Critical Care Medication Administration for Adults Guideline

Contents

1. Purpose

To provide information on the prescribing and administration of common medications administered by intravenous (unless otherwise specified) access in critical care areas or as part of a medical emergency response. Use outside of these areas/clinical situations should be based on clinical appropriateness and availability of appropriate staffing/equipment in line with monitoring requirements of each medication. This information aims to support medical, nursing, midwifery, and pharmacy staff in safe medication use.

2. Guideline

This guideline is separated into sections:

- Section 1 contains quick reference links and brief Guideline information.
- Section 2 – **Medical Emergency Quick Reference Medication Guide (Adults)**, contains information relating to medications commonly administered in emergency situations (e.g. medical emergency response) and is applicable to **adult** patients.
  - For paediatric patients, refer to the Monash Children's Hospital Paediatric Emergency Medication Book [1] and the PCH Emergency Department Guidelines
  - For neonatal patients, refer to the Women and Newborn Health Service's (WNHS) Neonatal Medication Protocols, and the Newborn Emergency Transport Service's (NETS WA) Guidelines.
    - See Also: NETS WA Resuscitation and Intubation Calculator (Excel spreadsheet for download) and NETS NSW Clinical Calculator (web-based)
- Section 3 – **Critical Care Intravenous Infusion Guideline (Adults)**, contains information relating to medications commonly administered in critical care areas via infusion control devices (volumetric or syringe pump) and is applicable to **adult** patients.
  - For **paediatric** patients, refer to the Australian Medicines Handbook Children's Dosing Companion or PCH Medication Monographs
  - For infusion information previously obtained from the RFDS Clinical Manual Part 2 – Medication Infusion Guidelines, see Appendix C
  - For **neonatal** patients, refer to WNHS Neonatal Medication Protocols, or the Australasian Neonatal Medicines Formulary (ANMF)
- Section 4 contains standard Guideline and document control information.
- Appendix A: Initial Rate Calculation Table
- Appendix B: Weight-Based Infusion Calculation Guide
- Appendix C: Paediatric Medication Monograph Quick Links

2.1 Dose Error Reduction Software

This guideline is designed to complement the Dose Error Reduction Software (DERS) system on the B. Braun Space® family of infusion control devices and has accommodations for use of non-DERS enabled devices (e.g., BD Alaris family, BD BodyGuard family, and pre-rollout B. Braun Space family devices).

Applicable DERS programs can be found in the Comments column of Section 3. Some medications may require administration of 'top-up', or 'bolus' doses, doses of this nature are **NOT** to be administered from a hanging infusion bag unless the administration is programmed using the DERS system.

To ensure accurate medication/fluid delivery on DERS-enabled devices, a corresponding volume of fluid must be removed from the diluent container before adding any medications. This is necessary to facilitate the accurate administration of intravenous medications/fluids using the B. Braun infusion pumps and associated DERS Libraries.

Worked Example

To prepare an 80 mg/100 mL infusion of pantoprazole:
1. reconstitute two 40 mg pantoprazole vials with 10 mL sodium chloride 0.9% each
2. withdraw the required dose (80 mg) from the reconstituted vials (20 mL)
3. remove a corresponding volume (20 mL) from a 100 mL sodium chloride 0.9% minibag
4. add the required dose (80 mg/20 mL) to the sodium chloride 0.9% minibag for a final preparation of 80 mg/100 mL.

ATTENTION

The primary reference for administration of medication by parenteral access is the Australian Injectable Drugs Handbook (AIDH). Further information on compatible diluents and administration instructions can be sought from this reference.

All staff are required to work within their scope of practice appropriate to their level of training and job role description.

Specific information for management of envenomation and poisoning is not included in this guideline. Seek toxicology input and refer to Antidotes and Antivenom – Administration Guide

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2.2 Medical Emergency Quick Reference Guide (Adults)

Medicine	Dose	Volume/Preparation	Rate / Comment
adenosine *Resuscitation* ETS ✓	**IV:** 1st dose: 6 mg [2] 2nd dose: 12 mg [2] 3rd dose: 12 mg [2]	2 mL (undiluted) [2] 4 mL (undiluted) [2] 4 mL (undiluted) [2]	-Give over 2 seconds, followed immediately by a **RAPID** 20 mL sodium chloride 0.9% flush [3] -Wait 1 to 2 minutes between doses to assess effect and need for repeated dosing. [4] Pregnancy Category B2
adrenaline (epinephrine) *Resuscitation* VASOPRESSOR ETS ✓	**IV:** 1 mg [5]	1 mL (1:1,000) OR 10 mL (1:10,000)	-Give by **RAPID** IV push, followed by 20 mL flush if given via PIVC [3] **VF/Pulseless VT:** Give 1st dose just after second shock, then every 2nd CPR cycle thereafter [5] **Asystole/Pulseless Electrical Activity:** Give as initial treatment, then every 2nd CPR cycle thereafter [5] **-For infusion refer to Section 3** Pregnancy Category A
adrenaline (epinephrine) *Acute Hypotension* VASOPRESSOR ETS ✓	**IV:** 25 to 50 microg [6]	Draw up 10 mL of 1 mg/10 mL (1:10,000) ampoule to give 100 microg/mL [3] **OR** Dilute 1mL of 1 mg/1 mL (1:1,000) ampoule to 10 mL with sodium chloride 0.9% to give 100 microg/mL [3]	-Give 25 to 50 microg (0.25 to 0.5 mL) every 3 to 5 minutes to maintain target MAP [6] Pregnancy Category A
adrenaline (epinephrine) *ANAPHYLAXIS*	**IM:** 500 microg [7] (300 or 500 microg if using an auto-injector.) [7]	0.5 mL of 1 mg/mL (1:1,000) ampoule [7] **OR** Use a 300 microg or 500 microg auto-injector [7]	-Give into the outer mid-thigh. [7] If repeated doses required, inject into the opposite thigh. [3] Do not inject into gluteal sites. [3] -If using an auto-injector, follow manufacturer directions. Patients may self-administer auto-injectors in hospital. [8] **-For infusion refer to Section 3**
amiNOPHYLLine *LOAD*	**IV:** 6 mg/kg [9]	Undiluted [3]	-Give at a rate not faster than 1 mL/minute. A loading dose may not be required in all patients. [3] [9] -For use ONLY under express instruction of FACEM / ETS / Intensivist. **-For infusion refer to Section 3** Pregnancy Category (theophylline) A
amiODARONe *Resuscitation* ETS ✓	**IV:** 300 mg [5]	Dilute 2 x 150 mg/3 mL ampoules to 20 mL with **glucose 5%** [3] **OR** Give 6 mL (undiluted) immediately followed by at least 20 mL sodium chloride 0.9% [3] **DO NOT DILUTE WITH SODIUM CHLORIDE**	**Cardiac Arrest:** Give by IV push over 1 to 2 minutes [3] Consider additional 150 mg in 20 mL (after 5th shock) for recurrent/refractory VF or pulseless VT [2] **Tachyarrhythmias with Pulse:** **Unstable:** Give 300 mg in 100 mL (CVC) or 250 mL glucose 5% (PIVC) over 10 to 20 minutes. [2] **Stable:** Give 300 mg in 100 mL (CVC) or 250 mL glucose 5% (PIVC) over 20 to 60 minutes. [2] **-For infusion refer to Section 3** Pregnancy Category C
atropine *Resuscitation* ANTICHOLINERGIC AGENT ETS ✓	**IV:** 600 microg [2]	1 mL (undiluted) [2]	-Give by **RAPID** IV push over a few seconds [3] -Titrate to effect, **maximum** total dose is 3 mg (5 ampoules) [2] unless suspected or confirmed organophosphate poisoning (see eTG) [10] Pregnancy Category A

Medicine	Dose	Volume/Preparation	Rate / Comment
benzatropine *Acute Dystonic Reaction* ETS ☐	**IV / IM**: 1 to 2 mg [9]	1 to 2 mL (undiluted) [3]	-Onset of action is similar for the IM and IV route. [3] Pregnancy Category B2
calcium gluconate *Hyperkalaemia* *Hypermagnesaemia* ETS ✓	**IV:** 1 g (≡ 2.2 mmol calcium) [10] [11]	10 mL (undiluted) [11]	-Give over at least 5 minutes into a large vein [3] -May be given faster (maximum 10 mL/minute) in cardiac arrest. [3] -In hyperkalaemia, calcium is cardioprotective but **does not** lower serum potassium [11] Exempt from Pregnancy Categorisation
calcium gluconate *Hypocalcaemia* ETS ✓	**IV Bolus:** 2 g [10] (≡ 4.4 mmol calcium) **IV Infusion:** 10 g [10] (≡ 22 mmol calcium)	**Bolus:** 20 mL (undiluted) [3] **Infusion:** add to 900 mL sodium chloride 0.9% [3]	**Bolus:** Give slowly over 3 to 10 minutes, [3] [10] followed by: **Infusion:** Start at 1.1 mmol/hour (50 mL/hour) and titrate to maintain corrected serum total calcium of 2 to 2.3 mmol/L [10] Exempt from Pregnancy Categorisation
CLONazepam *Seizures* BENZODIAZEPINE S4R	**IV:** 1 mg [10]	Dilute to 2 mL with supplied diluent [3]	-Give over at least 2 minutes [3] -May cause thrombophlebitis if given into a small vein or at a faster rate. [3] Pregnancy Category B3
DIAzepam *Seizures* BENZODIAZEPINE S4R	**IV:** 10 mg [10]	2 mL (undiluted) [3]	-Give over at least 2 minutes into a LARGE vein. -Do not use the veins in the back of the hand or wrist [3] Pregnancy Category C
DIAzepam *Rapid Tranquilisation* BENZODIAZEPINE S4R	**IV**: 5 to 10 mg [10]	**IV**: Undiluted [3]	-Give at a maximum rate of 5 mg/minute [3], repeat dose every 3 to 4 minutes as required or until the patient is sedated but rousable [10] -Use the lower end of the dosage scale in elderly, frail or cachectic patients. -Seek specialist advice when considering rapid tranquilisation. [10] -Ensure antidotes (e.g., flumazenil / benzatropine) and resuscitation facilities are available before initiating rapid tranquilisation. [10] Pregnancy Category C
digoxin *Resuscitation*	**IV:** 250 to 500 micrograms [9]	Dilute with 4 times the volume sodium chloride 0.9% [3] *e.g. dilute 250 microg/1 mL with 4 mL sodium chloride 0.9%* [3]	-Give over at least 5 minutes [3] Pregnancy Category A
droperidol *Rapid Tranquilisation* ETS ✓	**IM**: 5 to 10 mg [10] **IV**: 2.5 to 10 mg [10] [4]	**IM**: Undiluted [3] **IV**: Undiluted [3]	-If required, repeat the dose once after at least 15 minutes. [10] -Ensure antidotes (e.g., flumazenil / benzatropine) and resuscitation facilities are available before initiating rapid tranquilisation. [10] **IV**: Give over at least 3 minutes [3] Pregnancy Category C

<table>
<tr><th>Medicine</th><th>Dose</th><th>Volume/Preparation</th><th>Rate / Comment</th></tr>
<tr><td rowspan="2">ergometrine
Post-partum Haemorrhage
ETS ✓</td><td>IM: 250 to 500 microg [12]</td><td>IM: Undiluted [3]</td><td>-This medication is stored in the fridge
-IM injection is preferred [3]
-Give IV over at least 1 minute [3]
-IV route is more likely to cause hypertension, nausea, and vomiting [12]
-For use in obstetric patients ONLY under express instruction of Consultant Obstetrician or MFM Service.

See also:
-WNHS Postpartum Complications
-WNHS Caesarean Birth
Pregnancy Category C</td></tr>
<tr><td>IV: 250 microg [12]</td><td>IV: Dilute to 5 mL with sodium chloride 0.9% [3]</td></tr>
<tr><td>fentanyl
Rapid Sequence Induction
OPIOID
ETS ✓
S8</td><td>IV: 1 to 3 microg/kg [6]</td><td>Undiluted [3]
OR
Dilute 100 microg to 10 mL with sodium chloride 0.9% to give 10 microg/mL [3]</td><td>-Give over 3 to 5 minutes [3]

-If using 10 microg/mL dilution:
-Give in 1 to 2 mL (10 to 20 microg) increments until desired sedation is achieved.
Pregnancy Category C</td></tr>
<tr><td rowspan="2">fentanyl
Analgesia
OPIOID
ETS ✓
S8</td><td>IntraVENOUS
15 to 30 microg [10]

Use 30 to 75 microg as an initial dose in patients who have not already received an IV opioid and are <70 years [10]</td><td>IV: Dilute100 microg ampoule to 10 mL with sodium chloride 0.9% to give 10 microg/mL [3]</td><td>-Give over 3 to 5 minutes. May be given more rapidly if appropriate monitoring and resuscitation facilities in place.
-Wait 5 minutes [10] before reassessing pain scores to guide repeated dosing.
-Reduce the dose by 50% and titrate slower in patients who are frail, cachectic, or ≥70 years [10]
Pregnancy Category C</td></tr>
<tr><td>IntraNASAL
<table><tr><th>Age (years)</th><th>Dose [10]</th></tr><tr><td>≤49</td><td>75 to 100 microg</td></tr><tr><td>50 to 75</td><td>50 to 75 microg</td></tr><tr><td>>75</td><td>25 to 50 microg</td></tr></table></td><td>Use 100 microg/2 mL ampoule (undiluted) [4]

Draw up an additional 0.1 mL to allow for priming the atomiser [4]</td><td>-Give in 0.3 mL [10] aliquots, alternating between nostrils to minimise swallowing and sneezing [4]
-Use the lower end of the dose range for cachectic or frail patients [10]</td></tr>
<tr><td>flumazenil
Benzodiazepine Overdose
BENZODIAZEPINE ANTAGONIST
ETS ✓</td><td>IV: 100 to 300 microg [4]</td><td>Undiluted [3]</td><td>-Give over 15 seconds [3]
-Repeat dose every minute until reversal of sedation is achieved [3]
-Titrate to effect, maximum total dose is 2 mg (4 ampoules) [4]
Pregnancy Category B3</td></tr>
<tr><td>glucose 50%
Acute Hypoglycaemia
ETS ✓</td><td>IV: 12.5 g [2]</td><td>25 mL (undiluted) [2]</td><td>-Give via CVC or large peripheral vein over 1 to 2 minutes. Repeat as necessary [2].
Exempt from Pregnancy Categorisation</td></tr>
<tr><td>haloperidol
(Serenace® only)
Rapid Tranquilisation</td><td>IM / IV: 0.5 to 10 mg [4]</td><td>IM / IV: Undiluted [3]</td><td>-Titrate to effect, if required, repeat the dose as often as every 30 minutes (IV) or 60 minutes (IM) [9]
-Inject over 3 to 5 minutes [3]
-Ensure antidotes (e.g., flumazenil / benzatropine) and resuscitation facilities are available before initiating rapid tranquilisation. [10]

Pregnancy Category C</td></tr>
</table>

Medicine	Dose	Volume/Preparation	Rate / Comment
hydrocortisone *Asthma* ETS ✓	**IV:** 200 mg [13] [14]	Reconstitute each 100 mg vial with 2 mL sodium chloride 0.9% or water for injections [3]	-Give 200 mg (4 mL) over 30 seconds to 5 minutes [3] [9] **NB:** Follow manufacturer instructions for use of Act-O-Vial® presentations Pregnancy Category A
hydrALAZINe *Hypertensive Emergency* *Pre-Eclampsia* *Eclampsia* ETS ✓	**IV / IM:** 5 to 10 mg [15] (5 mg if fetal compromise) [15]	**IM:** Reconstitute each 20 mg ampoule with 1 mL water for injections and administer the required dose undiluted [3] **IV:** Reconstitute each 20 mg ampoule with 1 mL water for injections then dilute to the required dose to 20 mL with sodium chloride 0.9% [16]	-Give IV over 3 to 5 minutes [3] -If necessary, repeat dose after 20 to 30 minutes if target BP is not achieved. [15] -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. Pregnancy Category C See also: -MR72E WACHS Pre-Eclampsia/Eclampsia Crisis Record -WNHS Hypertension in Pregnancy: Medical Management
insulin *Hyperkalaemia* ETS ✓	**IV:** 10 units (Actrapid®) [17]	50 mL (glucose 50%) [17]	-Add 10 units Actrapid® insulin to 50 mL glucose 50% and give over 15 minutes. -Subsequent glucose infusions (without insulin) may be required to stabilise BGL -Measure BGL 15 to 30 minutes after insulin treatment, then hourly for up to 6 hours (12 hours in renal impairment). BGL must be recorded on **MR 156A** [17] Exempt from Pregnancy Categorisation
ketamine *Rapid Sequence Induction* INDUCTION AGENT ETS ✓ S8	**IV:** 1 to 2 mg/kg [18] [6]	Dilute with an equal volume of sodium chloride 0.9% [9]	-Give over at least 1 minute [3] Pregnancy Category B3
ketamine *Conscious Sedation* INDUCTION AGENT ETS ✓ S8	**IV:** 0.25 to 0.5 mg/kg (initially) [10]	Dilute to 50 mg/mL [3]	-Give over at least 1 minute [3] -If necessary, give additional 0.25 mg/kg doses every 2 to 3 minutes until adequate sedation and analgesia is achieved. [10] -Do not exceed a total dose of 1 mg/kg [10] Pregnancy Category B3
labetalol *Hypertensive Emergency* *Pre-Eclampsia* *Eclampsia* ETS ☐	**IV:** 20 mg [19]	4 mL (undiluted) [19]	-Give over 2 minutes [3] -Monitor BP and HR every 5 to 10 minutes [3] -If necessary, repeat dose after 10 to 20 minutes to a maximum of 4 doses (80 mg) [19] -If BP is not controlled after 2 bolus doses, consider starting an IV infusion: See Section 3 – labetalol [19] -Extravasation may cause irritation and tissue damage [3] -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. See also: -MR72E WACHS Pre-Eclampsia/Eclampsia Crisis Record -WNHS Hypertension in Pregnancy: Medical Management Pregnancy Category C

Medicine	Dose	Volume/Preparation	Rate / Comment
levetiracetam *Seizures* ETS ✓	**IV:** 60 mg/kg (up to 4500 mg) [10]	Undiluted [3]	-Give over 5 minutes [3] Pregnancy Category B3
magnesium sulfate *Cardiac Arrest* ETS ✓	**IV:** 10 mmol magnesium [2] [20]	5 mL (undiluted) [2] [20]	-Give over 1 to 2 minutes [2] [20] and follow with infusion if required (see Section 3) Exempt from Pregnancy Categorisation
magnesium sulfate *Asthma* *Hypomagnesaemia* ETS ✓	**IV:** 10 mmol magnesium [10]	Dilute to 100 mL with sodium chloride 0.9% [10]	-For Asthma: Give over 20 minutes [10] -For Hypomagnesaemia: Give over 20 to 60 minutes [3] Exempt from Pregnancy Categorisation
magnesium sulfate *Torsades de Pointes* ETS ✓	**IV:** 5 mmol magnesium [21]	2.5 mL (undiluted) [3]	-Give over 10 minutes [21] Exempt from Pregnancy Categorisation
magnesium sulfate *Pre-Eclampsia* *Eclampsia*	Refer to Section 3 – magnesium sulfate		
mannitol 20% *Reduction of ICP* ETS ✓	**IV:** 0.25 g/kg (1.25 mL/kg) [9]	Undiluted (20%) [9]	-Give over 10 to 30 minutes [22] via CVC (preferred) or large peripheral vein [3] Exempt from Pregnancy Categorisation
mannitol 20% *Reduction of IOP* ETS ✓	**IV:** 1.5 to 2 g/kg (7.5 to 10 mL/kg) [9]	Undiluted (20%) [9]	-Give over 30 to 60 mins [3] [4] via CVC (preferred) or large peripheral vein [3] Exempt from Pregnancy Categorisation
Massive Transfusion Protocol	Availability of blood products varies between sites. **Non-pregnant adults:** WACHS Blood Management Policy (Appendix 4) **Pregnant patients:** WNHS Critical Bleeding Protocol		RFDS: 1800 625 800 FSH: (08) 6152 2222 SCGH: (08) 6457 3333 RPH: (08) 9224 2244 PCH: (08) 6456 2222 KEMH: (08) 6458 2222
metaraminol *Acute Hypotension* VASOPRESSOR ETS ✓	**IV:** 0.5 to 1 mg [23]	Dilute 10 mg up to 20 mL with sodium chloride 0.9% to give 0.5 mg/mL [3] **OR** Use pre-filled syringes	**Do not bolus entire syringe contents as a single dose** [3] -Give doses every 2 to 5 minutes according to response. If a cumulative dose of 10 mg is reached, consider transitioning to infusion [23] - See Section 3
metoprolol *Hypertensive Emergency* ETS ✓	**IV:** 1 to 2 mg [10]	Undiluted [3]	-Give over 1 min [9] [3] -Repeat every 1 minute as needed [9] [3] [10] Pregnancy Category C
metoprolol *Arrhythmia* ETS ✓	**IV:** 2.5 to 5 mg [10]	Undiluted [3]	-Give over 2 to 3 minutes [3] -Repeat every 5 minutes as needed [4] Pregnancy Category C

Medicine	Dose	Volume/Preparation	Rate / Comment
midazolam *Rapid Sequence Induction* BENZODIAZEPINE ETS ✓ S4R	**IV:** 1 to 2.5 mg [2]	Undiluted [3] **OR** Dilute up to 10 mL with sodium chloride 0.9% to facilitate slow injection [3]	-Give over at least 2 minutes to reduce risk of respiratory and/or cardiac arrest. [9] -Titrate to response and give subsequent doses (every 3 to 5 minutes) if required [2] -Check ampoule strength: Use the lowest concentration ampoule available Pregnancy Category C
midazolam *Seizures* BENZODIAZEPINE ETS ✓ S4R	**IM / BUCCAL / NASAL:** 5 to 10 mg [10] **IV:** 10 mg [10]	**IM / BUCCAL / NASAL:** 1 to 2 mL (undiluted) [3] **IV:** 10 mL (undiluted) [3]	-Check ampoule strength: **IM / BUCCAL / NASAL:** use 5 mg/1 mL [9] [3] -The plastic ampoules are preferred for BUCCAL / NASAL administration [3] **IV** use 5 mg/5 mL Give over at least 2 minutes Pregnancy Category C
midazolam *Rapid Tranquilisation* BENZODIAZEPINE ETS ✓ S4R	**IM**: 5 to 10 mg [10] **IV**: 2.5 to 5 mg [10]	**IM**: Undiluted [3] **IV**: Undiluted [3]	-Check ampoule strength: **IM**: use 5 mg/1 mL [9] [3] Wait at least 15 minutes before repeating the dose. [10] **IV**: use 5 mg/5 mL [3] Give over at least 2 minutes [3], repeat dose every 3 to 4 minutes as required or until the patient is sedated but rousable [10] -Ensure antidotes (e.g., flumazenil / benzatropine) and resuscitation facilities are available before initiating rapid tranquilisation. [10] Pregnancy Category C
morphine sulfate *Acute Pain* OPIOID ETS ✓ S8	**IV:** 1 to 2 mg (initially) [10] Use 2 to 5 mg in patients who have not already received an IV opioid and are <70 years [10]	Dilute to 1 mg/mL with sodium chloride 0.9% or water for injections. [3] e.g., Dilute 10 mg ampoule to 10 mL to give 1 mg/mL [3]	-Give slowly over 4 to 5 minutes -Wait 5 minutes and reassess patient before administering subsequent doses. Time to peak effect of each dose may be up to 15 minutes. [3] -Use lower doses and titrate slower in patients who are frail, cachectic, or ≥70 years [10] Pregnancy Category C
naloxone *Opioid Overdose* OPIOID ANTAGONIST ETS ✓	**IV:** 100 microg [9]	Dilute 400 microg/2 mL ampoule up to 8 mL with sodium chloride 0.9% to give 50 microg/mL [3]	-Give in 100 microg (2 mL) increments every 2 to 3 minutes. -Titrate to effect, **maximum** total dose is 10 mg (25 ampoules) [9] [6] Pregnancy Category B1
olanzapine *(Zyprexa IM® only)* *Rapid Tranquilisation*	**IM**: 5 to 10 mg [10]	Reconstitute vial with 2.1 mL water for injections to make a 5 mg/mL solution [3]	-Do not give within 1 hour of IM/IV benzodiazepines. [3,9] -Up to 30 mg/24 hours may be used under Psychiatrist advice [10] -Ensure antidotes (e.g., flumazenil / benzatropine) and resuscitation facilities are available before initiating rapid tranquilisation. [10] Pregnancy Category C
phenytoin *Seizures* ETS ✓	**IV:** 15 to 20 mg/kg [4]	Undiluted [3]	-Give at a maximum rate of 50 mg/minute (1 mL/minute) [3] -Give at a maximum rate of 25 mg/minute, and if necessary, further reduce to 5 to 10 mg/minute in elderly patients and those with comorbidities [3] Pregnancy Category D

Medicine	Dose	Volume/Preparation	Rate / Comment
phytomenadione (Vitamin K) *Warfarin Overdose* ETS ✓	**With no, or minor bleeding:** **INR 4.5 to 10:** **IV:** 0.5 to 1 mg [10] **INR >10:** **IV:** 3 to 5 mg [10] **Severe bleeding:** 5 to 10 mg [10]	Undiluted [3]	-Give over 30 seconds [3] Exempt from Pregnancy Categorisation
propOFol *Rapid Sequence Induction* INDUCTION AGENT ETS ☐ S4R	**IV:** 1.5 to 3 mg/kg [20]	Undiluted [3]	-Shake well before use [3] -Give slowly until desired sedation achieved. [3] Pregnancy Category C
rocuronium *Rapid Sequence Induction* PARALYSING AGENT ETS ☐	**IV:** 1 mg/kg IBW [2] [4]	Undiluted [3]	-Give over a few seconds [3] -Ensure patient is fully sedated before administering. -Flush pre- and post- administration with 10 to 20 mL sodium chloride 0.9% to prevent inadvertent re-paralysis. [3] Pregnancy Category B2
salbutamol *Asthma* ETS ✓	**IV Bolus:** 200 to 300 microg [9] **IV Infusion:** 5 mg [3]	**Bolus:** 0.4 to 0.6 mL (undiluted) [9] **Infusion:** 500 mL [3] sodium chloride 0.9%	-Check ampoule strength: USE 500 microg/1mL AMPOULE **Bolus**: Give over 1 minute, and repeat after 15 minutes if required, or start infusion [3] [9] Pregnancy Category A **Infusion:** Start at 5 microg/minute and titrate to response. -See Section 3 for infusion information.
salbutamol *Hyperkalaemia* ETS ✓	10 to 20 mg **nebulised** [11]	Undiluted [9]	**Nebulised** over 10 minutes [11] Pregnancy Category A
sodium bicarbonate 8.4% *Hyperkalaemia* ETS ✓	**IV:** 4.2 g (≡ 50 mmol sodium and 50 mmol bicarbonate) [11]	50 mL (undiluted) [11]	-Give into a large vein over 5 to 15 minutes. [11] -The undiluted solution is highly irritant [3] Exempt from Pregnancy Categorisation
sugammadex RELAXANT REVERSAL AGENT	**IV:** 16 mg/kg [9]	Undiluted [3]	-Give by **RAPID** injection over less than 10 seconds [3] -Suitable for reversal of rocuronium and vecuronium ONLY [9] Pregnancy Category B2
Suxamethonium *Rapid Sequence Induction* PARALYSING AGENT ETS ☐	**IV:** 1 to 2 mg/kg ABW [6]	Undiluted [3]	-Give over 10 to 30 seconds [3] -Ensure patient is fully sedated before administering. -Flush pre- and post- administration with 10 to 20 mL sodium chloride 0.9% to prevent inadvertent re-paralysis. [3] Pregnancy Category A

<table>
<tr><th>Medicine</th><th>Dose</th><th>Volume/Preparation</th><th>Rate / Comment</th></tr>
<tr><td>tenecteplase
Myocardial Infarction
Pulmonary Embolism
ETS ✓</td><td><table><tr><th>Patient Weight</th><th>IV Dose [9]</th></tr><tr><td><60 kg</td><td>30 mg/6 mL</td></tr><tr><td>60 to 69 kg</td><td>35 mg/7 mL</td></tr><tr><td>70 to 79 kg</td><td>40 mg/8 mL</td></tr><tr><td>80 to 89 kg</td><td>45 mg/9 mL</td></tr><tr><td>≥90 kg</td><td>50 mg/10 mL</td></tr></table></td><td rowspan="2">Reconstitute the vial(s) by slowly injecting the supplied diluent.
Once reconstituted, withdraw the required dose. [9]</td><td>-Give over 10 seconds. [3]
-Flush post administration with sodium chloride 0.9% to prevent precipitation in the line. [3]
-See MR172A WACHS Tenecteplase Checklist
Pregnancy Category C</td></tr>
<tr><td>tenecteplase
Acute Ischaemic Stroke
ETS ✓</td><td><table><tr><th>Patient Weight</th><th>IV Dose [24]</th></tr><tr><td><60 kg</td><td>15 mg/3 mL</td></tr><tr><td>60 to 69 kg</td><td>17.5 mg/3.5 mL</td></tr><tr><td>70 to 79 kg</td><td>20 mg/4 mL</td></tr><tr><td>80 to 89 kg</td><td>22.5 mg/4.5 mL</td></tr><tr><td>≥90 kg</td><td>25 mg/5 mL</td></tr></table></td><td>-Give over 5 seconds. [3]
-Flush post administration with sodium chloride 0.9% to prevent precipitation in the line. [3]
-See Protocol for Intravenous Thrombolysis in Acute Ischaemic Stroke
Pregnancy Category C</td></tr>
<tr><td>thiopental
Rapid Sequence Induction
INDUCTION AGENT</td><td>IV: 3 to 4 mg/kg [9]</td><td>Dilute 470 mg vial with 18.8 mL sodium chloride 0.9% to give 25 mg/mL [9]</td><td>-Give over 15 seconds and allow at least 20 to 40 seconds between doses to assess response [3]
Pregnancy Category A</td></tr>
<tr><td>tranexamic acid
ETS ✓</td><td>IV: 1 g [20] [6]</td><td>Undiluted [3]</td><td>-Give over a minimum of 10 minutes [3]
-Rapid administration may cause dizziness and hypotension [3]
-See Section 3 for infusion information.
Pregnancy Category B1</td></tr>
<tr><td>vecuronium
PARALYSING AGENT
ETS ☐</td><td>IV: 0.1 mg/kg IBW [9]</td><td>Reconstitute 10 mg vial with 5 mL water for injections to give 2 mg/mL [3]</td><td>-Give over a few seconds [3]
-Ensure patient is fully sedated before administering.
-Flush pre- and post- administration with 10 to 20 mL sodiumchloride 0.9% to prevent inadvertent re-paralysis. [3]
Pregnancy Category C</td></tr>
</table>

2.3 Critical Care Intravenous Infusion Guide (Adults)

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
acetylcysteine *Paracetamol Poisoning* CHECK INDICATION ETS ✓	**First infusion:** 200 mg/kg* **Second infusion⁺:** 100 mg/kg* *When used for paracetamol poisoning, the patient weight should be rounded **up** to the nearest 10 kg (capped at 110 kg) (3) ⁺In consultation with ETS or Toxicology, the second infusion may be dosed at 200 mg/kg (3)	**First infusion:** 500 mL (3) **Second infusion:** 1000 mL (3) ***Glucose 5%*** (9)	**First infusion**: 4 hours (3) **Second infusion:** 16 hours (3)	-The preferred diluent is glucose 5%, however, some brands may be compatible with sodium chloride 0.9% (3) Pregnancy Category B2 PathWest Paracetamol Poisoning Treatment Nomogram (Immediate Release Preparations Only) **DERS Entries:** acetylcysteine 1st dose acetylcysteine 2nd DS acetylcysteine 2nd SS

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
acetylcysteine *Acute Liver Failure* **CHECK INDICATION** **ETS ✓**	**First infusion:** 200 mg/kg [25] **Second infusion:** 100 mg/kg [25]	**First infusion:** 250 mL [25] **Second infusion:** 250 mL [25] ***Glucose 5%*** [3]	**First infusion:** 4 hours [25] **Second infusion:** 16 hours [25] -The second infusion may be repeated up to a total treatment duration of 72 hours [25]	

Medicine *Qualifier*	Amount in bag/syringe for initial therapy	Volume ***Preferred*** / *Alt. Diluent*	Time / Rate *Equivalent rate*	Comments
adrenaline (epinephrine) *ANAPHYLAXIS* **CHECK INDICATION** **VASOPRESSOR** **ETS ✓**	1 mg [7]	**Standard:** 1000 mL [7] **Low Volume:** 100 mL ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	Initially 0.1 microg/kg/min (use IBW [26]) then titrate to effect [7] *approx. 6 mL/kg/hour (standard)* *approx. 0.6 mL/kg/hour (low volume)*	-Continuous cardiac monitoring required. [3] -Extravasation may cause local ischaemia and necrosis. [3] Pregnancy Category A **DERS Entries:** adrenaline ANAPHYLAXIS adrenaline ANAPHYLAXIS LV
adrenaline (epinephrine) *CENTRAL* **CHECK ROUTE** **VASOPRESSOR** **ETS ✓**	6 mg *(via infusion pump)* [3]	100 mL *(via infusion pump)* [3] *Glucose 5%* [3]	Initially 0.05 microg/kg/min (use IBW [26]) then titrate to effect [27] *approx. 0.05 mL/kg/hour*	-Double and quadruple strength infusions are available in the DERS Library for patients with increased requirements. -May be given via larger peripheral vein in emergency situations while awaiting central access. [3] -Continuous cardiac monitoring required. [3] Pregnancy Category A -For patients being transferred or managed by RFDS, the preferred preparation is **3 mg in 50 mL *(via syringe driver).*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** adrenaline CENTRAL
	3 mg *(via syringe driver)* [3]	50 mL *(via syringe driver)* [3] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]		
adrenaline (epinephrine) *Peripheral* **CHECK ROUTE** **VASOPRESSOR** **ETS ✓**	3 mg [18]	500 mL [18] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	Initially 0.05 microg/kg/min (use IBW [26]) then titrate to effect [22] *approx. 0.5 mL/kg/hour*	-Suitable for initial infusions only, transition to central line for subsequent infusions. -Continuous cardiac monitoring required. [3] Pregnancy Category A -For patients being transferred or managed by RFDS, the preferred preparation is **3 mg in 500 mL *(via infusion pump).*** See: -Peripheral Vasopressor Infusion Guideline - Adults -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** adrenaline peripheral

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
alteplase *Myocardial Infarction* CHECK INDICATION HIGH RISK MEDICINE	**<65 kg:** 15 mg bolus, then 0.75 mg/kg (max. 50 mg) in **Step 1**, and 0.5 mg/kg (max. 35mg) in **Step 2** [9] The total infusion dose is 1.25 mg/kg **≥65 kg:** 15 mg bolus, then 50 mg in **Step 1**, and 35 mg in **Step 2** [9]	-Reconstitute vials as per manufacturer instructions. -Withdraw bolus dose from vial and administer. -Withdraw infusion dose from vial and add to 100 mL bag [9] then administer as per steps 1 and 2. ***Sodium chloride 0.9%*** [3]	**Bolus (manual push):** 1 to 2 minutes [9] **Step 1**: 30 minutes [9] **Step 2:** 60 minutes [9]	-The infusion dose should be administered immediately following the manual push. Pregnancy Category B1 **DERS Entries:** alteplase STEMI <65kg alteplase STEMI >=65kg -Ensure the weight used to calculate the dose is the weight entered on the infusion control device, if prompted. -This is a stepped program, and the B. Braun infusion pumps will change the rate automatically if the VTBI is set as 100 mL
alteplase *Ischaemic Stroke* CHECK INDICATION HIGH RISK MEDICINE	0.9 mg/kg (max. 90 mg) 10% as bolus, then remainder as infusion [9]	-Reconstitute vials as per manufacturer instructions. -Withdraw bolus dose from vial and administer. -Withdraw infusion dose from vial and add to 100 mL bag and administer. [9] ***Sodium chloride 0.9%*** [3]	**Bolus (manual push):** 1 to 2 minutes [9] **Infusion:** 60 minutes [9]	-The infusion dose should be administered immediately following the manual push. -Avoid thrombolytics, antiplatelet agents and anticoagulants for 24 hours post administration of alteplase for ischaemic stroke. [9] Pregnancy Category B1 See: -Protocol for Intravenous Thrombolysis in Acute Ischaemic Stroke **DERS Entries:** alteplase ischaemic stroke

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
alteplase *Pulmonary Embolism* **CHECK INDICATION** **HIGH RISK MEDICINE**	**<65 kg:** 10 mg bolus, then 1.5 mg/kg (max. 90 mg) as infusion [9] **≥65 kg:** 10 mg bolus, then 90 mg as infusion [9]	-Reconstitute vials as per manufacturer instructions. -Withdraw bolus dose from vial and administer. -Withdraw infusion dose from vial and add to 100 mL bag and administer. [9] ***Sodium chloride 0.9%*** [3]	**Bolus (manual push):** 1 to 2 minutes [9] **Infusion:** 2 hours [9]	-The infusion dose should be administered immediately following the manual push. -Heparin therapy can be initiated or resumed when aPTT values are less than double the upper limit of normal. [9] Pregnancy Category B1 **DERS Entries:** alteplase PE <65kg alteplase PE >=65kg
amiNOPHYLLine	**Loading dose:** 5 to 6 mg/kg [9] [4] A loading dose is not required in patients taking regular theophylline [9]	**Loading:** 50 mL *(via syringe driver)* [18] 500 mL *(via infusion pump)* [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Loading:** 30 minutes [3]	-For use ONLY under express instruction of FACEM / ETS / Intensivist. -Avoid extravasation [3] -amiNOPHYLLine 100 mg ≈ theophylline 80 mg [9] *Maintenance infusion rate ranges from 0.5 mg/kg/hour (liver dysfunction) to 1 mg/kg/hour (young adult smokers). In the absence of the above, the usual rate is 0.5 mg/kg/hour [9] Pregnancy Category (theophylline) A -For patients being transferred or managed by RFDS, the preferred preparation is **500 mg in 50 mL *(via syringe driver)*** or **500 mg in 500 mL *(via infusion pump).*** **DERS Entries:** amiNOPHYLLine LOAD amiNOPHYLLine maintenance -Ensure the weight used to calculate the dose is the weight entered on the infusion device.
	Maintenance: 500 mg [3]	**Maintenance:** 500 mL *(via infusion pump)* [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3] 50 mL *(via syringe driver)* [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Maintenance:** 0.5 mg/kg/hour* [3] *approx. 0.5 mL/kg/hour (via infusion pump)* [3] *approx. 0.05 mL/kg/hour (via syringe driver)* [3]	

Medicine *Qualifier*	Amount in bag/syringe for initial therapy	Volume ***Preferred*** / *Alt. Diluent*	Time / Rate *Equivalent rate*	Comments
amiODARONe *CENTRAL* ETS ✓	**Loading Dose:** 5 mg/kg (max. 300 mg) (9)	**Loading Dose:** 100 mL *(via infusion pump)* ***Glucose 5%*** (3)	**Loading:** 20 minutes (3)	-Use glucose 5% and rigid PVC or non-PVC containers ONLY (3) -Use low sorbing non-DEHP or PE-lined giving sets. (3) All B. Braun "Space®" giving sets are DEHP-free. -Continuous cardiac monitoring required. (3) -Pain, phlebitis, and necrosis are common if given via peripheral vein, central administration is preferred. (3) -Use central line if concentration >2 mg/mL (3) Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **600 mg in 50 mL (*via syringe driver)*** or **600 mg in 500 mL *(via infusion pump)*** **DERS Entries:** amiODARONe LOAD CENTRAL amiODARONe LOAD periph amiODARONe maint. CENTRAL amiODARONe maint. periph.
	Maintenance: 15 mg/kg (max. 1200 mg) 900 mg / 100 mL 1200 mg / 100 mL	**Maintenance:** 100 mL *(via infusion pump)* ***Glucose 5%*** (3)	**Maintenance:** 24 hours (3)	
amiODARONe *Peripheral* ETS ✓	**Loading Dose:** 5 mg/kg (max. 300 mg) (9)	**Loading Dose:** 250 mL *(via infusion pump)* (3) ***Glucose 5%*** (3) 50 mL *(via syringe driver)* (18) ***Glucose 5%*** (3)	**Loading:** 20 minutes (3)	
	Maintenance: 15 mg/kg (max. 1200 mg) (9) 900 mg / 500 mL 1200 mg / 500 mL	**Maintenance:** 500 mL *(via infusion pump)* (3) ***Glucose 5%*** (3)	**Maintenance:** 24 hours (3)	
argipressin *Diabetes Insipidus* VASOPRESSOR CHECK INDICATION	2 units (28) (27)	50 mL (28) (27) ***Glucose 5%*** (3) *Sodium chloride 0.9%* (3)	**Initially:** 0.2 units/hour (28) (27) *approx. 5 mL/hour* **Usual range:** 0.1 to 0.8 units/hour (28) (27) *approx. 2.5 to 20 mL/hour*	-Suitable for administration via peripheral line, however a central line is preferred. -Extravasation may cause tissue necrosis. (3) -Continuous cardiac monitoring required. (3) -Titrate in 0.2 mL increments to target urine output. (28) (27) **DERS Entries:** argipressin diab. insipidus
argipressin *Sepsis* *Vasopressor* VASOPRESSOR CHECK INDICATION	20 units (28) (27)	50 mL (28) (27) ***Glucose 5%*** (3) *Sodium chloride 0.9%* (3)	**Initially:** 0.02 units/min and titrate to target MAP (28) (27) *approx. 3 mL/hour* **Usual range:** 0.01 to 0.04 units/min (28) (27) *approx. 1.5 to 6 mL/hour*	-Suitable for administration via central access only. (3) -Extravasation may cause tissue necrosis. (3) -Continuous cardiac monitoring required. (3) See: -Peripheral Vasopressor Infusion Guideline - Adults -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** argipressin sepsis

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
calcium chloride **CHECK MEDICINE** **HIGH RISK MEDICINE**	**Intermittent Infusion:** 3.4 mmol calcium (5 mL of 10% solution) [10]	**Intermittent Infusion:** 100 mL [10] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Intermittent Infusion:** at least 20 minutes [10]	-Highly irritant. Extravasation can cause tissue necrosis. [3] -A central line is recommended, except in emergencies. [3] -Rapid administration may cause hot flushes, chalky taste, peripheral vasodilation, hypotension, bradycardia, cardiac arrhythmias, syncope, and cardiac arrest [3] **-Calcium gluconate is the preferred calcium salt** -For use in CRRT, refer to local policies. Exempt from Pregnancy Categorisation **DERS Entries:** calcium chloride intermittent calcium chloride continuous
	Continuous Infusion: 20.4 mmol calcium (30 mL of 10% solution) [10]	**Continuous Infusion:** 970 mL (to make 1 L) [10] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Continuous Infusion:** Initially 1.02 mmol/hour then titrate to target serum calcium [10] *approx. 50 mL/hour*	
calcium gluconate **CHECK MEDICINE** **HIGH RISK MEDICINE** **ETS ✓**	**Intermittent Infusion:** 2.2 mmol calcium (10 mL of 10% solution) 4.4 mmol calcium (20 mL of 10% solution) [10]	**Intermittent Infusion:** 100 mL [10] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Intermittent Infusion:** 30 minutes [10]	-Highly irritant. Extravasation can cause tissue necrosis. [3] -Rapid administration may cause hot flushes, chalky taste, peripheral vasodilation, hypotension, bradycardia, cardiac arrhythmias, syncope, and cardiac arrest [3] Exempt from Pregnancy Categorisation **DERS Entries:** calcium gluconate 2.2mmol calcium gluconate 4.4mmol calcium gluconate continuous calcium gluconate intermittent calcium gluconate LOAD P'Thy calcium gluconate maint. P'Thy
	Continuous Infusion: 22 mmol calcium (100 mL of 10% solution) [10]	**Continuous Infusion:** 900 mL (to make 1 L) [10] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Continuous Infusion:** Initially 1.1 mmol/hour then titrate to target serum calcium [10] *approx. 50 mL/hour*	

Medicine *Qualifier*	Amount in bag/syringe for initial therapy	Volume ***Preferred*** */ Alt. Diluent*	Time / Rate *Equivalent rate*	Comments
cisatracurium *Acute Respiratory Distress Syndrome (ARDS)* CHECK INDICATION PARALYSING AGENT HIGH RISK MEDICINE	**Loading Dose:** 0.15 mg/kg [9] **Maintenance Infusion:** 100 mg [3] 100 mg / 50 mL *(via syringe driver)*	**Loading Dose:** Undiluted [3] **Maintenance Infusion:** 50 mL *(undiluted, via syringe driver)* [3]	**Loading Dose:** Give rapidly over 5 to 10 seconds [3] **Maintenance Infusion:** 0.5 to 3 microg/kg/min (maximum 10 microg/kg/min) [9] *approx. 0.015 to 0.09 mL/kg/hour*	-Continuous monitoring required. -Ensure patient is fully sedated before administering. -Discard giving set and flush well after infusion to avoid re-paralysis during recovery. [3] -If required, dilute with sodium chloride 0.9% or glucose 5% [3] Pregnancy Category C See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** cisatracurium
cisatracurium *Adjunct to anaesthesia or sedation* CHECK INDICATION PARALYSING AGENT HIGH RISK MEDICINE	**Maintenance Infusion:** 100 mg	**Maintenance Infusion:** 50 mL *(undiluted, via syringe driver)* [3]	**Maintenance Infusion:** 0.5 to 10 microg/kg/min [9] *approx. 0.015 to 0.3 mL/kg/hour*	
clonidine *Sedation* CHECK INDICATION	**Continuous Infusion:** 1200 microg *(via infusion pump)* 600 microg *(via syringe driver)* [28]	**Continuous Infusion:** 100 mL *(via infusion pump)* 50 mL *(via syringe driver)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Continuous Infusion:** 0.2 to 2 microg/kg/hour [27] [28] *approx. 0.017 to 0.17 mL/kg/hour*	-Titrate to RASS. -Monitor BP and HR, Notify MO if SBP <90 mmHg and/or HR <60 bpm. [28] [27] -Sudden withdrawal of clonidine infusion may result in agitation, sweating and hypertension. Reduce dose gradually, rate of reduction will depend on duration of infusion. Pregnancy Category B3 See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** clonidine CONTINUOUS
clonidine *Hypertension* CHECK INDICATION	**Intermittent Infusion:** 150 to 300 microg [9]	**Intermittent Infusion:** 100 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Intermittent Infusion:** 10 to 15 minutes [3]	-A transient increase in BP of 5 to 10 mmHg lasting approximately 5 minutes may occur if administered too rapidly. [9] Monitor BP and HR [3] Pregnancy Category B3 **DERS Entries:** clonidine intermittent

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
dexmedetomidine	400 microg *(via infusion pump)* [9]	100 mL *(via infusion pump)* [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 0.2 microg/kg/hour then titrate to effect. [27] **Usual range:** 0.2 to 1 microg/kg/hour [3] **Maximum rate:** 1.5 microg/kg/hour [27] *approx. 0.05 mL/kg/hour*	**-DO NOT BOLUS** [27] -Cardiac monitoring required. [27] -Monitor BP and HR, Notify MO if SBP <90 mmHg and/or HR <60 bpm [27] Pregnancy Category B1 See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** dexmedetomidine
	200 microg *(via syringe driver)* [27]	50 mL *(via syringe driver)* [27] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]		

Medicine *Qualifier*	Amount in bag/syringe for initial therapy	Volume ***Preferred*** / *Alt. Diluent*	Time / Rate *Equivalent rate*	Comments
DOBUTamine hydrochloride *CENTRAL* **CHECK MEDICINE** **CHECK ROUTE** **VASOPRESSOR**	500 mg *(via infusion pump)* [3] [29]	100 mL *(via infusion pump)* [3] [29] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 2.5 to 5 microg/kg/min (use IBW [26]) then titrate to effect [3] [28] *approx.* *0.03 to 0.06 mL/kg/hour* **Usual range:** 2.5 to 10 microg/kg/min (use IBW) [3] *approx.* *0.03 to 0.12 mL/kg/hour* **Maximum rate:** 40 microg/kg/min [27]	-Continuous cardiac monitoring required [3] -Solution should be clear and colourless but may develop a pink hue that darkens over time. This does not affect potency. [29] -Contains sodium metabisulfite which may cause allergic reactions in susceptible people [3] Pregnancy Category B2 -For patients being transferred or managed by RFDS, the preferred preparation is **250 mg in 50 mL *(via syringe driver)*** or **250 mg in 500 mL *(via infusion pump).*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** DOBUTamine CENTRAL
	250 mg *(via syringe driver)* [3] [29]	50 mL *(via syringe driver)* [3] [29] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]		
DOBUTamine hydrochloride *Peripheral* **CHECK MEDICINE** **CHECK ROUTE** **VASOPRESSOR**	250 mg [28] [27]	250 mL [28] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 2.5 to 5 microg/kg/min (use IBW [26]) then titrate to effect [3] [28] *approx. 0.15 to 0.3 mL/kg/hour* **Usual range:** 2.5 to 10 microg/kg/min (use IBW) [3] *approx. 0.15 to 0.6 mL/kg/hour* **Maximum rate:** 40 microg/kg/min [27]	-Continuous cardiac monitoring required [3] -Solution should be clear and colourless but may develop a pink hue that darkens over time. This does not affect potency. [29] -Contains sodium metabisulfite which may cause allergic reactions in susceptible people [3] -May be administered via LARGE peripheral vein while awaiting placement of a central line. [3] -Extravasation causes tissue necrosis, monitor infusion site closely. [3] Pregnancy Category B2 -For patients being transferred or managed by RFDS, see *CENTRAL* entry above. See: -Peripheral Vasopressor Infusion Guideline - Adults -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** DOBUTamine peripheral

Medicine *Qualifier*	Amount in bag/syringe for initial therapy	Volume ***Preferred*** / *Alt. Diluent*	Time / Rate *Equivalent rate*	Comments
DOPamine *CENTRAL* CHECK MEDICINE CHECK ROUTE VASOPRESSOR	400 mg *(via infusion pump)* [27]	100 mL *(via infusion pump)* [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 2 to 5 microg/kg/min (use IBW [26]) then titrated to effect [3] [9] *approx.* *0.03 to 0.075 mL/kg/hour*	-Continuous cardiac monitoring required. [3] -Avoid extravasation. [9] -For peripheral administration, use at least an 18-gauge cannula sited in a brachial or cephalic vein at or above the elbow. [30] -Contains metabisulfite which may cause allergic reactions in susceptible people. [3] Pregnancy Category B3 -For patients being transferred or managed by RFDS, the preferred preparation is **200 mg in 50 mL *(via syringe driver)*** or **200 mg in 500 mL *(via infusion pump).*** See: -Peripheral Vasopressor Infusion Guideline - Adults -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** DOPamine CENTRAL DOPamine peripheral DOPamine peripheral Low Vol
	200 mg *(via syringe driver)* [18] [27]	50 mL *(via syringe driver)* [18] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]		
DOPamine *Peripheral* CHECK MEDICINE CHECK ROUTE VASOPRESSOR	200 mg [18] [27]	500 mL [18] [27] 250 mL (if fluid restricted) [18] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 2 to 5 microg/kg/min (use IBW [26]) then titrated to effect [3] [9] *approx. 0.3 to 0.75 mL/kg/hour (in 500 mL)* *approx.* *0.15 to 0.38 mL/kg/hour (in 250 mL)*	
esmolol	500 mg [27] [28]	50 mL (undiluted) [27] [28]	**Initially:** 500 microg/kg over 1 minute, [27] [28] followed by: **Usual rate:** 25 to 200 microg/kg/min [27] [28] **Maximum rate:** 200 microg/kg/min [3]	-Continuous cardiac monitoring required. [3] -Central line preferred but may be infused via large peripheral vein. [27] -Extravasation may cause tissue necrosis. [3] -Notify Pharmacy as soon as possible after commencement of infusion to ensure ongoing medication supply. [27] **DERS Entries:** esmolol
fentanyl *Sedation* CHECK INDICATION OPIOID HIGH RISK MEDICINE ETS ✓ SB	500 microg [28]	50 mL [28] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially**: 20 microg/hour then titrated to effect [28] *approx. 2 mL/hour*	-Titrate to RASS / pain relief. [27] Pregnancy Category C **DERS Entries:** fentanyl sedation

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
furosemide ETS ✓	500 mg [28] [27]	50 mL (undiluted) [3] [28] [27]	**Initially**: 20 mg/hour then titrate to target urine output [28] [27] *approx. 2 mL/hour* **Maximum rate:** 240 mg/hour (4 mg/min) [3] **Maximum dose:** 1000 mg/24 hours [9]	-Protect from light [3] -Monitor serum potassium [27] -Central administration preferred; peripheral administration may cause phlebitis [27] Pregnancy Category C **DERS Entries:** furosemide
glucose 50% ETS ✓	25 g (50 mL) [3]	50 mL (undiluted) [3]	Up to 0.5 g/kg/hour [3] *approx. 1 mL/kg/hour*	-Use central venous access or large peripheral vein. Avoid extravasation. [3] -Monitor hydration status – hypertonic glucose may cause dehydration. [3] -Faster rates may be used if given in combination with insulin for the management of hyperkalaemia. [3] Exempt from Pregnancy Categorisation **DERS Entries:** glucose hypertonic 50%
glyceryl trinitrate HYPOTENSIVE AGENT ETS ✓	50 mg [3]	100 mL *(via infusion pump)* [3] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3] 50 mL *(via syringe driver)* [3] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 25 microg/min then titrated to effect [9] *approx. 3 mL/hour (via infusion pump)* *approx. 1.5 mL/hour (via syringe driver)*	-Use non-PVC infusion bags/bottles and giving sets. [3] -Check blood pressure and heart rate every 2 to 3 minutes during titration. -Continuous cardiac monitoring may be required. [3] Pregnancy Category B2 -For patients being transferred or managed by RFDS, the preferred preparation is **50 mg in 50 mL *(via syringe driver)*** or **50 mg in 100 mL *(via infusion pump).*** See: -Specialised Medication – Intravenous Glyceryl Trinitrate in Critical Care Areas Guideline -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** glyceryl trinitrate

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
heparin **CHECK MEDICINE** **HIGH RISK MEDICINE** **ETS ✓**	25,000 units (31)	500 mL (31) ***Sodium chloride 0.9%*** (3) *Glucose 5%* (3)	Refer to nomogram on MR170C WA Anticoagulation Medication Chart (31)	-Refer to MR170C WA Anticoagulation Medication Chart for monitoring requirements. Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **25,000 units in 500 mL *(via infusion pump).*** **DERS Entries:** heparin
heparin *Low Volume Infusion* **CHECK MEDICINE** **HIGH RISK MEDICINE** **ETS ✓**	25,000 units (32)	50 mL (32) ***Sodium chloride 0.9%*** (3) *Glucose 5%* (3)	Refer to MR170C.1 Heparin Infusion Nomogram (Fluid Restricted Patients) (32) Place a line through the original nomogram on Page 3 of the WA Antocoagulation Medication Chart to indicate the MR170C.1 Heparin Infusion Nomogram is in use. (32)	**CAUTION**: Check infusion device programming carefully, incorrect programming may lead to 10-fold overdose and patient harm. -Refer to MR170C.1 Heparin Infusion Nomogram (Fluid Restricted Patients) for monitoring requirements. Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **25,000 units in 50 mL *(via syringe driver).*** **DERS Entries:** heparin low volume

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
hydrALAZINe *Hypertensive Emergency* *Pre-Eclampsia* *Eclampsia* **CHECK MEDICINE** **ETS ✓**	20 mg [3] *(via infusion pump)*	500 mL [3] *(via infusion pump)* ***Sodium chloride 0.9%*** [3]	**Initially:** 200 to 300 microg/min, reducing rate when adequate response achieved. [15] *approx. 300 to 450 mL/hour* **Usual range:** 50 to 150 microg/min [15] *approx. 75 to 225 mL/hour*	-Continuous BP, HR, and fetal monitoring required [15] -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. Pregnancy Category C -See also: -Magnesium Sulfate for Neuroprotection of the Fetus (KEMH) -Hypertension and Pregnancy (KEMH) -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** hydrALAZINe hydrALAZINe low volume
hydrALAZINe *Low Volume Infusion* *Hypertensive Emergency* *Pre-Eclampsia* *Eclampsia* **CHECK MEDICINE** **ETS ✓**	20 mg [3] *(via infusion pump)*	100 mL [3] *(via infusion pump)* ***Sodium chloride 0.9%*** [3]	**Initially:** 200 to 300 microg/min, reducing rate when adequate response achieved. [15] *approx. 60 to 90 mL/hour (via infusion pump)* *approx. 12 to 18 mL/hour (via syringe driver)* **Usual range:** 50 to 150 microg/min [15] *approx. 15 to 45 mL/hour (via infusion pump)* *approx. 3 to 9 mL/hour (via syringe driver)*	
	40 mg [3] *(via syringe driver)*	40 mL [3] *(via syringe driver)* ***Sodium chloride 0.9%*** [3]		

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
insulin *Diabetic Ketoacidosis* **CHECK INDICATION** **HIGH RISK MEDICINE** **ETS ✓**	50 units [22] [33] [34] [35] Use *Actrapid*® ONLY	50 mL [22] [33] [34] [35] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	Initially 0.1 units/kg/hour then titrate to effect. [22] [33] [34] [35] *approx. 0.1 mL/kg/hour*	-Refer to linked policy (below) and MR157B for monitoring requirements. -Following resolution of the DKA, the DERS program must be changed to **insulin: variable rate** Exempt from Pregnancy Categorisation -For patients being transferred or managed by RFDS, the preferred preparation is **50 units in 50 mL *(via syringe driver).*** See: -Adult Diabetic Ketoacidosis Guideline -MR157B WACHS Adult Diabetic Ketoacidosis (DKA) Treatment & Monitoring Chart **DERS Entries:** insulin: DKA
insulin *Hyperosmolar Hyperglycaemic State* **CHECK INDICATION** **HIGH RISK MEDICINE** **ETS ✓**	50 units [36] Use *Actrapid*® ONLY	50 mL [36] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	Initially 0.05 units/kg/hour then titrate to effect. [10] *approx. 0.05 mL/kg/hour*	-Monitor BGL at least every 2 hours. -Stop infusion, inform MO and increase monitoring to every 15 minutes if BGL <4 mmol/L [37] Exempt from Pregnancy Categorisation -For patients being transferred or managed by RFDS, the preferred preparation is **50 units in 50 mL *(via syringe driver).*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** insulin: HHS
insulin *Hyperkalaemia* **CHECK INDICATION** **HIGH RISK MEDICINE** **ETS ✓**	10 units [17] [38] Use *Actrapid*® ONLY	50 mL [17] [38] ***Glucose 50%*** [3]	15 minutes [17] [38]	-Monitor BGL prior to administration, 15 minutes post infusion, and then hourly for up to 6 hours (12 hours in renal impairment). [39] Exempt from Pregnancy Categorisation See: -Hyperkalaemia Guideline -MR176 Intravenous Fluid Treatment Chart **DERS Entries:** insulin: hyperkalaemia

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
insulin *Glycaemic Control* CHECK INDICATION HIGH RISK MEDICINE ETS ✓	50 units [3] Use *Actrapid*® ONLY	50 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	As per BGL: a *suggested* starting rate is 2 to 6 units/hour, however treatment must be individualised for each patient. [37] *approx. 2 to 6 mL/hour*	-Concurrent glucose infusion may also be required. Ensure insulin infusion is not administered unopposed. -Monitor BGL at least every 2 hours. -Stop infusion, inform MO and increase monitoring to every 15 minutes if BGL <4 mmol/L [37] Exempt from Pregnancy Categorisation -For patients being transferred or managed by RFDS, the preferred preparation is **50 units in 50 mL *(via syringe driver).*** See: -Diabetes – Inpatient Management Clinical Practice Standard -MR157A WACHS Insulin Infusion Order Chart **DERS Entries:** insulin: variable rate
insulin *High-dose Insulin Euglycaemia Therapy (HIET)* CHECK INDICATION HIGH RISK MEDICINE ETS ✓	500 units [3] Use *Actrapid*® ONLY **HIGH-DOSE INDICATION-SPECIFIC THERAPY (HIET-only)**	50 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 1 unit/kg/hour [10] *approx. 0.1 mL/kg/hour* Increase rate by 1 unit/kg/hour until adequate response achieved. [10] **Maximum rate:** 10 units/kg/hour [10]	-Only in consultation with FACEM / ETS / Clinical Toxicologist. -Concurrent glucose infusion required to maintain euglycaemia. Ensure insulin infusion is not administered unopposed. Exempt from Pregnancy Categorisation See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** insulin: HIET

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
isoprenaline *CENTRAL* **CHECK ROUTE** ETS ☐	6 mg [3]	100 mL *(via infusion pump)* [3] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 0.5 to 5 microg/min then titrate to effect [3] *approx. 0.5 to 5 mL/hour* **Usual range:** 2 to 10 microg/min [3] **Maximum rate:** Rates ≥30 microg/min have been used in advanced stages of shock [9]	-'CENTRAL' preparation can be given peripherally in emergency situations while waiting for placement of a central line. Use a large peripheral vein and a proximal site such as the anterior cubital fossa. [3] -Continuous cardiac monitoring required. [3] -If HR >110 beats per minute, consider reducing infusion rate or temporarily discontinuing the infusion. [9] Pregnancy Category A -For patients being transferred or managed by RFDS, the preferred preparation is **1 mg in 50 mL *(via syringe driver)*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** isoprenaline CENTRAL
	3 mg [3]	50 mL *(via syringe driver)* [3] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]		
isoprenaline *Peripheral* **CHECK ROUTE** ETS ☐	2 mg [9]	500 mL [9] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 0.5 to 5 microg/min then titrate to effect [3] *approx. 7.5 to 75 mL/hour* **Usual range:** 2 to 10 microg/min [3] **Maximum rate:** 20 microg/min [27]	-Continuous cardiac monitoring required. [3] -If HR >110 beats per minute, consider reducing infusion rate or temporarily discontinuing the infusion. [9] Pregnancy Category A -For patients being transferred or managed by RFDS, the preferred preparation is **1 mg in 500 mL *(via infusion pump).*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** isoprenaline peripheral

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
ketamine *Analgesia* CHECK INDICATION HIGH RISK MEDICINE ETS ✓ S8	**Infusion:** 200 mg [28]	100 mL *(via infusion pump)* [28] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 0.1 to 0.2 mg/kg/hour [28] and titrate to RASS and Pain Scores *Approx.0.05 to 0.1 mL/kg/hr (in 100 mL)*	Pregnancy Category B3 -For patients being transferred or managed by RFDS, the preferred preparation is **200 mg in 50 mL *(via syringe driver)*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** ketamine (mg/hr) ketamine (mg/kg/hr)
		50 mL *(via syringe driver)* [18] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	*Approx. 0.025 to 0.05 mL/kg/hr (in 50 mL)*	
ketamine *Sedation (Mechanically Ventilated Patients)* CHECK INDICATION INDUCTION AGENT HIGH RISK MEDICINE ETS ✓ S8	**Rapid Induction:** 1 to 2 mg/kg [6] [18]	Dilute with an equal volume of sodium chloride 0.9% [9]	At least 1 minute [3]	-Sedation score target to be annotated on order by FACEM / ETS / Intensivist. -Higher initial doses may be used under express instruction of FACEM / ETS / Intensivist. -Continuous oxygen monitoring required. -Doses **greater than 4 mg/kg/hour** must be run using the **"ZZ NO DERS ENTRY"** program on WACHS DERS-enabled devices. Pregnancy Category B3 -For patients being transferred or managed by RFDS, the preferred preparation is **200 mg in 50 mL *(via syringe driver)*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** ketamine (mg/kg/hr)
	Infusion: 200 mg [27] [28]	100 mL *(via infusion pump)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially** (Following load): 0.2 to 0.5 mg/kg/hour and titrate to RASS. [22] *Approx. 0.1 to 0.25 mL/kg/hour (in 100 mL)*	
		50 mL *(via syringe driver)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	*Approx. 0.05 to 0.125 mL/kg/hour (in 50 mL)*	

Medicine *Qualifier*	Amount in bag/syringe for initial therapy	Volume ***Preferred*** / *Alt. Diluent*	Time / Rate *Equivalent rate*	Comments
ketamine *Sedation (Acute Behavioural Disturbance Requiring Aeromedical Retrieval)* CHECK INDICATION INDUCTION AGENT HIGH RISK MEDICINE ETS ✓ S8	**Bolus:** 1 to 1.5 mg/kg [40]	Dilute with an equal volume of sodium chloride 0.9% [9]	At least 1 minute [3]	-Initiation of infusion must be in consultation with APTC / ETS / receiving hospital via the "Team Time Out" process for behavioural agitation. [40] -Doses **greater than 4 mg/kg/hour** must be run using the **"ZZ NO DERS ENTRY"** program on WACHS DERS-enabled devices. Pregnancy Category B3 -For patients being transferred or managed by RFDS, the preferred preparation is **200 mg in 50 mL *(via syringe driver)*** See: -MR12A WACHS Sedation Assessment Tool (SAT) -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** ketamine (mg/kg/hr)
	Infusion: 200 mg [27] [28]	100 mL *(via infusion pump)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially**: 1 to 2 mg/kg/hour and titrate to SAT score of -2. [40] [41] [42] *Approx. 0.5 mL/kg/hour (in 100 mL)*	
		50 mL *(via syringe driver)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	*Approx. 0.25 mL/kg/hour (in 50 mL)*	
ketamine *Refractory Asthma requiring Delayed Sequence Intubation* CHECK INDICATION INDUCTION AGENT HIGH RISK MEDICINE ETS ✓ S8	**Bolus / Delayed Sequence Intubation:** 2 mg/kg [43] [44]	Dilute with an equal volume of sodium chloride 0.9% [3]	At least 1 minute [3]	-For use ONLY under express instruction of FACEM / ETS / Intensivist. -Doses **greater than 4 mg/kg/hour** must be run using the **"ZZ NO DERS ENTRY"** program on WACHS DERS-enabled devices. Pregnancy Category B3 -For patients being transferred or managed by RFDS, the preferred preparation is **200 mg in 50 mL *(via syringe driver)*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** ketamine (mg/kg/hr)
	Infusion: 200 mg [28] [27]	100 mL *(via infusion pump)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially** (following load): 1 to 4 mg/kg/hour and titrate to RASS. [44] [45] [43] *Approx. 0.5 to 2 mL/kg/hour (in 100 mL)*	
		50 mL *(via syringe driver)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	*Approx. 0.25 to 1 mL/kg/hour (in 50 mL)* **Usual Range:** 0.5 to 2 mg/kg/hour [44] [46] *Approx. 0.25 to 1 mL/kg/hour (in 100 mL)* *Approx. 0.125 to 0.5 mL/kg/hour (in 50 mL)*	

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
labetalol *CENTRAL*	200 mg [19]	40 mL (undiluted) [3] *(via syringe driver)*	**Initially:** 20 mg/hour, then titrate to effect, adjusting rate at 15 to 30 minute intervals [19] *approx. 4 mL/hour* **Maximum rate:** 160 mg/hour [19] **Maximum dose:** 300 mg/24 hours (including any bolus doses given) [19]	-Continuous cardiac monitoring required. [3] -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. Pregnancy Category C -See also: -Magnesium Sulfate for Neuroprotection of the Fetus (KEMH) -Hypertension in Pregnancy: Magnesium Anticonvulsant Therapy (KEMH) -MR170V WACHS Variable Rate Medication Chart (or approved local variant) -MR72E WACHS Pre-Eclampsia/Eclampsia Crisis Record **DERS Entries:** labetalol CENTRAL
labetalol *Peripheral*	200 mg [19]	100 mL [19] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 20 mg/hour, then titrate to effect, adjusting rate at 15 to 30 minute intervals [19] *approx. 10 mL/hour* **Maximum rate:** 160 mg/hour [19] **Maximum dose:** 300 mg/24 hours (including any bolus doses given) [19]	-Continuous cardiac monitoring required. [3] -Ensure volume of addition (40 mL) is removed from infusion bag before adding medication. [19] -Monitor closely for extravasation [3] -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. Pregnancy Category C -See also: -Magnesium Sulfate for Neuroprotection of the Fetus (KEMH) -Hypertension in Pregnancy: Magnesium Anticonvulsant Therapy (KEMH) -MR170V WACHS Variable Rate Medication Chart (or approved local variant) -MR72E WACHS Pre-Eclampsia/Eclampsia Crisis Record **DERS Entries:** labetalol peripheral

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
levetiracetam ETS ✓	**Maintenance:** 250 to 1,500 mg [9]	100 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	15 minutes [3]	-For patients at risk of cerebral oedema, avoid glucose solutions if possible. Excessive glucose can exacerbate cerebral oedema and may worsen brain injury in stroke patients. [3] Pregnancy Category B3 **DERS Entries:** levetiracetam levetiracetam 500 mg levetiracetam 1000 mg levetiracetam 1500 mg
levosimendan (SAS)	12.5 mg [47]	250 mL [47] ***Glucose 5%*** [3]	**Initially:** 0.05 microg/kg/min, increasing to 0.1 microg/kg/min after 60 minutes (if tolerated) [47] **Usual range:** 0.05 to 2 microg/kg/min [47] *approx. 0.06 mL/kg/hour*	-A peripheral line can be used if necessary while waiting for placement of a central line. [3] -Loading doses are not typically administered due to hypotension. [47] -Dose changes take 30 to 60 minutes to take effect. [3] -Use actual body weight up to 120 kg [47] -Continuous cardiac monitoring required. Continue ECG, BP, and HR monitoring for at least 3 days after stopping the infusion or until patient is stable. [3] -This medicine is available via the Special Access Scheme (SAS), prescriber to complete online Category A form as per local procedure to obtain and document supply. Exempt from Pregnancy Categorisation (SAS) See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) -SAS and AP Scheme Portal **DERS Entries:** levosimendan (SAS) maint.

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
lidocaine (lignocaine) *Arrhythmia* **LOCAL ANAESTHETIC** **ETS ✓**	2000 mg [27] [28]	500 mL [27] [28] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**1st hour:** 4 mg/min (*approx. 60 mL/hour)* [10] **2nd hour:** 3 mg/min (*approx. 45 mL/hour)* [27] [28] **3rd hour:** 2 mg/min (*approx. 30 mL/hour)* [27] [28] **4th hour onwards (maintenance):** 1 mg/min (*approx. 15 mL/hour)* [27] [28]	-Continuous cardiac monitoring required. [3] Pregnancy Category A -For patients being transferred or managed by RFDS, the preferred preparation is **2000 mg in 500 mL *(via infusion pump).*** See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** lidocaine: arrhythmia
lidocaine (lignocaine) *Pain* **LOCAL ANAESTHETIC** **ETS ✓**	400 mg [3]	100 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	1 to 2 mg/kg/hour [48] *approx. 0.25 to 0.5 mL/kg/hour*	-For use under the direction of an Acute Pain Service ONLY. [3] -Continuous cardiac monitoring required. [48] Pregnancy Category A **DERS Entries:** lidocaine: pain

Medicine *Qualifier*	Amount in bag/syringe for initial therapy	Volume ***Preferred*** */ Alt. Diluent*	Time / Rate *Equivalent rate*	Comments
magnesium sulfate **PRE-MIXED BAG** *Neuroprotection of the Fetus* *Pre-Eclampsia* *Eclampsia* CHECK INDICATION CHECK MEDICINE HIGH RISK MEDICINE ETS ☐	32 mmol (≈8 g) magnesium [49] [50]	100 mL (pre-mixed bag) [49] [50]	**Loading dose:** 16 mmol (≈4 g) over 20 minutes *approx. 150 mL/hour* [49] [50] **Maintenance infusion:** 4 mmol/hour (≈1 g/hour) *approx. 12.5 mL/hour* [49] [50] **Further seizures:** 8 to 16 mmol (≈2 to 4 g) over 5 to 10 minutes approx. 300 mL/hour (*pre-mixed bag)* [49] [50] **Note:** Use Programmed Bolus function	Exempt from Pregnancy Categorisation -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. -See also: -Magnesium Sulfate for Neuroprotection of the Fetus (KEMH) -Hypertension in Pregnancy: Magnesium Anticonvulsant Therapy (KEMH) -MR72E WACHS Pre-Eclampsia/Eclampsia Crisis Record -32 mmol magnesium ≈ 8 g magnesium [3] **DERS Entries:** mag. sulf. eclamp. (g) mad. sulf. Eclamp. (mmol)
magnesium sulfate **40 mmol/120 mL bags** *Neuroprotection of the Fetus* *Pre-Eclampsia* *Eclampsia* CHECK INDICATION CHECK MEDICINE HIGH RISK MEDICINE ETS ✓	40 mmol (≈10 g) magnesium [49] [50] (20 mL of 2.47 g/5 mL solution) Add 4 ampoules (20 mL) of 2.47 g/5 mL magnesium sulfate to a 100 mL minibag. **DO NOT REMOVE VOLUME FROM BAG BEFORE ADDING MAGNESIUM**	120 mL [49] [50] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Loading dose (1st bag):** 16 mmol (≈4 g) over 20 minutes [49] [50] *approx. 150 mL/hour* **Maintenance infusion (2nd bag):** 4 mmol/hour (≈1 g/hour) [49] [50] *approx. 12.5 mL/hour* **Further seizures:** 8 to 16 mmol (≈2 to 4 g) over 5 to 10 minutes [49] [50] *approx. 300 mL/hour* **NB:** Use Programmed Bolus function	Exempt from Pregnancy Categorisation -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. -See also: -Magnesium Sulfate for Neuroprotection of the Fetus (KEMH) -Hypertension in Pregnancy: Magnesium Anticonvulsant Therapy (KEMH) -MR72E WACHS Pre-Eclampsia/Eclampsia Crisis Record -40 mmol magnesium ≈ 10 g magnesium [3] **DERS Entries:** mag. sulf. eclamp. (g) mag. sulf. Eclamp. (mmol)

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
magnesium sulfate *Torsades de Pointes* *VF/Pulseless VT* *Cardiac Arrest* **CHECK INDICATION** **HIGH RISK MEDICINE** **ETS ✓**	20 mmol magnesium [5]	100 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	4 hours [5] **Maximum rate:** 0.6 mmol magnesium per minute [3]	-**For bolus information refer to Section 2** Exempt from Pregnancy Categorisation **DERS Entries:** magnesium sulfate
magnesium sulfate *Refractory Asthma* **CHECK INDICATION** **HIGH RISK MEDICINE** **ETS ✓**	10 mmol magnesium [10]	100 mL [10] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	20 minutes [10]	Exempt from Pregnancy Categorisation **DERS Entries:** magnesium sulfate RAPID
metaraminol **VASOPRESSOR** **ETS ✓**	20 mg [23]	40 mL *(via syringe driver)* [23] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Titrate to target MAP** [23] **Usual range:** 0.5 to 10 mg/hour [23] *approx. 1 to 20 mL/hour*	-Continuous cardiac monitoring required. [3] -A central line is preferred, but a large peripheral vein may be used if necessary. [3] -Extravasation may cause tissue necrosis. [3] -Contains metabisulfite, which may cause allergic reactions in susceptible people. [3] -noradrenaline (norepinephrine) is preferred for ongoing vasopressor support. [23] -Bolus doses of 0.5 to 1 mg every 2 to 5 minutes may be administered using Programmed Bolus Function as required for transient hypotension or while establishing infusions of other vasopressors [23] Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **20 mg in 40 mL *(via syringe driver).*** See: -Peripheral Vasopressor Infusion Guideline - Adults -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** metaraminol

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
midazolam *Sedation* **BENZODIAZEPINE** **HIGH RISK MEDICINE** **ETS ✓** **S4R**	50 mg (single strength) [27] [28] 100 mg (double strength) [27] [28]	50 mL [27] [28] ***Glucose 5%*** *[3]* *Sodium chloride 0.9%* *[3]*	**Initially:** 2 mg/hour, then titrate to RASS [27] [28] *approx. 2 mL/hour (single strength)* *approx. 1 mL/hour (double strength)* **Usual range:** 0 to 10 mg/hour *approx. 0 to 10 mL/hour (single strength)* *approx. 0 to 5 mL/hour (double strength)*	-Midazolam infusion is not recommended in patients that are not ventilated except on FACEM / ETS / Intensivist order. [27] [28] Pregnancy Category C **DERS Entries:** midazolam
milrinone	20 mg *(via infusion pump)* [3] [51]	100 mL *(via infusion pump)* [3] [51] ***Glucose 5%*** *[3] [51]* *Sodium chloride 0.9%* *[3]*	**Initially:** 0.1 microg/kg/min [51], then titrate in accordance with haemodynamic and clinical response with dose adjustments every 2 to 4 hours. *approx. 0.03 mL/kg/hour* **Usual range:** 0.125 to 0.35 microg/kg/min *approx.* *0.04 to 0.105 mL/kg/hour* **Maximum rate:** 0.75 microg/kg/min [51] *approx. 0.225 mL/kg/hour* **Maximum dose:** 1.13 mg/kg/24 hours [9]	-Loading doses are not typically administered, due to hypotension [51] -A peripheral line can be used if necessary while waiting for placement of a central line. Use a large peripheral vein and monitor closely for extravasation. [3] -Continuous cardiac monitoring required. [3] -Use ABW up to 120kg, then use AdjBW for dose calculations [51] Pregnancy Category B3 **DERS Entries:** milrinone LOAD milrinone maintenance
	10 mg *(via syringe driver)* [3] [51]	50 mL *(via syringe driver)* [3] [51] ***Glucose 5%*** *[3] [51]* *Sodium chloride 0.9%* *[3]*		

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
morphine **OPIOID** **HIGH RISK MEDICINE** **ETS ✓** S8	50 mg (single strength) [27] [28] 100 mg (double strength) [27] [28]	50 mL [27] [28] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 0.02 to 0.04 mg/kg/hour, then titrate to pain relief / RASS [27] *approx.* *0.02 to 0.04 mL/kg/hour (single strength)* *approx.* *0.01 to 0.02 mL/kg/hour (double strength)* **Usual range:** 0.5 to 10 mg/hour [27] *approx. 0.5 to 10 mL/hour (single strength)* *approx. 0.25 to 5 mL/hour (double strength)*	-Doses >5 mg/hour not recommended in patients that are not ventilated except on FACEM / ETS / Intensivist order. -Continuous SpO_2 monitoring required. [28] -Morphine sulfate and morphine hydrochloride contain approximately equal amounts of morphine base per milligram [9] See: -Intravenous Opioid Administration Policy Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **30 mg in 30 mL *(via syringe driver).*** **DERS Entries:** morphine
morphine + midazolam **BENZODIAZEPINE** **OPIOID** **HIGH RISK MEDICINE** **ETS ✓** S4R S8	**morphine: 50 mg** **midazolam: 50 mg** [18]	500 mL *(via infusion pump)* [18] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3] 50 mL *(via syringe driver)* [18] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 0.02 to 0.08 mg/kg/hour, then titrate to pain relief / RASS [18] approx. 0.2 *to* 0.8 mL/kg/hour (in 500 mL) *approx.* *0.02 to 0.08 mL/kg/hour (in 50 mL)*	Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **30 mg + 30 mg in 30 mL *(via syringe driver)*** or **50 mg + 50 mg in 500 mL *(via infusion pump).*** **DERS Entries:** morphine + midazolam
naloxone hydrochloride **OPIOID ANTAGONIST** **ETS ✓**	**Standard infusion:** 2 mg [3] **If high naloxone requirements:** 10 mg [27]	100 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** Start at two thirds of the total effective bolus dose per hour then titrate to GCS / RR [10] **Usual range:** 100 to 400 microg/hour [27] *approx. 5 to 20 mL/hour (2 mg infusion)* *approx. 1 to 4 mL/hour (10 mg infusion)*	-E.g., if 300 microg required to achieve initial response, commence infusion at 200 microg/hour. Target RR > 8 to 10 [27] Pregnancy Category B1 **DERS Entries:** naloxone

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
nimodipine	10 mg (undiluted) [3]	50 mL (undiluted) [3] **Co-Infusion via Y-site:** *Glucose 5% OR* *Sodium chloride 0.9%* [3]	**Patients ≥70 kg AND stable BP** **Initially (1st and 2nd hour):** 1 mg/hour for 2 hours [3] *approx. 5 mL/hour* **3rd hour onwards (if tolerated):** 2 mg/hour [3] *approx. 10 mL/hour* **Patients <70 kg OR unstable BP** **Initially (1st and 2nd hour):** 0.5 mg/hour for 2 hours [3] *approx. 2.5 mL/hour* **3rd hour onwards (if tolerated):** 2 mg/hour [3] *approx. 10 mL/hour*	-Co-infusion of compatible fluid required via Y-site or 3-way stopcock at 4 times the rate of the niMODIPine infusion [3] -Light sensitive, use UV-Protect Amber PVC-Free line. [3] -A peripheral line can be used if necessary while waiting for placement of a central line. Use a large peripheral vein and monitor closely for extravasation. [3] -Monitor BP. [3] Pregnancy Category C **DERS Entries:** niMODIPine

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
noradrenaline (norepinephrine) *CENTRAL* **VASOPRESSOR** **CHECK ROUTE** **ETS ✓**	8 mg *(via infusion pump)* [28] [27]	100 mL *(via infusion pump)* [28] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 0.05 microg/kg/min (use IBW [26]) then titrate to MAP and/or CPP [27] *approx. 0.038 mL/kg/hour* **Usual range:** 0.01 to 0.5 microg/kg/min [27] *approx.* *0.008 to 0.38 mL/kg/hour*	**DO NOT BOLUS** -Continuous cardiac monitoring required. [3] -Double and quadruple strength infusions are available in the DERS Library for patients with increased requirements. -Contains sodium metabisulfite, which may cause allergic reactions in susceptible people. [3] Pregnancy Category B3 [9] -For patients being transferred or managed by RFDS, the preferred preparation is **4 mg in 50 mL *(via syringe driver).*** **DERS Entries:** noradrenaline CENTRAL
	4 mg *(via syringe driver)* [28] [27]	50 mL *(via syringe driver)* [28] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]		
noradrenaline (norepinephrine) *Peripheral* **VASOPRESSOR** **CHECK ROUTE** **ETS ✓**	4 mg [28] [27]	500 mL [28] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 0.05 microg/kg/min (use IBW [26]) then titrate to MAP and/or CPP [27] *approx. 0.38 mL/kg/hour* **Usual range:** 0.01 to 0.5 microg/kg/min [27] *approx. 0.075 to 3.75 mL/kg/hour*	**DO NOT BOLUS** -Continuous cardiac monitoring required. [3] -Contains sodium metabisulfite, which may cause allergic reactions in susceptible people. [3] -Use a large peripheral vein and a proximal site such as the anterior cubital fossa. [3] -Extravasation can cause tissue necrosis. -If this occurs, refer to Peripheral Vasopressor Infusion Guideline - Adults Pregnancy Category B3 -For patients being transferred or managed by RFDS, the preferred preparation is **4 mg in 500 mL *(via infusion pump).*** **DERS Entries:** noradrenaline peripheral

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
octreotide **CHECK MEDICINE**	500 microg [28] [27]	500 mL [28] [27] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Bolus Dose:** 25 to 50 microg in 10 mL sodium chloride 0.9% over 3 to 5 minutes **Ensure bolus dose administered before preparing infusion.** **Infusion:** 25 to 50 microg/hour [10] *25 to 50 mL/hour (in 500 mL)* *5 to 10 mL/hour (in 100 mL)*	-Multiple formulations and strengths available. Check product. -May cause hyper- or hypoglycaemia, BGL monitoring may be required. [3] -Sodium chloride 0.9% is the preferred diluent for most indications as octreotide inhibits the release of insulin and affects blood glucose regulation. [3] Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **100 microg in 50 mL *(via syringe driver)*** or **500 microg in 500 mL *(via infusion pump).*** **DERS Entries:** octreotide: variceal bleeding
octreotide *Low Volume Infusion* **CHECK MEDICINE**	500 microg [28] [27]	100 mL [28] [27] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]		
oxytocin *Post-Partum Haemorrhage* **CHECK MEDICINE** **ETS ✓**	40 units [52] **PRE-MIXED BAG:** 43.9 units	500 mL [52] ***Sodium chloride 0.9%*** [3] **PRE-MIXED BAG:** 549 mL	**Prophylactic:** 125 mL/hour (10 units/hour) [52], and if necessary increase to: **Therapeutic:** 250 mL/hour (20 units/hour) [52] **Maximum rate:** 250 mL/hour (20 units/hour) [52]	-If postpartum blood loss >500 mL due to atony, start at **therapeutic rate**. [52] -Refer to guidelines for stopping and weaning criteria. -For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician, MFM Service or MOETS. -Compatible with glucose 5% but not recommended as a diluent as it increases the risk of water intoxication. [3] -See: -Primary Postpartum Haemorrhage Guideline -MR72A WACHS Primary Post Partum Haemorrhage Record -WNHS Postpartum Complications **DERS Entries:** oxytocin: PPH oxytocin: PPH low volume
oxytocin *Low Volume Infusion* *Post-Partum Haemorrhage* **CHECK MEDICINE** **ETS ✓**	40 units [52]	50 mL [52] ***Sodium chloride 0.9%*** [3]	**Prophylactic:** 12.5 mL/hour (10 units/hour), and if necessary increase to: **Therapeutic:** 25 mL/hour (20 units/hour) [52] **Maximum rate:** 25 mL/hour (20 units/hour) [52]	

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
pantoprazole *Upper Gastrointestinal Bleed* **ETS ✓**	**Loading dose:** 80 mg [10] **Maintenance infusion:** 80 mg [3] **OR** 200 mg [3]	**Loading dose:** 100 mL [10] **Maintenance infusion:** 100 mL [3] **OR** 250 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Loading dose:** 15 to 30 minutes [3] **Maintenance infusion:** 8 mg/hour [10] *approx. 10 mL/hour*	Pregnancy Category B3 -For patients being transferred or managed by RFDS, the preferred preparation is **40 mg in 50 mL *(via syringe driver)*** or **40 mg in 100 mL *(via infusion pump).*** **DERS Entries:** pantoprazole UGIB contin. pantoprazole UGIB intermit.
phenylephrine **VASOPRESSOR**	20 mg *(via infusion pump)* [28] [27] 10 mg *(via syringe driver)* [28] [27]	100 mL *(via infusion pump)* [28] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3] 50 mL *(via syringe driver)* [28] [27] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 0.5 microg/kg/min (use IBW [26]), then titrate to MAP [27] *approx. 0.15 mL/hour* **Usual range:** 0.5 to 6 microg/kg/min [28] [27] *0.15 to 1.8 mL/kg/hour*	-Continuous BP monitoring required [3] See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) Pregnancy Category B2 **DERS Entries:** phenylephrine

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
potassium CHLORIDE *CENTRAL* **CHECK ROUTE** **CHECK MEDICINE** **HIGH RISK MEDICINE**	50 mmol potassium 40 mmol potassium (premixed bag)	50 mL (undiluted) 100 mL (premixed bag)	Titrate to potassium level. **Usual range:** 10 to 20 mmol/hour [27] **Maximum rate:** 20 mmol/hour [53] Rates greater than 20 mmol/hour are potentially hazardous and are not permitted. [53]	-Pre-mixed potassium infusion bags are to be used for all intravenous potassium administration when possible. -Under exceptional circumstances, the prescription and preparation of a non-standard solution of potassium is permitted after consultation with the **most senior** medical practitioner available. The name of the most senior medical practitioner must be documented on the medication chart order. [53] -Ensure admixture is thoroughly mixed to avoid a large potassium bolus. Fully invert the bag/syringe AT LEAST ten times before administering. [54] -Undiluted potassium solutions may ONLY be administered in Critical Care Areas with appropriate monitoring. -Continuous ECG monitoring required when rate >10 mmol/hour. [3] -Do not add potassium to hanging IV bags. -Never administer potassium via gravity. [54] See: -Potassium Supplementation Policy -Adult Diabetic Ketoacidosis Guideline Exempt from Pregnancy Categorisation **DERS Entries:** potassium chl. 10mmol/100mL potassium chl. 20mmol/L potassium chl. 30mmol/L + CSL potassium chl. 40mmol/100mL potassium chl. 40mmol/L potassium chl. non-standard potassium chlor. MOLAR
potassium CHLORIDE *Peripheral* **CHECK ROUTE** **CHECK MEDICINE** **HIGH RISK MEDICINE** **ETS ✓**	10 mmol potassium (pre-mixed bag) 20 mmol potassium 40 mmol potassium (pre-mixed bag) ***Maximum concentration for peripheral administration (except 10 mmol/100 mL pre-mixed bags) is 40 mmol/L (potassium)*** [3]	100 mL (pre-mixed bag) 1000 mL (pre-mixed bag) 1000 mL (pre-mixed bag) *Multiple diluents available – check bag matches prescription*	10 mmol/hour [3] **Maximum rate:** 10 mmol/hour [3] Up to 20 mmol/hour may be administered peripherally when treating DKA as per the Adult Diabetic Ketoacidosis Guideline	

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
potassium DIHYDROGEN PHOSPHATE *CENTRAL* **CHECK ROUTE** **CHECK MEDICINE** **HIGH RISK MEDICINE**	10 mmol phosphate [3] 40 mmol phosphate [9] ***Contains 1 mmol potassium per 1 mmol phosphate.***	100 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	2 to 6 hours [3] **Maximum rate:** 10 mmol/hour [3] Slower infusion rates are preferred to avoid phosphate intoxication [9] and improve patient response	-Under exceptional circumstances, the prescription and preparation of a non-standard solution of potassium is permitted after consultation with the **most senior** medical practitioner available. The name of the most senior medical practitioner must be documented on the medication chart order. [53] -Ensure admixture is thoroughly mixed to avoid a large potassium bolus. Fully invert the bag/syringe AT LEAST ten times before administering. [3]
potassium DIHYDROGEN PHOSPHATE *Peripheral* **CHECK ROUTE** **CHECK MEDICINE** **HIGH RISK MEDICINE**	10 mmol phosphate [3] 20 mmol phosphate [3] 40 mmol phosphate [3] ***Contains 1 mmol potassium per 1 mmol phosphate. Maximum concentration for peripheral administration is 40 mmol/L (phosphate)*** [3]	250 mL (pre-mixed bag) [3] 500 mL [3] 1000 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	2 to 6 hours [3] Slower infusion rates are preferred to avoid phosphate intoxication [9] and improve patient response	-Continuous ECG monitoring required when rate >10 mmol/hour. [3] -Do not add potassium to hanging IV bags. -Never administer potassium via gravity. [3] See: -Potassium Supplementation Policy -Specialised Medication – Intravenous Phosphate Supplementation in Adults Guideline Exempt from Pregnancy Categorisation See also: sodium DIHYDROGEN PHOSPHATE **DERS Entries:** potassium dihy. phos. CENTR potassium dihy. phos. periph.

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
propOFol *Sedation in Intensive Care* **INDUCTION AGENT** **HIGH RISK MEDICINE** ETS ☐ S4R	200 mg [9] 500 mg [9] 1000 mg [9]	20 mL (undiluted) [9] 50 mL (undiluted) [9] 100 mL (undiluted) [9]	**Usual range:** 1 to 3 mg/kg/hour [27] *approx. 0.1 to 0.3 mL/kg/hour* **Maximum rate:** 4 mg/kg/hour [27] *approx. 0.4 mL/kg/hour*	-Contraindicated in patients with allergies to soya, peanut, or egg lecithin. [3] -Continuous cardiorespiratory monitoring required. Resuscitation facilities must be available. [3] -If used for ≥72 hours, monitor CK twice weekly to check for propOFol-related infusion syndrome (PRIS). [27] -Each 1 mL propOFol (1%) provides 0.1 g lipid (1.1 kcal) [9] -Remove line at end of infusion to avoid inadvertent re-sedation. [3] Pregnancy Category C See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** propOFol (mg/kg/hr) propOFol (mL/hr)
propOFol *Maintenance of General Anaesthesia* **INDUCTION AGENT** **HIGH RISK MEDICINE** ETS ☐ S4R	200 mg [9] 500 mg [9] 1000 mg [9]	20 mL (undiluted) [9] 50 mL (undiluted) [9] 100 mL (undiluted) [9]	**Use of Target-Controlled Infusion (TCI) modes on enabled devices is preferred.** **If not using TCI, usual range:** 4 to 12 mg/kg/hour [9] *approx. 0.4 to 1.2 mL/kg/hour* Available on: BD Alaris™ PK/Alaris™ PK Plus B. Braun Infusomat® Space B. Braun Perfusor® Space	-TCI modes should only be used by clinicians familiar with the process and relevant devices. -Marsh [55] and Schnider [56] [57] TCI models are available on both Alaris™ and B. Braun devices. Pregnancy Category C **DERS Entries:** TCI Propofol

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
salbutamol *Tocolysis* **CHECK INDICATION** **ETS ✓**	5 mg [58]	100 mL [58] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 10 microg/min then increase by 3.3 microg/min every 30 minutes. [58] *approx. 12 mL/hour, increasing by 4 mL/hour every 30 minutes.* **DERS Hard Limit:** 30 microg/min [58] *approx. 36 mL/hour* Rates greater than 30 microg/minute (36 mL/hour) may ONLY be used under express instruction of a consultant obstetrician. This requires deactivation of the DERS Medication Library.	-For use in **obstetric patients** ONLY under express instruction of Consultant Obstetrician or MFM Service. -Do not use beyond 37 weeks' gestation. -Do not use in combination with nifedipine. -Reduce infusion rate if maternal heartrate ≥120 beats per minute. -Cease infusion if maternal respiratory rate ≥30 breaths per minute. See: -Preterm Labour Policy -Imminent Unplanned Birth at a Non-Birthing Site Policy -WNHS Preterm Labour Clinical Practice Guideline -Quick Reference Resource: Working Outside the DERS Medication Library Pregnancy Category A -For patients being transferred or managed by RFDS, the preferred preparation is **2.5 mg in 50 mL *(via syringe driver)*** or **5 mg in 100 mL *(via infusion pump).*** **DERS Entries:** salbutamol obstetric

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
salbutamol *Asthma* *Bronchospasm* **CHECK INDICATION** **ETS ✓**	5 mg [3]	500 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 5 microg/min then titrate to effect. [9] *approx. 30 mL/hour* **Usual range:** 5 to 20 microg/min [27] *approx. 30 to 120 mL/hour* **DERS Hard Limit:** 45 microg/minute *approx. 270 mL/hour*	-Titrate to avoid tachycardia [27] -Monitor potassium and cardiorespiratory function [27] -Do not reduce rate by more than 5 to 10 mL/hr every hour. [27] Pregnancy Category A -For patients being transferred or managed by RFDS, see *"Low Volume"* entries below. **DERS Entries:** salbutamol
salbutamol *Low Volume Infusion* *Asthma* *Bronchospasm* **CHECK INDICATION** **ETS ✓**	10 mg *(via infusion pump)* [18]	100 mL *(via infusion pump)* [18] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 5 microg/min [9] *approx. 3 mL/hour* **Usual range:** 5 to 20 microg/min [9] *approx. 3 to 12 mL/hour* **DERS Hard Limit:** 45 microg/min *approx. 27 mL/hour*	-Titrate to avoid tachycardia [27] -Monitor potassium and cardiorespiratory function [27] -Do not reduce rate by more than 0.5 to 1 mL/hr every hour. [27] Pregnancy Category A -For patients being transferred or managed by RFDS, the preferred preparation is **5 mg in 50 mL *(via syringe driver)*** or **10 mg in 100 mL *(via infusion pump).*** **DERS Entries:** salbutamol low volume
	5 mg *(via syringe driver)* [18]	50 mL *(via syringe driver)* [18] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]		

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
sodium bicarbonate 8.4% *CENTRAL* **CHECK INDICATION** **ETS ✓**	100 mmol bicarbonate (100 mL 8.4% solution) ***Contains 1 mmol sodium per 1 mmol bicarbonate*** (3)	100 mL (undiluted 8.4% solution)	4 to 8 hours (3)	-The 8.4% solution is hypertonic and highly irritant; extravasation may cause tissue necrosis. (3) Exempt from Pregnancy Categorisation **Preparation:** -Remove 150 mL from a 1000 mL bag of water for injections and add 150 mL sodium bicarbonate 8.4% solution and mix well. (3) -This gives an approximately isotonic solution of sodium bicarbonate 1.26% (54) **DERS Entries:** sodium bicarbonate 100mmol sodium bicarbonate 150mmol
sodium bicarbonate 1.26% "isotonic" *Peripheral* **CHECK INDICATION**	150 mmol (150 mL 8.4% solution) (27)	1000 mL **See Comments** *Water for Injections* (3) ***NB*** *water for injections may not be stored in medication rooms. Check AIRVO equipment storage locations.* *Also compatible with Glucose 5%* (3)	4 to 8 hours (3)	
sodium chloride 3% (hypertonic) **ETS ☐**	~50 mmol sodium (100 mL 3% solution) ~125 mmol sodium (250 mL 3% solution) ~500 mmol sodium (1000 mL 3% solution)	100 mL (pre-mixed bag) 250 mL (pre-mixed bag) 1000 mL (pre-mixed bag) **Use ONLY pre-mixed bags.**	Refer to Electrolyte Abnormalities: Hyponatraemia in Therapeutic Guidelines for rate of sodium replacement. **Recommended rate of change in serum sodium:** 4 to 8 mmol/L per day (4 to 6 mmol/L per day if additional risk factors present) (10)	-Rapid correction of hyponatraemia may produce permanent central nervous system injury due to osmotic demyelination. (10) -Check ABG and serum sodium every 2 hours (27) **Maximum rate of change in serum sodium:** ≤10 mmol/L in the first 24 hours (10) ≤18 mmol/L in the first 48 hours (10) **DERS Entries:** sodium chloride 3%
sodium DIHYDROGEN PHOSPHATE **CHECK ROUTE** **CHECK MEDICINE** **HIGH RISK MEDICINE**	10 mmol phosphate (3) 20 mmol phosphate (3) 40 mmol phosphate (3)	100 mL / 250 mL (3) 250 mL / 500 mL (3) *100 mL* / 500 mL / 1000 mL* (3) ***Sodium chloride 0.9%*** (3) *Glucose 5%* (3) *** 40 mmol/100 mL on consultant order via central access ONLY**	2 to 6 hours (3) Slower infusion rates are preferred to avoid phosphate intoxication (9) and improve patient response	Exempt from Pregnancy Categorisation See also: -potassium DIHYDROGEN PHOSPHATE -Specialised Medication – Intravenous Phosphate Supplementation in Adults Guideline **DERS Entries:** sodium dihy. phos. CENTRAL sodium dihy. phos. 10 periph. sodium dihy. phos. 20 periph. sodium dihy. phos. 40 periph.

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
sodium nitroprusside *CENTRAL*	100 mg [27] [28]	100 mL [27] [28] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 0.3 microg/kg/min then titrate to effect. [3] *approx. 0.018 mL/kg/hour* **Maximum rate:** 10 microg/kg/min may be used for up to 10 minutes [3] *approx. 0.6 mL/kg/hour*	**-Protect infusion bag from light and use within 24 hours.** [3] -Cover the bag with aluminium foil. An amber line is **NOT** required. [3] Discard the infusion if the colour changes, particularly to blue, green, or red. [3] -Avoid extravasation [3] -Continuous BP monitoring required. -Avoid abrupt withdrawal or cessation of infusion. [59] -Use IBW for dose calculations [27]
sodium nitroprusside *Peripheral*	50 mg [27] [28]	500 mL [27] [28] ***Glucose 5%*** [3] *Sodium chloride 0.9%* [3]	**Initially:** 0.3 microg/kg/min then titrate to effect. [3] *approx. 0.18 mL/kg/hour* **Maximum rate:** 10 microg/kg/min may be used for up to 10 minutes [3] *approx. 6 mL/kg/hour*	-Prolonged rapid or high-dose infusions can produce clinically significant methaemoglobinaemia and cyanide toxicity. [3] -Monitor blood cyanide levels if treatment >72 hours [27] [28] See: -MR170V WACHS Variable Rate Medication Chart (or approved local variant) **DERS Entries:** sodium nitroprusside CENTR sodium nitroprusside perhiph.
sodium valproate HIGH RISK MEDICINE	**Epilepsy / Bipolar Disorder:** 1 to 2 g (20 to 30 mg/kg) [4] **Status Epilepticus:** 40 mg/kg (maximum 3 g) [4] ***NB: in status epilepticus, doses may be given undiluted at a maximum rate of 10 mg/kg/min*** [3]	100 to 1000 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3] **Maximum concentration:** 8 mg/mL [9]	**Intermittent infusion:** 15 to 60 minutes [3] **Maximum rate:** 20 mg/minute [3] **Continuous infusion:** 1 to 2 mg/kg/hour [3] **Maximum dose:** 2500 mg/24 hours [9]	-Dizziness may occur a few minutes after injection, but will resolve within a few minutes [3] -Rapid administration into a peripheral line commonly causes pain and irritation [3] Pregnancy Category D **DERS Entries:** sodium valproate intermittent sodium valproate continuous sodium valproate LOAD
thiamine hydrochloride ETS ✓	100 to 500 mg [10]	100 mL [3] ***Sodium chloride 0.9%*** [3]	30 minutes [3]	-Compatible with glucose 5%, but not recommended as a diluent as this can further deplete thiamine stores and precipitate Wernicke encephalopathy. [3] Exempt from Pregnancy Categorisation **DERS Entries:** thiamine

Medicine *Qualifier*	**Amount in bag/syringe for initial therapy**	**Volume** ***Preferred*** */ Alt. Diluent*	**Time / Rate** *Equivalent rate*	**Comments**
thiopental sodium	940 mg [27] [28] **OR** 1000mg [27] [28] Prepare 2 vials (either 470 mg or 500 mg each depending on brand availability)	50 mL *(via syringe driver)* ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Initially:** 125 mg/hour then titrated to effect. [28] *approx. 6.65 mL/hour (using 940 mg/50 mL)* ***OR*** *approx. 6.25 mL/hour (using 1000 mg/50 mL)* **Usual range:** 0 to 300 mg/hour [27] *approx. 0 to 16 mL/hour (using 940 mg/50 mL)* ***OR*** *approx. 0 to 15 ml/hour (using 1000 mg/50mL)*	-Continuous cardiorespiratory monitoring required. [3] -Extravasation may cause tissue necrosis. -Boluses of 75 to 125 mg may be given [27] [28] via the programmed bolus function. -Levels can accumulate with prolonged infusion and may delay recovery. [27] [28] **DERS Entries:** thiopental
tranexamic acid ETS ✓	1 g [3]	100 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	20 minutes [3] A prolonged infusion over 8 hours may be indicated in some scenarios. [3] **Maximum rate:** 1 g over 10 minutes (100 mg/min) [3]	-Rapid administration may cause dizziness and hypotension [3] Pregnancy Category B1 **DERS Entries:** tranexamic acid tranexamic acid 1g
vasopressin	*See Argipressin*			
vecuronium PARALYSING AGENT HIGH RISK MEDICINE ETS ☐	**Maintenance infusion:** 10 mg [3]	**Maintenance infusion:** 50 mL [3] ***Sodium chloride 0.9%*** [3] *Glucose 5%* [3]	**Maintenance infusion:** 0.8 to 1.4 microg/kg/min [9] *approx.* *0.24 to 0.42 mL/kg/hour*	-Flush pre- and post- administration with 10 to 20 mL sodium chloride 0.9% to prevent inadvertent re-paralysis. [3] Pregnancy Category C -For patients being transferred or managed by RFDS, the preferred preparation is **20 mg in 20 mL *(via syringe driver).*** **DERS Entries:** vecuronium

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2.4 Guideline Information and Document Control

Colour Coding and Medication Flags

This guideline incorporates recommendations from several Australian Commission on Safety and Quality in Health Care (ACSQHC) standards:

- National Standard for User-Applied Labelling of Injectable Medicines, Fluids and Lines (60)
- National Mixed-Case Lettering List (61)
- Recommendations for terminology, abbreviations and symbols used in medicines documentation (62)
- National Guidelines for On-Screen Display of Medicines Information (63)

Flag	Rationale
INDUCTION AGENT BENZODIAZEPINE PARALYSING AGENT [1] OPIOID VASOPRESSOR [2] LOCAL ANAESTHETIC ANTICHOLINERGIC AGENT ANTIEMETIC	Colours as per National Standard for User Applied Labelling of Injectable Medicines, Fluids and Lines (ISO 26825:2008) (60)
BENZODIAZEPINE ANTAGONIST RELAXANT REVERSAL AGENT OPIOID ANTAGONIST HYPOTENSIVE AGENT	Colours as per National Standard for User Applied Labelling of Injectable Medicines, Fluids and Lines (ISO 26825:2008) (60) White diagonal stripes represent agents with an opposite action (including antagonists)
CHECK INDICATION	To assist in identification of medicines with multiple listings, where the dose, rate or volume may differ based on the **indication**.
CHECK ROUTE	To assist in identification of medicines with multiple listings where the dose, rate or volume may differ based on the **route of administration**.
CHECK MEDICINE	To assist in identification of medicines that may be misread due to similarities with medications listed in close proximity.
HIGH RISK MEDICINE	To assist in identification of medicines classified as High Risk in the WACHS High Risk Medications Procedure
S4R	To assist in identification of medications classified as Schedule 4 Restricted (S4R).
S8	To assist in identification of medications classified as Schedule 8 (S8).
ETS ✓ Stocked at all ETS-enabled sites / ETS ☐ May not be stocked at smaller ETS-enabled sites	To assist in identification of medicines that are on the Minimum Medication Stock List for ETS Sites. Regional variations exist, refer to Imprest Search on Formulary One.

1 suxamethonium appears as reverse plate letters within a black bar as per ISO 26825:2008
2 adrenaline (epinephrine) appears as reverse plate letters within a black bar as per ISO 26825:2008

Pregnancy Categorisations

In Australia, medications are categorised following the Australian Categorisation System for Prescribing Medicines in Pregnancy. Unlike the systems used in other jurisdictions, **this system is not hierarchical.**

- Human data are lacking or inadequate for medicines in the B1, B2 and B3 categories
- Subcategorisation of the B category is based on animal data
- The allocation of a B categorisation **does not** imply greater safety than a C categorisation
- Medicines in category D are not absolutely contraindicated during pregnancy.

Due to legal considerations in Australia, sponsor companies have, in some cases, applied a more restrictive category than can be justified based on available data.

Specialist medicines information for use in pregnancy can be found on the King Edward Memorial Hospital (KEMH) website.

Additional information and a database search tool can be found on the TGA website.

Category		TGA Definition
A		Medicines which have been taken by a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the fetus having been observed.
B		Medicines which have been taken only by a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect effect on the human fetus having been observed.
	1	Studies in animals have not shown evidence of an increased occurrence of fetal damage
	2	Studies in animals are inadequate or may be lacking, but available data show no evidence of an increased occurrence of fetal damage.
	3	Studies in animals have shown evidence of an increased occurrence of fetal damage, the significance of which is considered uncertain in humans.
C		Medicines which, owing to their pharmacological effects, have caused or may be suspected of causing, harmful effects on the human fetus or neonate without causing malformations. These effects may be reversible. Accompanying texts should be consulted for further details.
D		Medicines which have cause, are suspected to have caused, or may be expected to cause an increase incidence of human fetal malformations or irreversible damage. These medicines may also have adverse pharmacological effects. Accompanying texts should be consulted for further details.
X		Medicines which have such a high risk of causing permanent damage to the fetus that they should not be used in pregnancy or when there is a possibility of pregnancy.
Exempt		The Prescribing Medicines in Pregnancy Database does not include all medicines approved for use in Australia. Certain classes of medicines are exempted from receiving a pregnancy category.[64] Refer to the Product Information[9] or KEMH Guideline/Monograph for further information.

3. Roles and Responsibilities

Prescribers are responsible for the safe prescribing and monitoring of medicines. All orders must be documented, completely and unambiguously, on a WACHS endorsed medication chart. The chart must be completed in a printed or written form or by means of an endorsed electronic medication management (eMM) system for administration within the health service.

Nurses and midwives are responsible for the safe administration and monitoring of medicines.

Pharmacists are responsible for providing clinical review of medicines.

All staff are required to:

- work within their scope of practice appropriate to their level of training and job role responsibilities,
- support the safe prescribing, administration, and monitoring of medicines,
- work within policies and guidelines to make sure that WACHS is a safe, equitable, and positive place to be.

All staff are required to comply with the directions in WACHS policies and procedures as per their roles and responsibilities. Guidelines are the recommended course of action for WACHS and staff are expected to use this information to guide practice. If staff are unsure which policies procedures and guidelines apply to their role or scope of practice, and/or are unsure of the application of directions they should consult their manager in the first instance.

4. Monitoring and Evaluation

Adverse events and clinical incidents relating to medications are to be reported via the approved clinical incident management system (CIMS) e.g. DATIX, and managed as per the WACHS Medication Prescribing and Administration Policy and the MP 0122/19 Clinical Incident Management Policy. The WACHS Medication Safety Committee and local Medicines and Therapeutics Committees review clinical incident data relevant to medications.

This guideline will be reviewed as required to determine effectiveness, relevance, and currency. At a minimum it will be reviewed every five years by the WACHS Medication Safety Committee.

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 Clinical Documentation Policy.

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6. Definitions

Term	Definition
Critical Care Areas	High-acuity areas providing advanced medical care, such as Emergency Departments, High-Dependency Areas/Units, Intensive Care Units, Operating Theatres, and Post-Anaesthetic Care Units

List of Acronyms/Abbreviations

Acronym/ Abbreviation	Term	Acronym/ Abbreviation	Term
ABG	Arterial Blood Gas	**IBW**	Ideal Body Weight
ABW	Actual Body Weight	**ICP**	Intracranial Pressure
ACSQHC	Australian Commission on Safety and Quality in Health Care	**IM**	Intramuscular
AdjBW	Adjusted Body Weight	**INR**	International Normalised Ratio
aPTT	Activated Partial Thromboplastin Time (seconds)	**IOP**	Intraocular Pressure
BGL	Blood Glucose Level	**IV**	Intravenous
BP	Blood Pressure	**MAP**	Mean Arterial Pressure
CIMS	Clinical Incident Management System	**PCA**	Patient Controlled Analgesia
CK	Creatine Kinase	**PIVC**	Peripheral Intravenous Catheter
CPP	Cerebral Perfusion Pressure	**PVC**	Polyvinyl Chloride
CPR	Cardiopulmonary Resuscitation	**RASS**	Richmond Agitation Sedation Scale
CVC	Central Venous Catheter	**SAT**	Sedation Assessment Tool
DEHP	Diethylhexyl phthalate	**RR**	Respiratory Rate
DERS	Dose Error Reduction Software	**RSI**	Rapid Sequence Induction
ECG	Electrocardiogram	**TGA**	Therapeutic Goods Administration
ETS	Emergency Telehealth Service	**VF**	Ventricular Fibrillation
GCS	Glasgow Coma Scale	**VT**	Ventricular Tachycardia
HR	Heart Rate		

7. Document Summary

Coverage	WACHS-wide
Audience	Nursing, midwifery, medical and pharmacy staff
Records Management	Clinical: Health Record Management Policy
Related Legislation	*Medicines and Poisons Act 2014* (WA) Medicines and Poisons Regulations 2016 (WA) *Mental Health Act 2014* (WA)
Related Mandatory Policies / Frameworks	• MP 0077/18 Statewide Medicines Formulary Policy • MP 0131/20 High-Risk Medication Policy • MP 0175/22 Consent to Treatment Policy • Mandatory Standard for Intravenous Potassium

Related WACHS Policy Documents	• Acute Behavioural Disturbance in Emergency Departments Guideline
	  ○ WACHS ABD Tool 1: General Information
	  ○ WACHS ABD Tool 2: Legal Framework and Restrictive Practices
	  ○ WACHS ABD Tool 3: Assessment
	  ○ WACHS ABD Tool 4: De-escalation
	  ○ WACHS ABD Tool 5: Sedation
	  ○ WACHS ABD Tool 6: Disposition Planning and Considerations
	  ○ WACHS ABD Tool 7: Supporting Staff and Case Review
	• Acute Stroke Clinical Standards and Guidelines – Endorsed for Use in Clinical Practice Policy
	• Adult Diabetic Ketoacidosis Guideline
	• Diabetes – Inpatient Management Clinical Practice Standard
	• High Risk Medications Procedure
	• Hyperkalaemia Guideline
	• Imminent Unplanned Birth at a Non-Birthing Site Policy
	• Intravenous Opioid Administration Policy
	• Irukandji Syndrome Management Guideline
	• Maternity and Newborn Care Resources – Endorsed for Use in Clinical Practice Policy
	• Medication Prescribing and Administration Policy
	• Peripheral Intravenous Cannula (PIVC) Guideline
	• Peripheral Vasopressor Infusion Guideline - Adults
	• Potassium Supplementation Policy
	• Postpartum Haemorrhage Policy
	• Preterm Labour Policy
	• Procedural Sedation – Emergency Department Clinical Practice Standard
	• Snakebite Management Guideline
	• Use of Prismaflex® Continuous Renal Replacement Therapy using Citrate as an Anticoagulant Procedure – Bunbury Hospital

	• Use of Prismaflex® Continuous Renal Replacement Therapy using Heparin as an Anticoagulant or No Anticoagulant Procedure – Bunbury Hospital **Specialised Medication:** • Intravenous Glyceryl Trinitrate in Critical Care Areas Guideline • Intravenous Phosphate Supplementation in Adults Guideline
Other Related Documents	• Antidotes and Antivenom – Recommended Toxicology Critical Medicine Stockholding • Antidotes and Antivenom – Administration Guide • KEMH Hypertension and Pregnancy • KEMH Magnesium Sulfate for Neuroprotection of the Fetus • Minimum Medication Stock List for ETS Sites (TRIM Link) • Protocol for Intravenous Thrombolysis in Acute Ischaemic Stroke • RFDS Clinical Manual – Part 2: Medication Infusion Guidelines (v10.1) • WNHS Caesarean Birth • WNHS Hypertension in Pregnancy: Medical Management • WNHS Postpartum Complications • WNHS Preterm Labour Clinical Practice Guideline
Related Forms	• MR12A WACHS Sedation Assessment Tool (SAT) • MR72A WACHS Primary Post-Partum Haemorrhage Record • MR72E WACHS Pre-Eclampsia/Eclampsia Crisis Record • MR140 WACHS Medical Emergency Response – Code Blue Record • MR157A WACHS Insulin Infusion Order Chart • MR157B WACHS Adult Diabetic Ketoacidosis (DKA) Treatment & Monitoring Chart • MR170.5 WACHS PCIA-IV Opioid Infusion Prescription and Additional Observation Chart • MR170.6 WACHS PCIA-IV Opioid Infusion Continuation Sheet • MR170C WA Anticoagulation Medication Chart • MR170C.1 Heparin Infusion Nomogram (Fluid Restricted Patients) • MR170V WACHS Variable Rate Medication Chart • MR172A WACHS Tenecteplase Checklist • MR176 Intravenous Fluid Treatment
Related Training	Available from MyLearning: • High Risk Medications: Introduction (HRMINT EL2) • High Risk Medications: Insulin Declaration (HRMI EL2)

	• High Risk Medications: Anticoagulants Declaration (HRMA EL2)
Aboriginal Health Impact Statement Declaration (ISD)	ISD Record ID: 3395
National Safety and Quality Health Service (NSQHS) Standards	1.07, 1.27, 4.01, 4.04, 4.13, 4.15
Aged Care Quality Standards	Nil
Chief Psychiatrist's Standards for Clinical Care	Nil
Other Standards	Nil

8. Document Control

Version	Published date	Current from	Summary of changes
1.00	18 November 2024	18 November 2024	New guideline
2.00	12 November 2025	12 November 2025	• updated wording and formatting to improve readability when printed • addition of information to align with RFDS practice at patient transfer • updates to obstetric medication information as per WACHS OLG • additions and updates to ketamine infusion information • addition of vasopressor weight-based dosing recommendations as per SIPAG • removal of exclusion for Bunbury ICU.

9. Approval

Policy Owner	Executive Director Clinical Excellence
Co-approver	Executive Director Nursing and Midwifery
Contact	WACHS Director Pharmacy (Chief Pharmacist)
Business Unit	Clinical Excellence and Medical Services
EDRMS #	ED-CO-24-400131

The authors of the original version of this guideline wish to acknowledge the previous site-endorsed works that were used to compile this guideline:

- Intravenous Infusion Orders for Common Medications in the Emergency Department and Intensive care Unit Guideline (Bunbury Hospital, WACHS South West)
- Adult Resuscitation and Medical Emergency Drugs (Fiona Stanley Fremantle Hospitals Group, South Metropolitan Health Service)
- Common Orders for Continuous Intravenous Infusions in Critical Care Areas Clinical Guideline (Royal Perth Hospital, East Metropolitan Health Service)

This document can be made available in alternative formats on request.

Appendix A: Initial Rate Calculation Table

Initial Rate Calculations (values in mL/hour)													
Weight (kg) → / Rate (mL/kg/hour) ↓	30	40	50	60	70	80	90	100	110	120	130	140	150
0.015	0.45	0.6	0.75	0.9	1.05	1.2	1.35	1.5	1.65	1.8	1.95	2.1	2.25
0.017	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.7	1.87	2.04	2.21	2.38	2.55
0.025	0.75	1	1.25	1.5	1.75	2	2.25	2.5	2.75	3	3.25	3.5	3.75
0.03	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3	3.3	3.6	3.9	4.2	4.5
0.04	1.2	1.6	2	2.4	2.8	3.2	3.6	4	4.4	4.8	5.2	5.6	6
0.05	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5
0.06	1.8	2.4	3	3.6	4.2	4.8	5.4	6	6.6	7.2	7.8	8.4	9
0.07	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7	7.7	8.4	9.1	9.8	10.5
0.09	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9	9.9	10.8	11.7	12.6	13.5
0.1	3	4	5	6	7	8	9	10	11	12	13	14	15
0.12	3.6	4.8	6	7.2	8.4	9.6	10.8	12	13.2	14.4	15.6	16.8	18
0.15	4.5	6	7.5	9	10.5	12	13.5	15	16.5	18	19.5	21	22.5
0.17	5.1	6.8	8.5	10.2	11.9	13.6	15.3	17	18.7	20.4	22.1	23.8	25.5
0.19	5.7	7.6	9.5	11.4	13.3	15.2	17.1	19	20.9	22.8	24.7	26.6	28.5
0.25	7.5	10	12.5	15	17.5	20	22.5	25	27.5	30	32.5	35	37.5
0.3	9	12	15	18	21	24	27	30	33	36	39	42	45
0.375	11.25	15	18.75	22.5	26.25	30	33.75	37.5	41.25	45	48.75	52.5	56.25
0.38	11.4	15.2	19	22.8	26.6	30.4	34.2	38	41.8	45.6	49.4	53.2	57
0.5	15	20	25	30	35	40	45	50	55	60	65	70	75
0.6	18	24	30	36	42	48	54	60	66	72	78	84	90
2.5	75	100	125	150	175	200	225	250	275	300	325	350	375
5	150	200	250	300	350	400	450	500	550	600	650	700	750
6	180	240	300	360	420	480	540	600	660	720	780	840	900
10	300	400	500	600	700	800	900	1000	1100	1200	**1300**	**1400**	**1500**

Appendix B: Weight-Based Infusion Rate Calculation Guide

Medicine	Standard Order	Common Dose/Rate and Titrations	Patient Weight		
			60 kg	80 kg	100 kg
adrenaline (epinephrine) **VASOPRESSOR**	**CENTRAL** 6 mg in 100 mL **OR** 3 mg in 50 mL (0.06 mg/mL - *single strength*)	**Initial Rate:** 0.05 microg/kg/min [27] (use IBW [26])	3 mL/hour	4 mL/hour	5 mL/hour
		Example Titration: 0.01 microg/kg/min [27]	0.6 mL/hour	0.8 mL/hour	1 mL/hour
	Peripheral 3 mg in 500 mL (0.006 mg/mL)	**Initial Rate:** 0.05 microg/kg/min [27] (use IBW [26])	30 mL/hour	40 mL/hour	50 mL/hour
		Example Titration: 0.01 microg/kg/min [27]	6 mL/hour	8 mL/hour	10 mL/hour
clonidine	**CENTRAL / Peripheral** 1,200 microg in 100 mL **OR** 600 microg in 50 mL (12 microg/mL)	**Initial Rate:** 0.2 microg/kg/**hour** [27] (use IBW [26])	1 mL/hour	1.33 mL/hour	1.66 mL/hour
		Example Titration: 0.1 microg/kg/**hour** [27]	0.5 mL/hour	0.66 mL/hour	0.83 mL/hour
dexmedetomidine	**CENTRAL / Peripheral** 400 microg in 100 mL **OR** 200 microg in 50 mL (4 microg/mL - *single strength*)	**Initial Rate:** 0.2 microg/kg/**hour** [27] (use IBW [26])	3 mL/hour	4 mL/hour	5 mL/hour
		Example Titration: 0.1 microg/kg/**hour** [27]	1.5 mL/hour	2 mL/hour	2.5 mL/hour

Medicine	Standard Order	Common Dose/Rate and Titrations	Patient Weight		
			60 kg	80 kg	100 kg
DOBUTamine hydrochloride **VASOPRESSOR**	**CENTRAL** 500 mg in 100 mL **OR** 250 mg in 50 mL (5 mg/mL)	**Initial Rate:** 2.5 to 5 microg/kg/min [28] [3] (use IBW [26])	1.8 to 3.6 mL/hour	2.4 to 4.8 mL/hour	3 to 6 mL/hour
		Example Titration: 1 microg/kg/min [27]	0.72 mL/hour	0.96 mL/hour	1.2 mL/hour
	Peripheral 250 mg in 250 mL (1 mg/mL)	**Initial Rate:** 2.5 to 5 microg/kg/min [28] [3] (use IBW [26])	9 to 18 mL/hour	12 to 24 mL/hour	15 to 30 mL/hour
		Example Titration: 1 microg/kg/min [27]	3.6 mL/hour	4.8 mL/hour	6 mL/hour
DOPamine **VASOPRESSOR**	**CENTRAL** 400 mg in 100 mL **OR** 200 mg in 50 mL (4 mg/mL)	**Initial Rate:** 2 to 5 microg/kg/min [27] (use IBW [26])	1.8 to 4.5 mL/hour	2.4 to 6 mL/hour	3 to 7.5 mL/hour
		Example Titration: 1 microg/kg/min [27]	0.9 mL/hour	1.2 mL/hour	1.5 mL/hour
	Peripheral 200 mg in 500 mL (0.4 mg/mL)	**Initial Rate:** 2 to 5 microg/kg/min [27]	18 to 45 mL/hour	24 to 60 mL/hour	30 to 75 mL/hour
		Example Titration: 1 microg/kg/min [27]	9 mL/hour	12 mL/hour	15 mL/hour

Medicine	Standard Order	Common Dose/Rate and Titrations	Patient Weight		
			60 kg	80 kg	100 kg
noradrenaline (norepinephrine) VASOPRESSOR	**CENTRAL** 8 mg in 100 mL **OR** 4 mg in 50 mL (0.08 mg/mL - *single strength*)	**Initial Rate:** 0.05 microg/kg/min [27] (use IBW [26])	2.25 mL/hour	3 mL/hour	3.75 mL/hour
		Example Titration: 0.01 microg/kg/min [27]	0.45 mL/hour	0.6 mL/hour	0.75 mL/hour
	Peripheral 4 mg in 500 mL (0.008 mg/mL)	**Initial Rate:** 0.05 microg/kg/min [27]	22.5 mL/hour	30 mL/hour	37.5 mL/hour
		Example Titration: 0.01 microg/kg/min [27]	4.5 mL/hour	6 mL/hour	7.5 mL/hour
propOFol *Sedation in Intensive Care* INDUCTION AGENT S4R	**CENTRAL / Peripheral** 200 mg in 20 mL 500 mg in 50 mL 1000 mg in 100 mL (10 mg/mL)	**Initial Rate:** 1 to 3 mg/kg/**hour** [27]	6 to 18 mL/hour	8 to 24 mL/hour	10 to 30 mL/hour
		Example Titration: 0.1 mg/kg/**hour** [27]	0.6 mL/hour	0.8 mL/hour	1 mL/hour
remifentanil *Analgesia* OPIOID S8	**CENTRAL / Peripheral** 1 mg in 50 mL (0.02 mg/mL - *single strength*)	**Initial Rate:** 0.1 microg/kg/min [27]	18 mL/hour	24 mL/hour	30 mL/hour
		Example Titration: 0.025 microg/kg/min [27]	4.5 mL/hour	6 mL/hour	7.5 mL/hour
remifentanil *Sedation* OPIOID S8	**CENTRAL / Peripheral** 5 mg in 50 mL **OR** 10 mg in 100 mL (0.1 mg/mL)	**Initial Rate:** 0.1 microg/kg/min [27]	3.6 mL/hour	4.8 mL/hour	6 mL/hour
		Example Titration: 0.025 microg/kg/min [27]	0.9 mL/hour	1.2 mL/hour	1.5 mL/hour

Medicine	Standard Order	Common Dose/Rate and Titrations	Patient Weight		
			60 kg	80 kg	100 kg
sodium nitroprusside	**CENTRAL** 100 mg in 100 mL (1 mg /mL)	**Initial Rate:** 0.3 microg/kg/min [3] [27] (use IBW)	1.08 mL/hour	1.44 mL/hour	1.8 mL/hour
		Example Titration: 0.1 microg/kg/min [27]	0.36 mL/hour	0.48 mL/hour	0.6 mL/hour
	Peripheral 50 mg in 500 mL (0.1 mg/mL)	**Initial Rate:** 0.3 microg/kg/min [3] [27] (use IBW)	10.8 mL/hour	14.4 mL/hour	18 mL/hour
		Example Titration: 0.1 microg/kg/min [27]	3.6 mL/hour	4.8 mL/hour	6 mL/hour

Appendix C: Paediatric Medication Monograph Quick Links

The RFDS Clinical Manual – Part 2: Medication Infusion Guidelines (v10.1) includes limited information for preparation, administration and dosing of medication in paediatric patients. As the tertiary paediatric referral service in WA, the following PCH Monographs are the preferred reference source for use at WACHS Sites:

- Adrenaline (Epinephrine) – Paediatric
- Aminophylline – Paediatric
- Amiodarone – Paediatric
- DOBUTamine – Paediatric
- DOPamine – Paediatric
- Hypertonic Saline (Sodium Chloride 3% and 23.4%) – Paediatric
- Insulin – Paediatric
- Isoprenaline – Paediatric
- Ketamine – Paediatric
- Magnesium – Paediatric
- Metaraminol – Paediatric
- Midazolam – Paediatric
- Morphine – Paediatric
- Noradrenaline (Norepinephrine) – Paediatric
- Propofol – Paediatric
- Salbutamol – Paediatric
- Vecuronium – Paediatric