- Ringers lactate, IV.

12.6.1 MALIGNANT HYPERTHERMIA

Dantrolene, IV: *dose and directions for use amended*

Amended, as dantrolene should be titrated to effect (reduction in muscle tone, cardiac and respiratory symptoms stabilise). Dose amended to dose used in standard clinical practice, based on old RCT evidence[23] [24] and 2010 observational study[25]. Use of higher doses is uncommon, and clinical experience warrants the diagnosis to be queried if a rapid response is not seen, though muscular males may require doses >10 mg/kg[26].

Level of Evidence: II RCTs of low quality, Observational study, Expert opinion

STG text amended from:

- ~~Dantrolene IV, 2 mg/kg as a single dose.~~
  - ~~Repeat doses until cardiac and respiratory symptoms stabilise.~~
  - ~~Up to 10 mg/kg may be required.~~

To

- Dantrolene IV, 2.5 mg/kg as a single dose (preferably through large bore cannula).
  - Reconstitute with 60 mL water for injection. For a 70 kg patient, 175 mg (9 vials) is required.
  - Administer subsequent doses to clinical effect (cardiac and respiratory symptoms stabilise, muscle tone and body temperature reduced).
  - Doses higher than 10 mg/kg is uncommon and the clinician should question the diagnosis.
  - Although, high doses of 10 mg/kg may be required in muscular males.

12.6.3 ANAESTHETIC-RELATED ACUTE HYPOTENSION

Ephedrine, IV: *directions for use amended*

STG text amended as flows based on standard clinical practice and expert opinion:

- Ephedrine IV, 3–5 mg as a single dose and then further boluses as required to a maximum of 30 mg.
  - Increases heart rate and contractility, and vasoconstrictor.
  - Repeated administration can result in tolerance and tachyphylaxis.
  - Alternative vasopressor infusion (e.g. adrenaline (epinephrine)) may be needed to mitigate unresponsiveness to treatment.

Level of Evidence: III Expert opinion

12.6.5.1 PREVENTION OF PONV

Combination therapy: *not added*

External comment from stakeholder received that recommendations should include a combination of prophylactic antiemetics ie: dexamenthasone with ondansetron.

Recommendation: Combination anti-emetic therapy for prevention of PONV to be reviewed in the

[23] Kolb ME, Horne ML, Martz R. Dantrolene in human malignant hyperthermia. Anesthesiology. 1982 Apr;56(4):254-62. https://www.ncbi.nlm.nih.gov/pubmed/7039419

[24] Flewellen EH, Nelson TE, Jones WP, Arens JF, Wagner DL. Dantrolene dose response in awake man: implications for management of malignant hyperthermia. Anesthesiology. 1983 Oct;59(4):275-80. https://www.ncbi.nlm.nih.gov/pubmed/6614536

[25] Larach MG, Brandom BW, Allen GC, Gronert GA, Lehman EB. Cardiac arrests and deaths associated with malignant hyperthermia in north america from 1987 to 2006: a report from the north American malignant hyperthermia registry of the malignant hyperthermia association of the United States. Anesthesiology. 2008 Apr;108(4):603-11. https://www.ncbi.nlm.nih.gov/pubmed/18362591

[26] Chapin et al. Medscape: Malignant Hyperthermia Treatment & Management, 28 November 2018. [Internet][Accessed 2 December 2019] https://emedicine.medscape.com/article/2231150-treatment#d11

next review cycle.

Droperidol, IM/IV: *not added*
External comment received to consider droperidol as it is a very effective anti-emetic (no evidence submitted).
Recommendation: For review in the next review cycle.

Ondansetron, IV/IM: *dose and directions for use amended*
Low quality RCT[27] suggests that ondansetron 8 mg is more effective than 4 mg in preventing vomiting (though comparable in reducing nausea) in patients undergoing general anaesthesia. Registered indication of PONV with dosing as a single dose of 4 mg given by intramuscular or slow intravenous injection at induction of anaesthesia[28] - intramuscular route of administration added.
Level of Evidence: III Disease oriented RCT, Guidelines

Guidance in STG updated to, *"4–8 mg slow IV/IM".*

12.6.5.2 TREATMENT OF PONV

Droperidol, IV: *not added*
External comment received to consider droperidol as it is a very effective anti-emetic (no evidence submitted).
Recommendation: For review in the next review cycle.

Ondansetron, IV: *not added*
External comment received to consider ondansetron, IV as it is a very effective anti-emetic (no evidence submitted).
Recommendation: For review in the next review cycle.

If an anticholinergic agent or promethazine is not available:
Diazepam, IV: *dose amended from "10 mg" to "5-10 mg".*
Standard of care.
Level of Evidence: III Expert opinion

12.7.1 ANTICOAGULANTS AND SPINAL OR EPIDURAL BLOCKS

The table on timing of anticoagulants in patients receiving neuraxial anaesthesia was amended in accordance with more recent American Society for Regional Anaesthesia, 2018 Guidelines[29].
However, due to the complex nature of management of patients on anticoagulants, the Committee recommended that specialists should be consulted for management.
And, the following STG text was added:

In order to encourage safe and quality care of patients, please consult a specialist prior to attempting blocks on patients on anticoagulants.
There are a range of oral anticoagulation, with each having specific recommendations with regard to neuraxial blocks.

[27] Zhang D, Shen Z, You J, Zhu X, Tang QF. Effect of ondansetron in preventing postoperative nausea and vomiting under different conditions of general anesthesia: a preliminary, randomized, controlled study. Ups J Med Sci. 2013 May;118(2):87-90. https://www.ncbi.nlm.nih.gov/pubmed/23441598
[28] SAMF, 2016
[29] Horlocker TT, Vandermeuelen E, Kopp SL, Gogarten W, Leffert LR, Benzon HT. Regional Anesthesia in the Patient Receiving Antithrombotic or Thrombolytic Therapy: American Society of Regional Anesthesia and Pain Medicine Evidence-Based Guidelines (Fourth Edition). Reg Anesth Pain Med. 2018 Apr;43(3):263-309. https://www.ncbi.nlm.nih.gov/pubmed/29561531

12.8 EPIDURAL ANAESTHESIA

Lidocaine 2% (preservative-free): *deleted*
Reported to not be commonly used in practice, as a test dose is required.
Level of Evidence: III Expert opinion

12.9 PERIPHERAL NERVE BLOCK OR WOUND INFILTRATION

Ropivacaine, IV: *not added*
External comment received to consider ropivacaine as an alternative to bupivacaine, as there is some suggestion of greater safety at equivalent doses, no evidence submitted.
Recommendation: For review in the next review cycle.

12.13.1 NUTRITIONAL SUPPORT

Multi-chamber bags: Guidance for short-term use at secondary level of care clarified, as per NEMLC's recommendation, below.
Level of Evidence: III Expert opinion

AT THE NEMLC MEETING OF 11 APRIL 2019, NEMLC RECOMMENDED THE FOLLOWING:
As the Adult Hospital Level STGs provides guidance for **short-term** nutritional care, the following statement was added to the STG: *"For short-term care, the current standard formulas in multi-chamber bags that have a long shelf-life are considered to provide adequate nutritional support. Clinicians should be aware of the possibility of clinically important hypovitaminosis in individual patients, and replace selected vitamins where appropriate".*

Report prepared by TD Leong: Secretariat to the Adult Hospital Level Committee (2017-2020)
- ***Note:*** *Information was sourced from NEMLC ratified minutes and NEMLC-approved documents.*